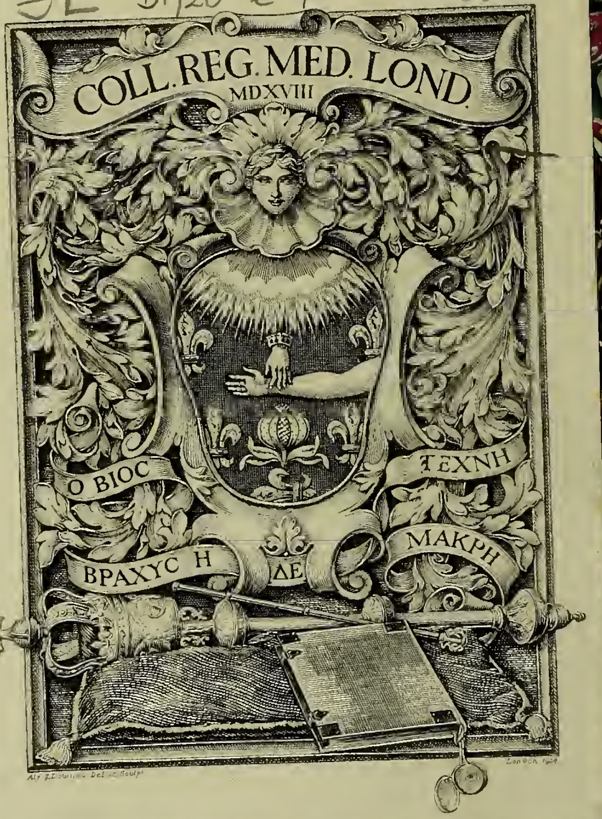
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THE

CYCLOPÆDIA;

OR,

Universal Dictionary

OF

ARTS, SCIENCES, AND LITERATURE.

VOL. IX.

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ARTS and SCIENCES.

COLLISION.

COLLISION, from the Latin *Collifio*, a breaking, knocking, or dafhing together, in *Philofophy* and in *Mechanics*, means the meeting, mutual ftriking, or congrefs, of two or more bodies, one of which at leaft is in motion. The collifions of bodies, and the refults arifing from thofe collifions, form by far the greateft part of the operations of nature, as well as of artificial mechanics; hence the induftry of man has fpared no pains in the inveftigation of the laws which regulate thofe motions, and in the performance of experiments tending to confirm and to illuftrate the fame. In the theory of collifion or percuffion, the fimpleft cafes are confidered firft, and fuch, indeed, as cannot actually take place in nature; for inftance, two bodies are fuppofed to move equally (that is, each of them, or one at leaft, to run through equal lengths in equal portions of time) in non-refifting mediums, and thofe bodies are farther fuppofed to be either hard, or foft, or elaftic. A hard body is that whofe parts retain their refpective fituation or figure in all cafes, not yielding to any ftroke or percuffion. A foft body is that whofe parts yield to any ftroke, and have no power to recover their original fituation; and laftly, an elaftic body is that whofe parts yield to any ftroke, but prefently regain their original form and fituation. Now, in nature, (as far as we know) there are no bodies perfectly elaftic or perfectly unelaftic; including under the latter name both thofe that are perfectly hard and thofe that are perfectly foft. All the bodies we are acquainted with are partially elaftic, but in various degrees; nor can their motions take place without meeting with fome obftruction. Yet the laws of collifion, under the above-mentioned fuppofitions, being demonftratively deduced from the general laws of motion, which are juftly affumed as axioms, determine the phenomena which would take place if thofe fuppofitions were real; it being afterwards more eafy and practicable to eftimate, and to allow for thofe deviations of practical refults from the abftract theory, which arife from the imperfect elafticity of bodies, from refiftances of mediums, from friction, &c.

The theory of collifion is derived from fir Ifaac Newton's third law of motion, which fays, that action and re-action are always equal and contrary to each other. See LAWS *of motion*.

Definition 1. *The refpective velocities or celerities of bodies are proportional to the fpaces which they defcribe in a given time.* Thus, if a body, A, paffes through an extenfion of 10 feet in one fecond of time, whilft the body, B, runs through an extenfion of 100 feet in the fame time, then the refpective celerities of thofe bodies are faid to be as 10 to 100; or as one to ten.

Def. 2. *The bodies are faid to ftrike directly againft each other, when in ftriking, there occurs no reafon why they fhould turn towards one fide rather than towards another; fo that both before and after the ftroke, the motion is in the fame ftraight line, unlefs it be all deftroyed.*

Def. 3. *In every other cafe the ftroke is faid to be oblique.* The principal propofition belonging to this theory, confiders two bodies that ftrike directly againft each other, and the refult is concifely expreffed by fir Ifaac Newton in the following words: "the quantity of motion, that is gathered by taking the fum of the motions made towards the fame part, and the difference of thofe made towards the contrary parts, is not altered by the action of bodies amongft themfelves." For the fake of perfpicuity we fhall endeavour to demonftrate this propofition, by confidering the two cafes feparately.

Strahan and Prefton,
New-Street Square, London.

Theorem I.

If a body, A, (Plate XV. Mechanics, fig. 1.) ſtrike directly againſt another body, B, which is either at reſt, or moving in the ſame direction, but ſlower; the ſum of the motions in both the bodies towards the ſame parts, will remain the ſame after the ſtroke, as it was before that ſtroke.

Let C D expreſs the motion of the body A, and E F the motion of the body B; *viz.* that whilſt A moves from C to D, B moves from E to F. Therefore, the ſum of the motions is C D plus E F. Now, ſince it moves with greater velocity than B moves with, it neceſſarily follows, that A muſt overtake, and ſtrike againſt B. And it will appear, that after the ſtroke the ſum of the motions is the ſame as it was before, *viz.* C D plus E F. For ſince action and re-action are equal (3 l law of motion), if A, by ſtriking on B, communicates to it the additional motion F G; it muſt loſe as much itſelf; *viz.* D K (equal to F G) muſt be ſubtracted from C D. So that after the ſtroke, C K is the motion of A, and E G that of B; and the ſum of thoſe motions is C K plus E G, equal to C D plus E F; for, ſince F G is equal to D K, add E F and C K to both, and it will be F G + E F + C K equal to K D + C K + E F; *viz.* E G + C K = C D + E F.

The various caſes of this propoſition are as follow: If F G is equal to C D, then K and C coincide, and C K vaniſhes or becomes equal to nothing (as in *fig.* 2.); hence, after the ſtroke, A will be at reſt.

If F G exceed C D; then K will fall beyond C; and the motion of A will become retrograde or negative (as in *fig.* 3.) Therefore, the ſum of the motions towards the ſame part is the difference between E G and C K; *viz.* E G minus C K.

If B ſtood at reſt, then its motion becomes equal to o, and in that caſe the ſum of the motions is reduced to C D.

Theorem II.

If two bodies, moving towards contrary parts, ſtrike directly againſt each other, the ſum of their motions towards the ſame parts (which is the difference of their motions towards contrary parts) before and after the ſtroke, will always remain the ſame towards the ſame parts.

Let the body, A (*fig.* 4.), move from C towards D, and let C D repreſent its motion, whilſt the body, B, moves in a contrary direction from E towards F, and let E F repreſent its motion.

Make D H equal to E F; then C H is the difference of the motions towards the contrary parts, and is, at the ſame time, the ſum of the motions towards the ſame part; *viz.* towards G. Now, after the ſtroke, the ſame, C H, will be as the ſum of the motions towards the ſame part, *viz.* towards G.

Let the motion of B, after the ſtroke, be towards G, and let it be repreſented by E G. Therefore, the force communicated to B is F E plus E G, that is, F G. But (by the 3d law of motion) making D K equal to F G, D K will repreſent the motion loſt by A; ſo that if D K be ſubtracted from C D, the remainder, C K, will be the motion of A towards G. Now, ſince D K is equal to F G, and D H is equal to F E; it will be D K minus D H, (*viz.* K H), equal to F G minus F E (*viz.* E G). Therefore, ſince K H is equal to E G; K H will repreſent the motion of B after the ſtroke, and C K will repreſent the motion of A; ſo that C K plus K H is equal to C H, and is the ſum of the motions of both the bodies towards G.

If F G is equal to C D (as in *fig.* 5.); then K and C coincide, conſequently the motion of A becomes equal to *o*.

If F G exceeds C D (as in *fig.* 6.) K will fall beyond C, and the motion of A will be retrograde; but (ſince F G is equal to D K, and F E to D H) K H will be equal to E G; therefore, taking C K from both, C H will be equal to E G minus C K. But C H was as the ſum of the motions towards G before the ſtroke, and E G minus C K is as the ſum of the motions towards the ſame part; namely, as the difference of the motions towards the contrary parts after the ſtroke. Therefore, the ſum of the motions towards the ſame part will be the ſame both before and after the ſtroke.

Having demonſtrated the two ſimpleſt theorems belonging to the doctrine of colliſion, wherein the equality of the motions before and after the ſtroke has been conſidered, it is now neceſſary to examine the direction, the velocity, and the momentum of the bodies after the ſtroke; and for this purpoſe the properties of the centre of gravity muſt be recollected.

But, that property of the centre of gravity, which is more immediately concerned with the preſent ſubject, is briefly expreſſed in the following lines:

If bodies, moving in the ſame ſtraight line, ſtrike againſt each other, the ſtate of their common centre of gravity will not thereby be altered; viz. it will either remain at reſt, or it will continue to move in the ſame ſtraight line, exactly as it moved before the ſtroke. See Center *of Gravity*.

Theorem III.

Let there be two non-elaſtic bodies (viz. either perfectly hard or perfectly ſoft); and if one of them move in a ſtraight line, whilſt the other is at reſt in that line, or is moving in the ſame direction, but at a ſlower rate, or is moving in the contrary direction; then thoſe bodies muſt ſtrike directly againſt each other, and after the ſtroke they will either remain at reſt, or they will move on together, conjointly with their common centre of gravity.—Their momentum, after the ſtroke, will be equal to the ſum of their momentums before the ſtroke, if they both moved in the ſame direction; but it will be equal to the difference of their momentums if they moved in contrary directions.—Their velocity, after the ſtroke, will be equal to the quotient that ariſes from dividing the ſum of their momentums, if they both moved the ſame way, or the difference of their momentums, if they moved contrary ways, by the ſum of their quantities of matter.

That, after the ſtroke, the two bodies muſt either remain at reſt or move on together, is evident; for, ſince they are not elaſtic, there exiſts no power that can effect their ſeparation. With reſpect to the momentum, it muſt be obſerved, that where the bodies meet (by the 3d law of motion), whatever part of the momentum is loſt by one of the bodies, muſt be acquired by the other; therefore, if before the ſtroke the bodies moved the ſame way, their joint momentum, after the ſtroke, will be equal to the ſum of their momentums before the ſtroke. If one of the bodies was at reſt, then, as its momentum is equal o, the joint momentum will be equal to the momentum of the other body before the meeting. If the bodies moved towards each other, then their momentum, after the meeting, will be equal to the difference of their former momentums; and if in this caſe their momentums are equal, then their difference vaniſhes; that is, the bodies will remain at reſt after their meeting.

The laſt part of the theorem is evident; for the momentum of a body in motion is equal to the product of the velocity multiplied by the quantity of matter. See Momentum.

The

The weights and velocities of the two bodies before their meeting being given, the velocity, after the meeting, may be determined by the following method, which is applicable to the four cafes of *figs* 7, 8, 9, and 10. Let A and B be the two bodies, C their common centre of gravity, and D the place of their meeting. Make D E equal to D C, fo that the point, D, may be between C and E; then D E will reprefent the velocity after their meeting; for, fince the bodies, after their meeting, move together conjointly with their common centre of gravity; and the centre of gravity has the property mentioned immediately before the third theorem; it follows that the velocity of their common centre of gravity after their meeting, muft be equal to its velocity before the meeting; *viz.* D E muft be equal to C D, and is the fame as the velocity of the two bodies after the meeting, becaufe, then, they move together with the centre of gravity.

Fig. 7. fhews when the bodies move the fame way. *Fig.* 8. fhews the body, B, at reft before the ftroke, in which cafe B and D coincide. In *fig.* 9. the two bodies move towards each other; and *fig.* 10. fhews the two bodies moving towards each other with equal momentums, in which cafe they will remain at reft after the meeting. In all thofe four figures, the refpective velocities of the bodies are reprefented by A D and B D, and A B is their difference. The refpective momentums are reprefented by the product of the weight of A multiplied by A D, and of the weight of B multiplied by B D. The momentum after the meeting is reprefented by the weights of both the bodies multiplied by D E.

Example of the computation of the firft cafe, fig. 7.—Let A weigh 10 lb. and move at the rate of 4 feet per minute. Let B weigh 6 lb., and move at the rate of 2 feet per minute, and let the diftance A B be 32 feet. The centre of gravity is found by faying $16 : 32 :: 10 : BC = \frac{32 \times 10}{16} = 20$ feet; hence $AC = 12$ feet. Put $BD = x$, and AD will be equal to $32 + x$. Then the time employed by A in moving from A to D, is equal to the quotient of the fpace, $32 + x$, divided by its velocity; *viz.* $= \frac{32 + x}{4}$. And the time employed by B in moving from B to D, is equal to the quotient of the fpace, x, divided by the velocity of B, *viz.* $= \frac{x}{2}$. But, fince the bodies meet at D, thofe times muft be equal; that is, $\frac{32 + x}{4} = \frac{x}{2}$; and by the refolution of this fimple equation, we have $64 + 2x = 4x$; and $x = 32 = BD$.

Then $DE = DB + BC = 32 + 20 = 52$ feet; *viz.* after the meeting, the two bodies will move from D to E, which are 52 feet apart, in as much time as each of them employed in going to D; *viz.* 16 minutes. Therefore, in order to find how many feet per minute the bodies will run over after the meeting, divide 52 by 16, and the quotient, $3\frac{1}{4}$, is the anfwer.

The magnitude or quantity of the ftroke is deduced from the third general law of motion, and from the nature of the momentum of a body in motion, which is equal to the product of the quantity of matter, or weight of the body, multiplied by the velocity, confequently in the fame body the momentum is proportionate to the velocity. The particulars relative to the magnitude of the ftroke, are expreffed in the following theorem.

Theorem IV.

If a body in motion ftrike directly againft another body, the magnitude of the ftroke is proportional to the momentum loft, at the concourfe, by the more powerful body. Alfo when the latter body is at reft, the quantity of the ftroke is proportional to the velocity of the former body.—If the fecond body be moving in the fame direction with the firft, but at a flower rate, the magnitude of the ftroke will be the fame as if the fecond body ftood ftill, and the firft impinged upon it with a velocity equal to the difference of their velocities.—And, laftly, if the bodies move directly towards each other, the magnitude of the ftroke is the fame as if one of the bodies ftood at reft, and the other ftruck it with the fum of their velocities.

Thus much may fuffice with refpect to the congrefs or collifion of non-elaftic bodies. It is now neceffary to ftate the particulars belonging to the congrefs of elaftic bodies; *viz.* of thofe whofe parts yield to any impreffion, but frequently recover their fituation, by re-acting the contrary way with a force, which, in bodies perfectly elaftic, is equal to the impreffion or ftroke received. There are innumerable degrees of elafticity. See Elasticity.

Theorem V.

When two bodies, that are perfect elaftic, ftrike directly againft each other, their relative velocity (by which is meant the excefs whereby the velocity of the fwifter body exceeds that of the flower) *will be the fame before and after the ftroke; viz. they will recede from each other with the fame velocity with which they approached before the ftroke.*

The magnitude of the ftroke (Theor. IV.) is proportional to the refpective velocities. And in bodies that are perfectly elaftic, the reftoring force is equal to the compreffing one; therefore, if the momentums of the bodies produced a certain compreffion, the elaftic force muft re-act on the bodies with equal power; hence the bodies will be forced to recede from each other with the fame velocity with which they approached each other.

From what has been ftated above, the refults arifing from the congrefs of bodies that are perfectly elaftic, may be eafily deduced in all the variety of cafes in which the two bodies may be conceived to meet. The particulars upon which thofe refults more immediately depend, are, firft, that the diftances of two bodies from their common centre of gravity are inverfely as their weights; (fee Center *of Gravity* and its properties); fecondly, that the ftate or the uniform motion of the centre of gravity of bodies is not altered by the mutual action of thofe bodies on each other; thirdly, that in bodies that are perfectly elaftic, the reftoring is equal to the compreffing force; and fourthly, that the diftances of the bodies from each other, and from their common centre of gravity, are equal in equal times taken before and after the ftroke; for in thofe two cafes they move with equal velocities.

All the cafes of direct congrefs of two perfectly elaftic bodies are delineated in the figures 11, 12, 13, 14, 15, 16, 17, 18, and 19, in which A and B reprefent the two bodies; C is their common centre of gravity, D the place where they meet. A D expreffes the velocity of A, B D the velocity of B, and C D that of the centre of gravity. Hence by infpecting the figures it will be eafily difcerned when both the bodies are in motion, or one of them is at reft; alfo their directions, &c. Then the rule for determining the velocities after the ftroke is as follows:—Take a point E in the line A B, produced if neceffary, fo that the diftance C E be equal to C D; then, after the ftroke, the right line E A will

exprefs

exprefs the velocity of the body A from E towards A, and the right line E B will exprefs the velocity of B from E towards B.

In *fig.* 11, B is larger than A, (which is plainly indicated by the fituation of the centre of gravity C), B is at reft, and A ftrikes againft it. In this cafe, after the ftroke, both the bodies will recede from the point D, with the velocities E A and E B.

In *fig.* 12, A, the larger body, runs againft the body B, which is at reft. In *fig.* 13, the body A is larger than B, and they are both in motion the fame way. In *fig.* 14, A is lefs than B; the reft as in the preceding cafe. In *fig.* 15, A and B meet at D, where A remains at reft. In *fig.* 16, A and B are equal, and after the ftroke they recede with interchanged velocities. In *fig.* 17, the bodies are proportional to their velocities; hence the points C, F, D, and E, coincide. In *fig.* 18, A remains ftationary at the place of congrefs D. Laftly, in *fig.* 19, though the bodies A and B meet at D between the points A and B, yet after the ftroke they both move towards F.

The numerical computation of thofe cafes may be eafily comprehended by the following example, which is adapted to the cafe of *fig.* 13.

A and B are two elaftic bodies. A weighs 2 lb., and moves at the rate of 8 feet per fecond. B weighs 1 lb., and moves the fame way at the rate of 5 feet per fecond. The diftance A B is 12 feet.

1. To find the place of the centre of gravity C, we have $A + B : B :: AB : CA$; *viz.* $3 : 1 :: 12 : 4$; fo that $AC = 4$, and $CB = AB - AC = 8$.

2. To find the diftance BD, put $BD = x$; and fince the diftances A D and B D are run over in the fame time, the former at the rate of 8, and the latter at the rate of 5 feet per fecond; therefore we have $\frac{x}{5} = \frac{x + 12}{8}$; hence $8x = 5x + 60$; and $3x = 60$; or $x = 20 = BD$.

3. If the diftance B D; *viz.* 20, be divided by the velocity of B (*viz.* by 5); the quotient 4, is the number of feconds, during which the bodies moved from their refpective places A and B, to the place of their congrefs D.

4. $EC = CD = CB + BD = 8 + 20 = 28$; and $EA = EC - AC = 28 - 4 = 24$; which being divided by 4 (the number of feconds found above) gives 6 for the velocity of A after the ftroke, in the direction from E towards A. Alfo $EB = EC + CB = 28 + 8 = 36$; which being divided by 4 (the number of feconds, &c.) gives 9 for the velocity of B after the ftroke in the direction from E towards B. So that after the ftroke, the bodies A and B will both continue to move the fame way, but the former at the rate of 6, and the latter at the rate of 9 feet per fecond.

It is now neceffary to apply the above theory to thofe cafes which really occur in nature, and in the firft, fince all known bodies are partially elaftic, we muft fhew how to eftimate the refults of the collifion of fuch bodies. Thus, let A and B, *figs.* 20 and 21, be two bodies imperfectly elaftic, C their common centre of gravity, and D the place of their meeting. Divide AC in *a*, fo that AC may be to *a*C, as the force compreffing the body, A, is to the force whereby it reftores itfelf. Alfo divide BC in *b*; fo that BC may be to *b*C as the force compreffing the body B is to the force whereby it reftores itfelf. Take CE equal to CD; then the right line E*a* will exprefs the velocity of A after the ftroke in the direction from E towards *a*, and the right line E*b* will exprefs the velocity of B after the ftroke in the direction from E towards D.

In the foregoing paragraphs the diftances have been reckoned from the centres of the bodies; but fince the bodies muft ftrike with their furfaces, and not with the centres, therefore, when great accuracy is required, the thickneffes of the bodies muft be deducted from the diftances. However, when the diftances are confiderable, and the fizes of the bodies proportionately very fmall, it is immaterial whether the diftances be reckoned from the centres or from the furfaces of the bodies; the difference becoming infignificant.

When more than two bodies move in the fame ftraight line, the computation of the velocity of each body after the various ftrokes cannot be expreffed under any general rules; the variety of cafes being too great, and often very intricate: yet when any particular cafe prefents itfelf, the preceding rules will be found fufficient to determine the particulars; obferving to apply the computation to the two bodies which, from the circumftances of the cafe, appear to ftrike firft, then to one of thofe and the next, and fo forth. But fometimes the equality of the bodies, their being contiguous to each other, and other favourable particulars, render the calculation pretty eafy and obvious. Thus, if any number of equal and perfectly elaftic bodies lie at reft, contiguous to each other in the fame ftraight line, and another body, equal to one of them, ftrike the firft of them in the fame ftraight line, with any velocity; then after the ftroke the ftriking body and all the reft will remain motionlefs, and the laft body only will move on with the velocity of the ftriking body.

If the movements, inftead of being equable, as we have hitherto fuppofed, be either accelerated or retarded, the momentum for each fingle fmall portion of time, muft be reckoned fuch as belongs to the velocity acquired at that particular moment. In curvilinear movements, the direction of the motion in each point is the fame as that of the tangent to the curve at that point. Laftly, if the movements, either accelerated or retarded, be likewife curvilinear (as in the vibration of pendulums;) the momentum for each fingle point muft be deduced from the degree of acceleration and from the direction of the tangent, at that particular point.

Hitherto we have confidered the collifion of bodies, which ftrike directly againft each other; that is, in a direction perpendicular to their furfaces, and in the direction of their centres. It is now neceffary to treat of oblique collifion; for which purpofe the doctrine of the compofition and refolution of forces, or of movements, muft be previoufly known. See *Compofition and refolution of* FORCES.

THEOREM VI.

If a body, perfectly elaftic, as A, fig. 22, *ftrike obliquely at* C *on the firm obftacle* B F, *then, after the ftroke, this body will be reflected from that obftacle in the direction* C E, *in fuch a manner as to form the angle of reflection* E C F, *equal to the angle of incidence* A C B.

The oblique force, A C, being refolved into two forces, *viz.* D C perpendicular to the obftacle, and A D parallel to it; the effect on the plane is the fame as if the body had advanced towards it directly from D, and (according to the laws already ftated) the body A, after the ftroke, would be fent back in the direction C D. But of the two forces into which the original force of A was refolved, this body retains the one reprefented by A D, fince this force was not concerned in ftriking the obftacle; therefore, after the ftroke, the body, A, is actuated by two forces, *viz.* one reprefented by C D, equal to A B, equal to E F; and the other reprefented by C F, equal to D A, equal to D E; hence it muft move in the diagonal C E; and fince the lines C F, F E,

F E, are refpectively equal to the lines C B, B A, and the angles at B and F are equal, being right angles; therefore the triangle, E F C, is in every refpect equal to the triangle A C B; confequently the angle of reflection, E C F, is equal to the angle of incidence A C B.

It evidently follows, from this propofition, that the force of an oblique ftroke is to that of the fame ftroke coming in a perpendicular direction, as the line of the angle of incidence is to radius.

If the body, inftead of ftriking upon a plane ftrikes upon a curve furface, the effect is the fame as if it ftruck on a plane, tangent to that furface at the ftriking point.

This being premifed, the application of the foregoing rules to the oblique collifion of bodies will be illuftrated by the following examples.

Let two non-elaftic bodies A and B, *fig.* 23, move, the former in the direction A C, the latter in the direction B D, and let them meet at C D. Draw the line, M G, through their centres, and through the point of contact. From A and B, *viz.* the original fituation of thofe bodies, drop A M and B N perpendicular on M G. Then the force of each body may be refolved into two forces, *viz.* that of A into A M and M C; and that of B into B N and N D. Of its two forces, A retains the force A M, whilft M C is exerted againft the other body. Of the two forces of the body B, the force B N is retained by it, whilft the force N D is exerted againft the other body. Therefore, the actions of thofe bodies upon each other is exactly the fame as if they moved directly one from M and the other from N; hence the above ftated rules of direct collifion, will ferve to find out whether the bodies, after the ftroke, will proceed both the fame way, or different ways, and at what rate. But when their velocities have been thus determined; for inftance, if it be found, that had the bodies moved directly from M and N after the ftroke, the body, A, would have moved as far as O, whilft the body, B, would have moved as far as G; then it muft be recollected, that, in the prefent cafe of oblique collifion, the body, A, has retained the force A M; therefore, after the ftroke, the body, A, is actuated by two forces, *viz.* one equal and parallel to A M, and another which is equal and parallel to C O, in confequence of which this body muft run a compound courfe, which is found thus: Through the centre, C, draw C I equal and parallel to A M; through I, draw I E equal and parallel to C O, then the diagonal C E exhibits the velocity and the direction of the body, A, after the oblique concourfe. With refpect to the body, B, it has been faid, that at the concourfe this body retains the force B N, and that, if the bodies had moved directly towards each other, B would, after the ftroke, have moved from D to G. Therefore, through D draw D H equal and parallel to B N, and through H draw H F equal and parallel to D G; and, laftly, the diagonal, D F, will reprefent the velocity and the direction of the body, B, after the oblique concourfe.

If the bodies be perfectly elaftic, then fuppofe it be found (by the rules for elaftic bodies) that, after the fuppofed direct concourfe, the body, A, would have been fent back to Q, in the fame time that B would have been fent back to R; it follows, that after the oblique ftroke, the body, A, will be actuated by two forces, *viz.* one equal and parallel to A M, and the other equal and parallel to C Q. The body, B, will likewife be actuated by two forces, *viz.* one equal and parallel to B N, and the other equal and parallel to D R; therefore, in *fig.* 24, draw Q Z through Q, equal and parallel to A M; alfo through Z draw I Z equal and parallel to C Q; then the diagonal, C Z, reprefents the direction and the velocity of the elaftic body, A, after the oblique ftroke.—Again, through R draw the line, R X, equal and parallel to B N, and through X draw the line, X Y, equal and parallel to D R, then the diagonal, D X, will reprefent the velocity and the direction of the elaftic body, B, after the oblique ftroke.

Amongft all the cafes of collifion, we have hitherto omitted to mention the ftriking of a body upon an immoveable obftacle. This has been done merely becaufe the particulars belonging to it may be eafily derived from the confideration of the foregoing cafes; it being only neceffary to confider this cafe as if it were that of the collifion of two bodies, either elaftic or non-elaftic, or partially fo, and to fuppofe that one of the bodies, which reprefents the immoveable obftacle, is infinitely great.

There is a difference between the ftroke of an elaftic body, and that of a non-elaftic one, which, not being very obvious, deferves to be mentioned. This is, that the effect of the blow of an elaftic body upon another body, as upon a plane, is double to that of a non-elaftic body, their maffes and velocities being equal. This arifes from the elafticity of the former, which, after the ftroke, by endeavouring to recover its original figure, acts upon the plane with a force equal to the firft impreffion; whereas a non-elaftic body acts only with the firft impreffion. See the article PERCUSSION. Alfo, if the reader wifh to fee the original inveftigation of the laws belonging to the collifion of bodies, together with any analytical and experimental illuftration of the fame, he may perufe Dr. Wallis's paper in the Phil. Tranf. No. 43; Mr. Huygens's paper, Phil. Tranf. No. 46; fir Chrift. Wren's paper, Phil. Tranf. No. 43; Gravefande's Mat. Elem. of Nat. Phil. edited by Defaguliers; Gregory's Mechanics, vol. i. chap. v.; and all the beft works on mechanics.

COLLIUS, PETER, in *Biography*, of the college of Milan, flourifhed in the beginning of the feventeenth century, and was the author of a curious treatife entitled "De Animalibus Paganorum," printed at Milan in two vols. 4to. in the years 1622-3. In this work he decides without hefitation on the future happinefs or mifery of many virtuous and truly illuftrious characters of the Pagan world. His conclufions were founded on conjectures, deduced from a comparative view of their means of divine knowledge, their lives and manners, their opinions and writings, united with the teftimony of facred and profane hiftory. He publifhed alfo a treatife "De fanguine Chrifti," and a quarto volume entitled "Conclufiones Theologicæ." In them all is a great difplay of fingularity, accompanied with a good fhare of talents. Nouv. Dict. Hift.

COLLIWILY, in *Geography*, a town of the ifland of Ceylon; 50 miles W. of Trincomaly.

COLLMEN, or CULLMEN, a town of Germany, in the circle of Upper Saxony, and circle of Leipfick; 6 miles E.N.E. of Mutfchen.

COLLOBRIE'RES, a town of France, in the department of the Var, and chief place of a canton, in the diftrict of Toulon; 18 miles N. E. of Toulon. The place contains 1509, and the canton 2933 inhabitants: the territory includes $322\frac{1}{2}$ kiliometres, and two communes.

COLLOCOCCUS, in *Botany*, Sloan. See CORDIA *Collococca*.

COLLON, in *Geography*, a poft and fair town of the county of Louth, Ireland, which is neat and well built; and which has improved confiderably under the aufpices of the late lord chief baron Fofter, and his fon the right honourable John Fofter, the much refpected fpeaker of the Irifh houfe of

of commons, when the union took place. It is 29 Irish miles N. from Dublin.

COLLONGE, a town of France, in the department of Lèman, and chief place of a canton, in the district of Genève; the place contains 1178, and the canton 8947 inhabitants: the territory comprehends $212\frac{1}{2}$ kiliometres, and nine communes.

COLLOPS, in *Ancient Geography*, an appellation distinguishing two towns of Africa; the one called "Collops Parva," appears to have been the same with *Cullucitanæ*, situate E. of the Sinus Numidicus; the other, called "Collops Magna," was, according to Ptolemy, the same with *Cullu*, and situated N.W. of the same gulf.

COLLOQUIA, in *Ecclesiastical History*, a name given in Swisserland to assemblies of the protestant Grison clergy. Each league is divided into a certain number of districts, the ministers of which assemble twice every year; and these assemblies are called *colloquia*. Each colloquium has its president, and each league a superintendent, called a dean. The supreme authority in spiritual concerns is vested in the synod, which is composed of the three deans, and the clergy of each league; the synod assembles every year alternately in each of the three leagues. Candidates for holy orders are examined before the synod. The necessary qualification for admission into the church, ought to be the knowledge of Hebrew, Greek, and Latin; but many are ordained without the least acquaintance with either of these languages. Formerly Latin was solely used, as well in the debates of the synod, as for the purpose of examining the candidates; but at present that tongue is more and more disused, and German is employed in its stead. See GRISONS.

COLLOQUIUM, in *Law*, *(a colloquendo)*, a talking together, or affirming of a thing, laid in declarations for words in actions of slander, &c.

COLLUCIANISTÆ, in *Church History*, a designation given to the Arians, from the martyr Lucian, a presbyter of Antioch.

COLLUM, in *Anatomy*. See NECK, and CERVIX.

COLLURIO, in *Ornithology*, the name given by Brisson to the *Lanius Collurio* of the Linnæan *Fauna Suecica*; red backed shrike of English writers.

COLLURIO *madagascariensis*, of Brisson, the hook-billed shrike, *lanius curvirostris*.

COLLUSION, a secret understanding between two parties, who plead, or proceed, fraudulently against each other, to the prejudice of a third. This collusion is either apparent, when it shows itself on the face of the act; or more commonly, it is secret and artfully concealed by a show of honesty. This is a practice which the law abhors; and, therefore, when detected, it makes void all things dependent upon it, though otherwise in themselves good. Co. Litt. 109. 360. Plowd. 54. Collusion may sometimes be tried in the same action, wherein the covin is, and sometimes in another action, as for lands aliened in mortmain by a *quale jus*; and where it is apparent, the proof of it is unnecessary; but when it is secret, it must be proved by witnesses, and found by a jury like other matters of fact. 9 Rep. 33. The statute of Westm. 2. 13 Ed. I. c. 33. gives the writ *quale jus*, and inquiry in these cases; and there are several other statutes relating to deeds, made by collusion and fraud. The cases particularly mentioned by the statute of Westm. 2. are of *quare impedit*, *assise*, &c. which one corporation brings against another, with intent to recover the land or advowson, for which the writ is brought, held in mortmain, &c. See FRAUD.

In the canon law, collusion, in matters of benefices, vacates the benefice, and incapacitates the person from holding any benefice at all.

COLLUTHIANS, in *Ecclesiastical History*, a religious sect, which rose about the beginning of the fourth century; on occasion of the indulgence shewn to Arius by Alexander, patriarch of Alexandria.

Several people being scandalized at so much condescension; and, among the rest, Colluthus, a priest of the same city; he hence took a pretence for holding separate assemblies, and by degrees proceeded to the ordination of priests, as if he had been a bishop; pretending a necessity for this authority, in order to oppose Arius. To his schism he added heresy; teaching, that God did not create the wicked; that he was not author of the evils that befal men, &c.—He was condemned by a council held at Alexandria by Osius, in the year 330.

COLLUTHUS, in *Biography*, a presbyter of Alexandria, was founder of the temporary Christian sect, at the beginning of the fourth century, above mentioned. By the decrees of the council held by Osius, Colluthus was despoiled of the episcopal honours with which he had invested himself, and the presbyters whom he had ordained were degraded. Colluthus submitted to the decree, and returned quietly to the duties of his office as a parochial presbyter; his followers likewise re-united themselves to the orthodox church. Nouv. Dict. Hist.

COLLUTION, *Collutio*, in *Medical Writers*, is sometimes used for the washing of the mouth, particularly, when done to clean or fasten bad or loose teeth; or free the gums, &c. from ulcers.

COLLUVIES, a term which Calcott and other writers on the universal deluge have applied to the fluid mass, into which, according to their opinion, the strata of the antediluvian earth were dissolved, and their constituent corpuscles separated. See DELUGE.

COLLYBUS, Κολλυβος, in *Antiquity*, the same with what is now called the rate of exchange.

COLLYRÆ, or COLLYRIDES, a certain ornament of hair, worn by women on their necks. It was made up in the form of the small, roundish, cakes, called κολλυραι, *collyræ*.

COLLYRIDIANS, in *Church History*, a sect, towards the close of the fourth century, denominated from a little cake, called by the Greeks κολλυριδιαι, *collyridia*, which they offered to the Virgin Mary.

This sect, it seems, consisted chiefly of Arabian women, who brought it from Thrace to Arabia, and who, out of an extravagance of devotion to the Virgin, met on a certain day in the year, to celebrate a solemn feast, and to render divine honours to Mary as to a goddess; eating the cake which they offered in her name.—St. Epiphanius, who relates the history of this superstitious ceremony, ridicules it. They sprung up in opposition to the Antidico-Marianites.

COLLYRIUM, κολλυριον. This term was formerly applied, to any medicament, solid, or liquid, employed to restrain defluxions; but it is now entirely confined to wet applications, topically applied for this purpose in complaints of the eyes.

COLLYRIUM is also a name given to unguents used for the same purpose; as unguent of tutty, and several others.

COLLYRIUM is also a denomination given, though improperly, to some liquid medicines used against venereal ulcers.

COLLYRIUM *Samium*. See SAMIA *terra*.

COLLY-WESTON *Slate*, a whitish kind of micaceous grit

grit ſtone, which ſplits into very thin laminæ, and is much uſed for ſlating of buildings in the eaſtern and ſome of the midland counties of England; it is the produce of a ſtratum ſituated not far in the ſeries from the Oolite or Ketton ſtone, ſo well known to builders. In this ſtratum, particularly near Stonesfield, in Oxfordſhire, bones of animals of ſome unknown kind are frequently found lodged. See SLATE.

COLM, in *Geography*, a ſmall iſland of Scotland, in the Frith of Forth, ſix miles S.E. of Dumferline.

COLMAN, GEORGE, in *Biography*, an Engliſh writer, was the ſon of Mr. Thomas Colman, Britiſh reſident at the court of the duke of Tuſcany. He was born at Florence about the year 1733. He received his ſchool education at Weſtminſter; and was entered as ſtudent at Chriſt-church, Oxford, where he engaged with Bonnel Thornton, in writing "the Connoiſſeur," a periodical paper of conſiderable merit, which was afterwards publiſhed in four volumes, 12mo. This work is remarkable for the humorous delineations of the manners of the age, and diſplays claſſical reading and taſte. On leaving the univerſity he entered at Lincoln's Inn, and was in due courſe called to the bar, but never followed his profeſſion. In 1760, he produced two dramatic pieces which were received with great ſucceſs, the firſt was entitled, "Polly Honeycombe," and the other "the Jealous Wife;" this laſt ſtill keeps its place on the ſtage. In 1764, lord Bath died and left Mr. Colman a handſome annuity, which was increaſed on the death of general Pulteney, in the year 1767. In conjunction with Garrick, he brought out the "Clandeſtine Marriage," a comedy of great merit, and which maintains an undiminiſhed reputation. In 1768, he purchaſed a ſhare of the Covent Garden theatre; this, however, he ſoon diſpoſed of, and purchaſed Mr. Foote's theatre in the Haymarket, which he held till his death in 1794, though he had for the five preceding years been incapable of any buſineſs, owing to a paralytic ſtroke with which he was ſeized in 1789, and which affected his underſtanding in ſuch a manner as to bring on derangement and idiocy. Mr. Colman tranſlated Terence's plays into a ſort of blank verſe: alſo "Horace's Art of Poetry," which added to his reputation as a claſſical ſcholar. In 1787, he collected, in three ſmall volumes, a variety of pieces which he had publiſhed at different times, under the title of "Proſe on ſeveral occaſions, accompanied with ſome pieces of verſe." Gen. Biog.

COLMAR, in *Geography*, a town of Germany, in the duchy of Holſtein, five miles S.E. of Gluckſtadt.

COLMAR, a large and well built town of France, and capital of the department of the Upper Rhine, ſeated on the river Fecht, and ſurrounded by a wall, flanked with towers. It has a prefect and four courts of juſtice. The town contains 13,396, and the canton 14,429 inhabitants; the territory includes 55 kiliometres, and two communes; $10\frac{1}{2}$ leagues N. of Bâle. The principal trade of the inhabitants of Colmar, who are ſaid to be very induſtrious, is in corn, and wine; and their chief manufactures are thoſe of woollen cloth, callico prints, ſtockings, hardware, and gun-powder. The diſtrict conſiſts of 142 communes or townſhips, diſtributed into 13 cantons, and comprehending a population of 144,821 inhabitants. Its whole territory includes 1680 kiliometres. It has ſilver, copper, lead, antimony, arſenic, and beautiful cryſtal mines; and alſo a manufacture of gold and lace. N. lat. 48° 4′ 44″. E. long. 7° 22′ 11″.

COLMARS, a town of France, in the department of the Lower Alps, and chief place of a canton, in the diſtrict of Caſtellane; 22 miles N. of it. The place contains 898, and the canton 3585 inhabitants; the territory includes 285 kiliometres and five communes.

COLMBERG, or KOLBENBERG, a town of Germany, in the circle of Franconia, and principality of Anſpach; 9 miles N.W. of it.

COLME, LA, a river of France, branching from the river, AA, at Watte, in the department of the ſtraits of Calais.

COLMENAR, a town of Spain, in Old Caſtile, on the confines of New Caſtile; 7 leagues N.W. of Talavera de la Reina.—Alſo, a town of Spain in New Caſtile, five leagues N.E. of Eſcurial.

COLMITZ, a town of Germany, in the archduchy of Auſtria, four miles S.S.W. of Droſſendorf.

COLMWORTH, a rectory in the county of Bedford, and hundred of Barford: the lofty ſpire of its ſteeple forms a very conſpicuous object to the ſurrounding country. In the Government Trigonometrical Survey in 1799, its ſituation was determined by obſervations from Lilley-Hoe ſtation, diſtant 97,617 feet, and bearing 0° 12′ 52″ S.E. from the parallel to the meridian of Greenwich; and from Lidlington ſtation 75,944 feet; whence is deduced its latitude 52° 12′ 49″.3 N. and its longitude 22′ 27″, or 1^{m} 29^{s}.8 W. of Greenwich.

COLN, a river of England, which paſſes by Uxbridge and Colnbrook, and runs into the Thames, near Staines, ſeparating the county of Middleſex from Buckinghamſhire. The clearneſs and purity of the water of this river, iſſuing almoſt entirely in ſprings out of the chalk hills of Hertfordſhire, have always been proverbial. This circumſtance probably occaſioned the cutting, at ſome diſtant periods, of two channels many miles in length, for diverting part of its waters acroſs Hownſlow-heath to Twickenham, and into Buſhey-park; and a very principal part of the deſign of the Paddington branch of the Grand Junction Canal, in latter times, was for diverting part of its limpid ſtreams, in order to ſupply the metropolis with water, to which purpoſe it is admirably adapted.

COLN, a river of Eſſex, which is navigable from the mouth of the Thames at Merſey iſland up to the town of Colcheſter. See CANAL.

COLN, a river which runs into the Thames at Cricklade.

COLNBROOK, a town of England, in the county of Bucks, on the river Coln, with a weekly market on Wedneſday, three miles E. of Windſor, and 17 W. from London.

COLNE, a conſiderable market-town of Lancaſhire, England, is advantageouſly ſituated on a dry and elevated ridge. This place, ſays Dr. Whitaker, "is unqueſtionably the *colunio* of the anonymous Ravennas, and was probably never abandoned entirely, in the long and obſcure period of Saxon hiſtory." At this place, there have been ſeveral Roman coins, and other antiquities found. The church is a ſpacious ſtructure, and appears to have been "reſtored about the time of Henry VII or VIII." Here are a market on Wedneſday, and two annual fairs. Colne is 218 miles N. of London, and contains 782 houſes, with 3626 inhabitants. This town is ſituated in the hundred of Blackburn, near to the grand ridge on its weſtern ſide, and alſo to the Leeds and Liverpool canal, and to the famous Foulridge tunnel upon it. It was once an object of contemplation to conduct a branch of the Rochdale canal to this town; but it was never accompliſhed. Whitaker's Hiſtory of Whalley, 4to. See CANAL.

COLNUD, *de Cayenne*, of Buffon, in *Ornithology*, the bare-necked crow, *corvus nudus*.

COLOMBAUDE, the name given by Buffon to *motacilla atricapilla*, or black cap.

COLO, in *Geography*, a town of Poland, in the palatinate of Kaliſch, 20 miles N. of Kaliſch.

COLO, in *Ancient Geography*, a Roman colony, near the city

city of Conſtantina, in the kingdom of Algiers, in Africa; the ruins of it now remain, having a caſtle on a very high rock towards the ſea-coaſt, with a garriſon, under the command of an aga; under the protection of which is a ſmall French factory, that deals with the Moors for hides, wax, and wool. The mountains of Colo abound with a large and fierce kind of monkeys, which the Moors have the art of catching with great facility.

COLOBI, a people of Africa, placed by Ptolemy in the Troglodytic territory.

COLOBIUM, Κολοβιον, from κολοω, *I mutilate*, among the *Ancients*, an upper garment, without ſleeves, longer than the tunic.

COLOBOMA, in *Medical Writers*, is uſed for the preternatural growing together of the lips, or eyelids, or for the adheſion of the ears to the head.

COLOBON PROMONTORIUM, in *Ancient Geography*, a promontory of Ethiopia, near Egypt, placed by Strabo and Ptolemy in the Arabic gulf.

COLOBONA, a town of Spain, in Bætica, placed by Pliny in the diſtrict of Hiſpalis: now Trebuxena.

COLOBRASUS, a town of Aſia, ſituate in the interior part of Cilicia Montana, which, according to Ptolemy, was a country of Pamphylia.

COLOCASIA, in *Botany*, Cluſ. See ARUM *Colocaſia*.

COLOCASITES, in *Ancient Geography*, an iſland of the Red ſea, on the coaſt of Azania, a country of Ethiopia, according to Pliny.

COLOCOLO, in *Ornithology*, a name given by the people of the Philippine iſlands, to a bird called alſo there *caſſili*, and by ſome authors the *water raven*, corvus fluviatilis. This bird, as it is deſcribed in the Philoſophical Tranſactions (n. 285.) "is of the ſhape of a common raven, but is truly an amphibious bird, living more of its time under water than in the air; it is black in colour; its neck is remarkably long, and it feeds on fiſh, which it hunts under water, as they do one another; it feeds likewiſe on frogs, ſerpents, and ſhell fiſh. It is common to ſee it under water in clear rivers, where it ſeems perfectly at eaſe, and runs about with great ſwiftneſs; at times it comes up to the ſurface, and dries its wings in the air and ſunſhine." It is underſtood by naturaliſts pretty generally, that the colocolo of the Philippines is no other than the common corvorant, *pelecanus carbo*, a bird known to inhabit moſt parts of the world, and to delight eſpecially in maritime ſituations, or in marſhes, and other watery places, near the ſea-coaſt.

COLOCYNTHIS, COLOQUINTIDA, *Bitter Apple*, in the *Materia Medica*. The colocynth is a ſpecies of gourd (*cucumis colocynthis*, Linn.) brought from Aleppo and Cyprus, of a globular ſhape, about the ſize of the fiſt, white, ſmooth, of a fungous texture, divided internally into large cells, which contain a number of oblong ſeeds.

The pulp, which is the part uſed medicinally, is intenſely bitter, nauſeous, and acrid. It contains a remarkably large portion of mucilage, ſo as to render ſlimy a conſiderable quantity of water when boiled with it; and, on this account too, the ſpirituous tincture is too thick to paſs through a paper filter.

The colocynth, taken in ſubſtance, without any mixture or preparation, is one of the moſt violent purgatives that we are acquainted with, producing, when in a large doſe (that is, when more than eight or ten grains), very ſevere griping pains, and often a diſcharge of blood, and leaving for ſome days ſymptoms reſembling thoſe of dyſentery. It is ſaid, too, to act upon the bowels when applied externally to the abdomen.

The activity of the colocynth renders it a valuable medicine, when uſed with caution. It is ſeldom or never employed by itſelf, but is mixed with aloes, and other purgatives, and much adds to their efficacy.

The only preparation of it retained in the London Pharmacopœia, is the extract (*extractum colocynthidis compoſitum olim ext. catharticum*), which is prepared by digeſting in proof ſpirit, colocynth, aloes, ſcammony, and cardamom ſeeds, and afterwards evaporating the tincture to the proper conſiſtence. This is one of the moſt certain and powerful purgatives we are acquainted with, and generally operates without much griping or inconvenience. It may be properly combined with calomel, if neceſſary, or, in caſes of ſpaſmodic pain of the bowels, with opium.

COLOCYNTHIS, in *Botany*. Tourn. Bauh. Pin. Ray. Moris. See CUCUMIS *colocynthis*.—Plum. See TRICHOSANTHES *amara*.

COLOCZA, in *Geography*, a town of Hungary, on the Danube, the ſee of an archbiſhop. This was formerly an important place, but it is now ſunk into decay, in conſequence of repeated wars; 136 miles S.E. of Vienna. N. lat. 46° 33′. E. long. 18° 36′.

COLODI, a town of Italy, in the republic of Lucca; 7 miles from Lucca.

COLOE, in *Ancient Geography*, a marſh of Ethiopia, according to Ptolemy, which, he ſays, was the ſource of the river Aſtapus.—Alſo, a town, ſituated, according to Ptolemy, in the interior of Ethiopia; but, according to Arrian, it was a maritime town, and carried on a conſiderable commerce in ivory.

COLOEPHRYGES, a people of Greece, in Bæotia, called alſo *Anticondyles*, according to Steph-Byz.

COLOEPHRYX MONS, a mountain of Bæotia. Heſychius.

COLOES, *Enli Gheul*, a lake of Aſia Minor, in Lydia, according to Strabo; called *Gigæa* by Homer. It was two leagues, or 40 ſtadia, to the N.E. of Sardes. Diana, ſurnamed *Coloëne*, had a temple on the bank of this lake, ſurrounded by the tombs of the kings of Lydia, and, among others, that of Aliattes, deſcribed by Herodotus, and compared by him with the grandeſt works of the Babylonians and Egyptians.

COLOGENBAR, a town of Aſia, ſituate near the Euphrates, and the town of Edeſſa.

COLOGNA, in *Geography*, a town of Italy, in the Paduan; 15 miles from Vicenza.

COLOGNE, PETER DE, in *Biography*, a proteſtant miniſter at Metz, in the 16th century. He was born at Ghent, and educated at Paris, from whence, at the advice of Robert Stevens, he retired to Geneva, to avail himſelf of the inſtructions of John Calvin, who perſuaded him to devote his life to the work of the miniſtry. He embarked in the proteſtant cauſe with great zeal and ardour, and the ſuperiority of his talents above thoſe of his contemporaries, recommended him to the peculiar friendſhip of Calvin and Beza. He commenced his miniſterial functions at Metz, in the year 1558, where he continued in the exerciſe of them either openly, or from houſe to houſe, in a private way, during the reigns of Francis II. and Charles IX. In the performance of his duty, he was occaſionally ſubjected to the miſeries of impriſonment and exile, until the diſperſion of the proteſtant church at Metz, in 1659. From this town he went to Heidelberg, where he undertook the charge of a congregation, and where he died while he was a young man. He was the author of ſome original works, and tranſlated others from the German into the French language, but, as they were moſtly on temporary ſubjects, it is not neceſſary to enumerate them. Nouv. Dict. Hiſt.

COLOGNE,

Cologne, in *Geography*, an archi-epifcopal electorate of Germany, in the circle of the Lower Rhine, divided into feveral diftricts by other eftates, and deriving its name from the city of Cologne. It was a bifhopric in the year 314, and, in 799, was erected into an archbifhopric by Charlemagne. In the ancient conftitution of Germany, the archbifhop affumed the title of born legate of the holy fee, and arch-chancellor of the facred empire for Italy. He gave his vote after the elector of Treves, and fat at the right hand of the emperor, at affemblies held in his own diocefe, in Gaul, or in Italy The metropolitan church, and chapter, which is compofed of 25 canons, and 36 dignitaries, are at Cologne. Since the French revolution, and the fubfequent arrangement of its territories, Cologne is a diftrict of Roer, or Roor, comprehending 10 cantons, *viz.* Cologne, Bergheim, Bruhl, Dormagen, Elfen, Juliers, Kerpen, Lechnich, Wayden, Zulpich, which include 294 communes, 1375 kiliometres, and 137,215 inhabitants. Although this electorate is reckoned one of the moft fertile countries of Europe, the bigotry, ignorance, and idlenefs of its inhabitants, who are moftly Roman Catholics, prevent its deriving thofe advantages from its productions, and particularly its commerce, which might reafonably be expected.

Cologne, the capital of the archbifhopric above mentioned, and formerly one of the free and imperial cities of Germany, in the circle of Weftphalia. It was taken poffeffion of by the French in 1794, and is now the capital of the diftrict that bears its name in the French department of Roer, and is faid to contain 38,844 inhabitants. Cologne is fituated, in the form of a crefcent, on the banks of the Rhine, and fortified in the ancient manner; but its walls are in fo decayed and tottering a ftate, that they are incapable of affording it any defence. The whole of its length, along the river, is about 3½ miles, two-thirds of which fpace is uninhabited; feveral of the fquares and ftreets more refembling a field, or an uncultivated garden, than parts of an inhabited city. In traverfing its environs one may obferve more than 150 miferable farm-houfes, with gardens, which furnifh the city with all forts of greens, butter, cheefe, milk, &c. The ftreets are narrow, winding, and gloomy, and moft of the houfes are very high, old, and ruinous; and yet this city is faid to contain, within its compafs, more churches, chapels, and monafteries, than there are days in the year. The Roman Catholic univerfity fcarcely merits the appellation. The number of beggars that difgrace its police is very great, and it is faid, that the propenfity to idlenefs, gluttony, and begging, which prevails through the city and adjacent country, is fanctioned and encouraged by the example of the different orders of monks; whofe chief object is to keep the people, who, with the exception of a few Proteftant families, are Roman Catholics, in a ftate of ignorance and fuperftition. Two-thirds of the inhabitants are either profeffed beggars, or ecclefiaftics. The other third confifts of a few patricians, merchants, and mechanics, on the produce of whofe exertions and induftry the reft live.

Cologne, upon the whole, is at leaft two centuries behind the other parts of Germany, with regard to improvement in the arts and fciences. Although no city in Germany is more favourably fituated for commerce, the natural bigotry and idlenefs of the inhabitants lead them to forego the benefits which their fituation affords them; and their trade has dwindled away to the manufacture of a few ribbands, ftockings, lace, and tobacco. The veffels that may be always feen in the port of Cologne are very numerous; the quay, more than 1½ mile long, is continually crowded with fhips; but the goods on board are almoft wholly the property of foreign merchants. About a fortnight before the fair at Frankfort begins, there is a great concourfe of thefe merchants at Cologne, who repair daily from thence to Frankfort, by means of two commodious veffels containing from 150 to 200 paffengers, which perform this voyage every other day during the fair. The Jews were expelled from Cologne in the year 1485, and from that remote period not one of them has ever obtained leave to fettle there, or dared even to enter the city without permiffion of the magiftrate. Under the old police, if a Jew came into the city, he was accompanied by a guard during his ftay, and obliged to pay a ducat for every hour of his continuance there. In the year 1618, the Proteftants were alfo expelled, but fome years after they obtained permiffion to return. The magiftrates indeed gave them leave to erect a place of worfhip, which was deftroyed by the infatuated mob as foon as it was finifhed. Since that event they have erected for themfelves feveral handfome churches at Miilheim, three miles from Cologne, on the right bank of the Rhine. The trifling commerce of Cologne has been confined to a few Proteftant families ever fince the period of their return, who, it is obferved, are the only opulent inhabitants of the place. The wealth of the churches at Cologne, at leaft before it was taken poffeffion of by its new occupiers, was immenfe, particularly that of the cathedral. Thefe churches are repofitories of various relics that are held in high eftimation by the fuperftitious catholics. The theatre is a roomy building, but not elegant. The town-houfe is an irregular ftone edifice, aukward and in a ruinous ftate. The arfenal occafions part of a very narrow ftreet; its contents are chiefly ancient arms, not proper for modern ufe; and the building itfelf is in a ftate of decay. The dealers of Nuremberg and Augfburg bring their toys in large quantities to Cologne for exportation to Holland, England, and America. The Spaniards and Portuguefe carry on a very profitable trade with them in both the Indies. The inhabitants of Cologne derive a very confiderable advantage from the importation of coals out of the adjacent countries of Berg, the electorate of Treves, the principalities of Saarbruck, and duchy of Deuxponts, which come by the Saar down the Mofelle and the Rhine, and fupply the want of wood-fuel, that is very fcarce about Cologne. Some of thefe coals are round and large, and another fort confifts of duft, which is mixed with clay and water, and formed into fmall cakes, manufactured in fummer; and which, being gradually hardened by the heat of the fun, are ftored up in large magazines erected for that purpofe. Thefe coal-cakes are fold at 12 ftivers (about 1 *s.* Englifh money) per hundred; and it is faid, that 100 of them will go as far as three bufhels. Near this city fome pfeudo-volcanic remains have been traced, which are thought to be fuch as are mentioned by Tacitus at the clofe of the 13th book of his Annals, the effects of fubterranean fire which ravaged the country of the Juhones. N. lat. 50° 55′ 21″. E. long. 6° 55′.

Cologne, a town of France, in the department of Gers, and chief place of a canton, in the diftrict of Lombès; fix leagues E. of Auch. The place contains 769, and the canton 6096 inhabitants; the territory comprehends 117½ kiliometres, and 17 communes.

Cologne *Earth*, a fubftance ufed in painting, as a water colour, much approaching to amber in its ftructure, and of a deep brown. It has generally been efteemed a genuine earth, but has been difcovered to contain a great deal of vegetable matter, and, indeed, it is a very fingular fubftance.

It never conftitutes an entire ftratum in the earth, but is lodged among other ftrata in large flat detached maffes. It is moderately dry, while in the earth, and of a foft crumbly

crumbly texture. When dried, it is of a deep, duſky brown, of a very cloſe, compact, and fine texture, and very remarkably light; it is of a ſmooth, even ſurface, dry, but not harſh to the touch, crumbles eaſily to pieces between the fingers, and ſlightly ſtains the hands; it adheres firmly to the tongue, but not at all reſembling the aſtringency of the boles, or any thing elſe of the mineral kingdom, but plainly reſembling the taſte of oak bark. It makes no effervefcence with acids; if thrown into water, it ſwims on the ſurface, till thoroughly wetted; and if brought into contact with burning coals, it takes fire and burns of itſelf, till reduced to yellowiſh aſhes.

It is eaſy to diſcern from this account, that, though this is generally eſteemed an earth, and known to the world by no other name, it is no pure native foſſil, but contains more vegetable than mineral matter, and owes its origin to the remains of wood which has been long buried in the earth. It is dug in Germany and France; the quantities conſumed in painting, in London, are brought from Cologne, where it is found very plentifully; but our own kingdom is not without it, it being found near Birmingham, and on Mendip hills in Somerſetſhire; but what has been yet found there is not ſo pure or fine, as that imported from Cologne. Hill's Hiſt. of Foſſils, p. 64. and Da Coſta's Hiſt. of Foſſils, p. 121.

COLOGNOLI, in *Geography*, a town of Italy, in the duchy of Tuſcany; 6 miles E. of Leghorn.

COLOKITIA, or KOLOKITIA, a town of European Turkey, on the ſouthern coaſt of the Morea, in a gulf to which it gives name; 25 miles S.E. of Miſitra. N. lat. 36° 47′. E. long. 22° 34′.

COLOMAY, a town of Poland, in the palatinate of Red Ruſſia; 5 miles N.E. of Halecz.

COLOMBA, in the *Materia Medica*. See COLUMBO.

COLOMBEL, NICOLAS, in *Biography*, a French painter who was born in 1646, at Sotteville near Rouen, and became the ſcholar of Le Sueur, under whom he ſtudied ſeveral years; he then went to Italy, where he aſſiduouſly copied the works of Raffaelle and Nicolo Pouſſin; but though he enjoyed every advantage of education, and laboured to form his ſtyle upon the model of thoſe great maſters, the poverty of his genius ever appeared; and his pictures, though correctly drawn and carefully finiſhed, generally wanted that elevation of thought and ſtriking expreſſion, which can alone give value to hiſtoric painting. However, in 1682, he ſent four pictures which he had painted at Rome to Paris, and thereby gained ſufficient reputation to cauſe his being choſen a member of the Academy upon his return to Paris in 1694. One of his moſt eſteemed pictures is an "Orpheus playing on his Lyre," in the apartment of the menagerie in the royal palace. He died in the year 1717. D'Argenville.

COLOMBES, in *Geography*, a town of France, in the department of Paris, and chief place of a canton, in the diſtrict of St. Denys; 1½ league N.W. of Paris.

COLOMBEY, a town of France, in the department of the Meurthe, and chief place of a canton, in the diſtrict of Toul; 15 miles S.W. of Nancy. The place contains 858 and the canton 12,887 inhabitants; the territory includes 315 kiliometres and 32 communes.

COLOMBIEN, DE, in *Biography*. See VALENTINE.

COLOMBIER, in *Geography*, a town of France, in the department of the Upper Saone, and chief place of a canton, in the diſtrict of Veſoul; four miles N. E. of Veſoul.

COLOMBIER, a town of Swiſſerland, in the principality of Neuchatel; two miles S.W. of Neuchatel.

COLOMBIERE, CLAUDE DE LA, in *Biography*, a celebrated French jeſuit, was born near Lyons, in which city he proſecuted his ſtudies, devoting moſt of his time to rhetoric and theology. Of the former branch of ſcience he became a profeſſor, and in the latter he was diſtinguiſhed as a popular and impreſſive preacher. In this character he was noticed at the court of the duke of York, afterwards James II. of England, being made chaplain and confeſſor to the ducheſs, until he was baniſhed under ſuſpicion of being engaged in a conſpiracy. He returned to his native country in the year 1682, where he died at the age of 41. Colombiere publiſhed ſix volumes of ſermons, which are elegant, pious, and ſimple; they have been often reprinted. He publiſhed alſo a "Collection of Orations" in Latin, delivered by the author as profeſſor of rhetoric; a volume of "Moral Reflections;" two volumes of "Spiritual Letters;" and "A Syſtem and Office for the Solemnity of the Worſhip of the Heart of Jeſus," which the jeſuits employed a conſiderable time in every Catholic country, as a powerful inſtrument in favour of the papal cauſe. Patru, a well known writer, deſcribes Colombiere as one who thoroughly underſtood the niceſt refinements of the French language. Nouv. Dict. Hiſt.

COLOMBINI, COSIMO, an engraver of Florence, who engraved a great part of the portraits of painters inſerted in the magnificent work of the "Muſeum Florentinum." He flouriſhed about 1754. Strutt. Heinecken.

COLOMBONI, DON ANGIOL MARIA, a very celebrated painter of miniature and natural hiſtory, was born at Gubbio in the year 1608, and at a very early period of life became a monk of the order of Mount Oliveto. He made conſiderable progreſs in literature, and in the mathematics, and publiſhed at Bologna, in the year 1669, a book on ſun-dialling, entitled "Pratica Gnomonica, ovvero Tavole, colle quali ciaſcuno agevolmente puo far da ſe gli Orologi da Sole." But he was not leſs admired for his miniatures, and for his excellent drawings of herbs, flowers, and birds, which he drew with ſuch taſte and correctneſs, and finiſhed with ſuch extraordinary delicacy and ſoftneſs, that he was ſtyled the Giovanni da Udine of his time, and the great Guercino uſed to call him the Raffaelle of his profeſſion. He left two volumes of theſe drawings of birds, in which not only the beautiful colours and the delicacy of the plumage were admirably repreſented, but, what was more extraordinary, each appeared exactly in the attitude moſt uſual to it or moſt characteriſtic. He ſpent great part of his life in Bologna, highly eſteemed, and died in the place of his nativity in the year 1672. Baldinucci.

COLOMBRARO, in *Geography*, a town of Naples, in the province of Baſilicata; 4½ miles S.S.W. of Turſi.

COLOMIES, PAUL, in *Biography*, was born at Rochelle; he embraced the Proteſtant religion, and followed his friend Iſaac Voſſius into England, where he attached himſelf to the cauſe of epiſcopacy, and even attacked the party among whom he had been educated, in a work entitled "Theologorum Preſbyterianorum Icon," which raiſed him many enemies. He was, however, rewarded by being made librarian at Lambeth, and reader at the epiſcopal French church in London. Here he died in January 1692, leaving the reputation of great ſkill in bibliography. He was author of "Gallia Orientalis," in 4to. which was an account of Frenchmen eminent for oriental learning; of a ſimilar work reſpecting Italy and Spain, with many others of conſiderable note at the time in which he flouriſhed. Bayle.

COLOMNA, FABIUS. See COLUMNA.

COLON, in *Anatomy*, from κοιλος, *hollow*; is a name applied to the greater part of the large inteſtine. See INTESTINE.

COLON,

Colon, in *Grammar*, a point, or character, formed thus (:) serving to mark a pause, and to divide the members of a period. See Pointing. See also Period, Comma, and Semicolon.

Grammarians generally assign the use of a colon to be to mark the middle of a period; or to conclude a sense less perfect than the dot, or period: but a sense less perfect than the period, is an expression extremely vague and indeterminate.

Others say, a colon is to be used when the sense is perfect, but the sentence not concluded: but neither is this sufficiently clear and express. Add to this, that in practice, our best writers confound the colon with the semicolon.

F. Buffier attempts to fix the use of the colon; but he does not much distinguish it from the semicolon: he prescribes the use of either, indifferently, and calls them by a common name, *intermediate pointings;* as being mediums between the comma, and full point, or period. Their use, according to this author, is to distinguish the supernumerary members of a period. By supernumerary members are meant such as the precedent ones do not raise any expectation of; *i. e.* such parts as have indeed a dependence on what goes before, even though what goes before has a complete sense, independent hereon: v. gr. "the Augustan age was so eminent for good poets, that they have served as models to all others: yet did it not yield any good tragic poets;" where the supernumerary member, and the use of the colon, are obvious. The most obvious and sensible use of the colon, he adds, is, when the supernumerary member is distinguished by some conjunction; as, "notwithstanding, however, but, except that, unless, inasmuch as, yet, since, the rather as, provided that," &c. Some, indeed, use the colon in the middle of long periods, without any regard to supernumerary members: which custom was probably introduced to mark, that the breath is here to be taken almost as much as in a common period, in the place where the supernumerary period commences. But this, at best, is arbitrary; and the intermediate pointings may always be omitted in a period, if there be no supernumerary member, *i. e.* if there be no subsequent member, but what is expected from the precedent. As to the occasions where the colon is to be used, rather than the semicolon, there is nothing precise to be said of it; except that the colon shews the supernumerary member more detached, and sets it at a greater distance from the rest; and therefore marks a longer pause than the semicolon.

Accordingly, it seems preferable to use the semicolon before conjunctions adversative, restrictive, conditional, &c. as, "nevertheless, but, excepting that, however, otherwise, provided that." Again, where the supernumerary phrases not only suppose the precedent, but depend on them for their regimen, and are, as it were, new parts thereof; there the semicolon seems preferable to the colon: v. gr. "You are regardless of the goodness of God, who first chose you; a God who is only jealous of your heart for your own happiness; a God who could be equally glorious in destroying you by his justice, as in saving you by his mercy." Or thus: "The discourse consisted of two parts; in the first was shewn the necessity of fighting; in the second, the advantages that would redound from it." But this difference, it must be owned, has a dependence on something that influences all the points, and sways the whole doctrine of punctuation; *viz.* the length, or shortness, of the members and periods: for, when the phrases are long, we point higher than when short.

A later author, in an ingenious discourse, "De Ratione Interpungendi," marks the office of the colon, and its difference from the semicolon, &c. more precisely; a colon, on his principles, serves to distinguish those conjunct members of a sentence, which are capable of being divided into other members, whereof one at least is conjunct. Thus, in the sentence, "as we cannot discern the shadow moving along the dial-plate, so the advances we make in knowledge are only perceived by the distance gone over;" the two members being both simple, are only separated by a comma: in this, "as we perceive the shadow to have moved, but did not perceive it moving; so our advances in understanding, in that they consist of such minute steps, as are only perceivable by the distance;" the sentence being divided into two equal parts, and those conjunct ones, since they include others, we separate the former by a semicolon, and the latter by commas: but in this, "as we perceive the shadow to have moved along the dial, but did not perceive it moving; and it appears the grass has grown, though nobody ever saw it grow: so the advances we make in knowledge, as they consist of such minute steps, are only perceivable by the distance." The advancement in knowledge is compared to the motion of a shadow, and the growth of grass; which comparison divides the sentence into two principal parts: but since what is said of the movement of the shadow, and likewise of the growth of grass, contains two simple members, they are to be separated by a semicolon; consequently a higher pointing is required to separate them from the other part of the sentence, which they are opposed to; and this is a colon.

Bishop Lowth observes, that a colon distinguishes a member of a sentence, whether simple or compounded, which of itself would make a complete sentence, and so requires a greater pause than a semicolon, yet is followed by an additional part, making a more full and perfect sense. He adds, that a colon may be also used, when a semicolon has preceded, and a greater pause is still necessary, though the sentence be incomplete; and that it is commonly used, when an example, or a speech, is introduced. Introd. to Eng. Gram. ed. 1772. p. 207.

COLONA, in *Botany*, Bosc. Nouv. Dict. Hist. Nat. Cavan. tab. 370. Class and order, *polyandria monogynia.*

Gen. Ch. *Cal.* five-leaved; leaves linear, coloured on the inside, caducous. *Cor.* Petals five, with a nectareous scale at the base. *Stam.* Filaments numerous, inserted into the top of a pentagonal column. *Pist.* Germ placed at the top of the column, in the centre of the stamens, tetragonous-globular; style longer than the stamens; stigma simple. *Peric.* Drupe globular, with four wings, opening into four parts. *Seeds* oval, two in each division of the drupe. Nearly allied to Grewia, and differing chiefly in the structure of the pericarp.

Sp. C. *dentata.* A tree. *Leaves* alternate, almost sessile, oval, toothed, very large. *Flowers* reddish, in axillary, solitary racemes, which sometimes form a panicle. A native of the Philippine islands.

COLONÆ, in *Ancient Geography*, a town of Asia Minor, in the Troade, placed by Strabo at the distance of 140 stadia from Ilium, in the territory of Lampsacus; it was a colony of Milesians.—Also, a town of the same name, placed by Strabo near Chrysa; by d'Anville, S. of Troas.—Also, a town, mentioned by Anaximenes, cited by Strabo, and placed in Erythræa.—Also, a town of Greece, in Messenia, according to Ptolemy; now *Grisso.*—Also, a town of Greece, in the Phocide.—Also, the name of a rock, on the bank of the Thracian Bosphorus, over-against the Cyanæan islands, at the entrance of the Euxine sea.—Also, a town of Greece, in Thessaly.—Also, a promontory near the river Lycus.

COLONEL, the officer who has the chief command of a regiment of horse, foot, dragoons, or artillery. The lieu-

 tenant-

tenant-colonel commands it in chief in the abſence of the colonel, to whom he is ſubordinate, as the other officers are in like manner to him, when he is preſent.

COLONEL *of a regiment of horſe*, is the firſt officer in it, and commands it when preſent. His duty conſiſts chiefly in keeping the regiment complete; in having it compoſed of men and horſes that are fit for ſervice; in taking care to have them well exerciſed and inſtructed in the different evolutions, ſo that they may be able, on all occaſions, to form themſelves ſuitably to the ground they occupy or act on, or to the manner in which they may wiſh either to make or receive an attack. In France, Spain, and ſome other ſouthern nations of Europe, colonels of horſe have been uſually called *maitres de camp*. But in Germany, and moſt northern nations, they are called *ritmeeſters*.

COLONEL *of dragoons*. His principal functions are the ſame as thoſe of a colonel of horſe. But he ought to be alſo in ſome meaſure acquainted with the duties of a colonel of infantry, as his men are liable to act either mounted or diſmounted.

COLONEL *of foot, or infantry*. His functions are more extenſive and diverſified than thoſe of a colonel of horſe, as the infantry are employed for a greater variety of purpoſes, and on a greater diverſity of ſervices. Colonels of infantry ſhould be well acquainted with fortification, and with field-engineering (which, however, they ſeldom or ever are); ſince ſuch a thorough and comprehenſive knowledge of their principles, as enables an officer to apply them expeditiouſly and judiciouſly, is the beſt and ſafeſt guide to the proper formation and arrangement of troops in various ſituations, and to the advantageous occupation of ground and poſitions. A colonel of infantry ſhould be particularly careful to maintain union and harmony among his officers, and contentment among his men; to acquire the eſteem and confidence of both, and to make himſelf be reſpected by them; to which nothing contributes more than a ſteady, uniform, and impartial enforcement of ſubordination and diſcipline. He ſhould likewiſe be peculiarly attentive to the health and comfort of his men.

COLONEL *of Artillery*; the commander of a battalion of artillery. His duties, when properly underſtood and attended to, are various and laborious, both in war and peace, and require, in order to be well performed, not only abilities, but alſo application, knowledge, and experience. He ought to be an able mathematician and mechanic, and ſhould be acquainted with all the duties of an engineer, that are connected with the uſe and application of artillery in different ſituations, and to different purpoſes; the conſtruction of batteries, platforms, field-works, the occupying of poſitions with artillery, to the beſt advantage, both as to direct and flanking fires, &c. Whatever ſituation he may be placed in, or on whatever ſervice he is going, he ſhould underſtand thoroughly what nature and ſpecies of ordnance is beſt adapted to it. He ſhould be acquainted with all the beſt and moſt uſeful experiments, that have been made with artillery in the different nations of Europe; he ſhould know the greateſt diſtance at which walls can be battered in breach effectually; the different charges of powder, beſt adapted for different ſervices, and different diſtances. And he ſhould not only be well acquainted with the wide differences between the ranges of cannon-ſhot and ſhells in the air, and thoſe which the parabolic theory gives for them *in vacuo*, but alſo be able to approximate, nearly to the truth, the diſtances to which projectiles will go in the air, thrown with given charges of powder, and given degrees of elevation. In ſhort, he ought to know a variety of things, which few officers of artillery actually do know.

COLONEL *of Engineers*. See the article ENGINEER.

COLONEL, *Lieutenant*, is, as has been already obſerved the ſecond officer belonging to a regiment, and commands it in the abſence of the colonel.

COLONEL *General of the French Infantry*, or COLONEL *General d'Infanterie Françoiſe*: an appointment of great truſt and authority, which took its birth, or originated, under Francis I. in 1544. It became an immediate gift of the crown, under Henry III. in 1584. It was at laſt ſuppreſſed, becauſe it gave too many prerogatives, and too much power to the perſon who was inveſted with it. Under Louis XV. however, it was re-eſtabliſhed in 1711, in favour of Louis, the firſt duke of Chartres. This officer had originally the right of nomination to every commiſſion and place of truſt in the infantry. He could order courts martial, and enforce the ſentences awarded by them, without any ſuſpenſion of his power in that reſpect, by an appeal to a ſuperior tribunal; and he had a company in every regiment of infantry, which was called the colonel general's company.

COLONEL *Général d'Infanterie de Suiſſes et Griſons*. This appointment was not held of the crown; but it was almoſt always given to a prince. It took its riſe in right of office under Charles IX. in favour of the ſon of the conſtable of Montmorency, killed at the battle of St. Denis. All the Swiſs and Griſon troops were ſubordinate to the colonel general, the company *des cent Suiſſe de la garde* excepted. He appointed colonels and captains. The ſovereigns at laſt aſſumed, or reſumed, this right of nomination. But he ſtill retained the right of naming and preſenting to the king the officers of the nation, to be included in the promotion of general officers, and enjoyed ſeveral other prerogatives.

COLONEL *Général de la Cavalerie légére et étrangère*. This charge, or employment, was created in right of office under Charles IX. It was, however, known before his time, in 1449, under the title of "capitaine general de la cavalerie Albanoiſe." Under Louis XIII. there were two ſuch colonels general, one of the French cavalry, and the other of the German cavalry. Though theſe general officers enjoyed great honours and prerogatives, the generals of the Roman cavalry, under the emperors, were perſons of ſtill greater importance. For they had the ſame authority over the troops and militia, that the kings and dictators had. The emperors treated them in their regulations and conſtitutions, as ſeignors of the higheſt rank, eminence, magnificence, and celebrity. They enjoyed an authority almoſt abſolute, over all military people.

COLONEL *General des Dragons*, colonel general of dragoons. This appointment was created in 1688, by Louis XIV. It was, like the preceding ones, favoured with an attribution of great honours and particular prerogatives.

COLONEL *de Troupes Légères*, colonel of light troops. This officer ought to be well inſtructed, both by ſtudy and experience, in the art of petty warfare, and the management of detachments. For, as he is almoſt always reſponſible for the corps confided to his charge, and forced to take advanced poſitions in an enemy's country, he is of conſequence the more expoſed to be ſurpriſed, taken, or at leaſt beaten.

COLONELLE, COMPAGNIE, the firſt company in a French regiment.

COLONI, ADAM, called the Old, in *Biography*, a painter who was born at Rotterdam, in 1634, but afterwards reſided and died in London, in 1685. The ſubjects of his pictures were generally wakes, country fairs, rural ſubjects, and cattle; beſides which, he made ſeveral copies from the pictures of the Baſſans, with ſucceſs. He had a ſon called ADRIAN COLONI the young, who received inſtructions

from

from his brother-in-law, Van Diest, in addition to the lessons bestowed on him by his father. He frequently painted the figures in the landscapes of Van Diest, as well as in those of other masters; and sometimes imitated the touch of Salvator Rosa. At other times he produced pictures of history, but more generally those of cattle, conversations, or landscapes. Adrian died in the year 1701, aged 33. Pilkington.

COLONI, *Cape*, in *Geography*, lies on the W. coast of Asiatic Turkey, N. of the gulf of Smyrna. N. lat. 39°. E. long. 26° 30'.

COLONIA, in *Ancient Geography*, an episcopal town of Asia, under the metropolis of Sebaste; situate in the first Armenia, and called also *Taxara*.—Also, an episcopal town of Asia, in Cappadocia.—Also, a town of Italy, in Etruria.—Also, a town of the isle of Albion, in the route from Londinium to Luguvallium ad Vallum between Cæsaromagus and Villa Faustini, according to the Itinerary of Antonine. Although our antiquarians are divided about the situation of Colonia, it seems, upon the whole, to be most probable that it was at Colchester, on the river Colne, from whence it derived its name.—Also, a town of the Damnii, according to Ptolemy, which some, as Camden and Baxter suppose, to have been Coldingham in the Mers, but which was more probably situated at or near Lanark, in Clydesdale. See COLDINGHAM.

COLONIA, in *Geography*, a town of Istria, five miles S.S.E. of Rovigno.

COLONIA *Agrippina Ubiorum*, in *Ancient Geography*, a town seated on the banks of the Rhine; now COLOGNE. It was built by the Ubii, when they left Germany to establish themselves in Gaul. Agrippina, the mother of Nero, fixed a colony of veterans in this place, and gave it her name in honour of the place of her birth.

COLONIA *Equestris*, a town of Gallia Belgica, assigned by Pliny to the Helvetians; but by Ptolemy to the Sequani. The Itinerary of Antonine marks it under the name of "Equestris," between Bautas and Lacus Lausanius. It was also called "Noviodunum," or "Neviodunum;" but when it became a colony, the Romans called it "Colonia Equestris." It is now *Nion*.

COLONIA *Flavia*, the town called CÆSAREA of *Palestine*.

COLONIA *Julia*, a town and Roman colony of Germany, now *Bonn*.

COLONIA *Julia Celsa*, a town of Spain, which was a Roman colony; now a village called *Xelsa*.

COLONIA *Julia Hispella*, a town and Roman colony of Italy, in Umbria; now *Spello*.

COLONIA *Marcia*, a town of Spain, which had the title of Roman colony; now *Marchena*.

COLONIA *Senensis*, a town of Italy, in Etruria, which was a Roman colony; now *Sienne*.

COLONIA *Septimanorum Juniorum*, a town of Gaul, with the title of colony; now *Beziers*.

COLONIA *Trajana*, now *Kelln*, or *Koln*, was situated at a small distance from the Rhine, and about a mile from Cleves.

COLONIA *Ulpia*, is now *Cleves*, which see.

COLONIDES, called *Colone*, by Ptolemy, a town of Messenia, seated on an eminence on the coast which bore northwards to the west of the gulf of Messenia. Its inhabitants are said to have been conducted under the direction of an oracle, by a person named Colænus, from Attica to this country. In process of time they assumed the manners and language of the Dorians. The mountain Temathea, called by Pausanias Temathia, commenced towards Colonis, and extended itself towards the north-west, as far as mount Egaleus.

COLONIS, an island of Greece in the Argolic gulf, according to Pliny.

COLONNA, GIOV. PAOLO, Maestro di Capella di San Petronio di Bologna, in *Biography*, was the son of Antonio Colonna, alias del Corno, a celebrated organ builder of Brescia. He composed but few operas; indeed, we know of but one, Amilcar in Cipro, for the theatre of Bologna, 1692, but he published about the latter end of the 17th century many excellent works for the church, of which P. Martini has given a list, to the amount of twelve, in the second volume of his History of Music.

It was the opinion of the late Dr. Boyce, that Colonna was Handel's model for choruses accompanied with many instrumental parts, different from the vocal. But it must, however, be owned, that Handel has greatly surpassed his model in energy, fire, and vigour of genius. The psalms of Colonna in eight real parts, published at Bologna in 1694, have been very justly admired for their masterly composition. Paolucci has selected the hymn, "Pange lingua," set in plain counterpoint of four parts by him, in a manner sufficiently simple and syllabic for the most zealous reformers of church music. His "Sacre lamentazioni della settimana santa, a voce sola," published 1689, contain many pleasing and elegant fragments of pathetic recitative, which we should have admired much more if we had not previously been acquainted with the works of Carissimi, who had anticipated not only all the thoughts of Colonna in this species of music, but almost all those of every composer of the present century. The airs of these lamentations are too short to make much impression on the hearer.

Colonna had a controversy with Corelli in 1685, concerning the succession of fifths in the first movements of the third sonata of his Opera 2da. Every lover of music will be sorry that the charge against Corelli should be well founded, but it must be owned that the fault is indefensible in the passage which has been condemned by Colonna, and was not likely to have passed uncensured, even in an age much more licentious than that of Corelli.

Antimo Liberati, with whom Colonna was in correspondence at the time of this controversy, seems to defend Corelli's violation of the known rule against the succession of fifths, in a letter written 1685, "sopra un certo dubbio," in which he tells us thus: "If a quaver rest, or even a semiquaver, were not sufficient to satisfy the rule against fifths and octaves, a composer writing in many parts would have very narrow limits for the expansion of his genius and fancy, or for varying the harmony." But with due respect for the authority of Antimo Liberati, and with peace to the shade of the gentle Corelli, the passage is unwarrantable, and seems the more unaccountable, as several better notes were easy to find, without altering the design, or destroying the effect of the trebles. It appears that the celebrated Angelo Berardi had a reverence for the professional eminence of Colonna, by his dedicating to him the seventh chapter of his "Miscellanea Musicale."

COLONNA, MICHAEL ANGELO. See [illegible].

COLONNA, MARC-ANTONIO, bore arms from an early age in the service of the Venetians, and rose to great military reputation. He was appointed by pope Pius V. general of his galleys, and served in the famous battle of Lepanto, gained over the Turks in 1571. On his return, the pope honoured him with a triumph, after the manner of the ancient Roman conquerors. He possessed several high civil posts, as constable of Naples, and viceroy of Sicily, and died in Spain in 1584. Moreri.

COLONNA, ASCANIO, son to Marc Antonio, was educated under his father's roof by the celebrated Muretus. He

He accompanied his father into Spain, and ftudied at the univerfities of Alcala and Salamanca. Philip II. gave him an abbacy, and he was made cardinal by Sextus V. At the death of the king his patron, he delivered a funeral oration, which he printed. He was himfelf a promoter of literature, and collected a magnificent library. Owing to his great fkill in canonical law, and the fupport which he gave to the claims of the Catholic king, he was made viceroy of Catalonia. He afterwards wrote a canonical defence of the pope's conduct in his difpute with the republic of Venice. This and fome other letters and harangues he publifhed, and died at Rome in 1608. Moreri.

Colonna, Fabius. See Columna.

Colonna, Francisco, was born about the middle of the fifteenth century, probably at Venice, and entered young into the order of Dominicans. The work by which he is chiefly known is "Hypnerotomachia di Poliphilo," which fignifies *the combat of Love in a dream*, and *the Lover of Polia.* It confifts of fable, hiftory, allegory, architecture, mathematics, &c. and is written in a language compounded of words taken from fix or feven different languages. It was printed by Aldus in 1499, and a French tranflation was publifhed in 1546, and has been feveral times re-printed. The original and tranflation have been in great requeft among collectors of books, as well on account of their fcarcity, as for the fake of the beauty of the numerous wooden cuts with which the work is decorated. Colonna died at an advanced age, at Venice, in the year 1527.

Colonna, Prospero, a diftinguifhed military commander, was younger fon of Anthony prince of Salerno, and born about the year 1452. He engaged in the fervice of Ferdinand king of Naples, and after his death, in that of Charles VIII. king of France. When that prince undertook the conqueft of Naples, Colonna, with his coufin Fabritio, rendered him fome fignal fervices, but upon a change of politics, they returned to their former allegiance. Profpero affifted in the recovery of the kingdom of Naples; he was at the battles of Barletta and Garigliano, at which the French were worfted; and he fignalized his valour and conduct at a variety of fieges and other military actions. In the year 1515, while attempting to defend the paffage of the Alps againft the French, he was made prifoner, and carried to France, but being liberated, he refumed his profeffion in order to revenge the difgrace that attached to him while a captive. He died in 1523, aged feventy-one, leaving behind him a very high character as a general; he was rather prudent and cautious than formed for remarkable enterprifes. Though flow and inactive, he was, by conftant vigilance, generally fecured from furprife. He was the friend and patron of learned men. Moreri. Robertfon's Hift. ch. v. vol. ii.

Colonna, Pompeo, was brought up by his uncle Profpero, and deftined by him for literary purfuits. The young man inclined to the profeffion of arms, and diftinguifhed himfelf as a military man till he was compelled to affume the ecclefiaftical character. He was made bifhop of Rietti, and obtained many lucrative benefices. He was, however, little attentive to the duties of his facred office, and fo regardlefs of the decorum that ought to be attached to it, that he accepted a challenge, and tore his caffock to pieces that he might not be prevented from fighting. On a falfe report of the death of pope Julius II. in 1512, Pompeo joined in raifing the cry of liberty, and took poffeffion of the capitol. For this he was deprived of his benefices, but by the intereft of his uncle, matters were again accommodated, and in 1517, he was elevated to the rank of cardinal. Still, however, inclined to turbulent meafures, his conduct gave his enemies the opportunity of charging him with the intention of putting the pope to death, in order that he might fucceed to that high dignity; he was accordingly deprived of his offices, in which he was reinftated on account of fome important fervices which he rendered to the reigning pontiff. He was afterwards viceroy of Naples, where he died in 1532. He was efteemed a patron of literature, and wrote a poem "De laudibus mulierum," chiefly in praife of Vittoria Colonna. Moreri. Robertfon's Hift. ch. v. vol. ii.

Colonna, Vittoria, a learned lady and poetefs, was born at Marino in 1490. At the age of feventeen, fhe married Ferdinand Francis D'Avalos, marquis Pefcara, who, by her influence, was diffuaded from accepting the kingdom of Naples, which was offered him after the victory of Pavia, in order to detach him from the fervice of the emperor Charles V. After his death, which happened in 1525, fhe lived in retirement, devoting herfelf to poetry; fhe kept up, with much credit to herfelf, a friendly and learned correfpondence with fome of the moft celebrated literary characters of the age. In 1541, fhe retired to the monaftery at Orvieto, and from thence fhe went to St. Catharine in Viterbo, but in 1547, fhe returned to Rome, where fhe died. Her poems have paffed through many editions, and have been printed with the commentaries of learned men. Moreri.

Colonna, in *Geography*, a town of European Turkey in Dalmatia; 24 miles N. of Spalatro.—Alfo, a town of Italy, in the Campagna di Roma; 12 miles from Rome.—Alfo, a cape of Naples, on the E. coaft of Calabria Ultra. N. lat. 39° 6′. E. long. 17° 26.′

COLONNADE, the name given to any range of infulated columns. See Portico.

COLONNE, in *Geography*, a town of France, in the department of the Jura, and chief place of a canton in the diftrict of Poligny; 2 leagues W.N.W. of Poligny.

COLONNI, a cape on the coaft of the Morea, in the Mediterranean. N. lat. 37° 32′. E. long. 24° 11′.

COLONOSSIS, in *Ancient Geography*, a place of Afia, in Lycaonia.

COLONSAY, in *Geography*, one of the iflands of Scotland, called the Hebrides. It belongs to Argyllfhire, and as it is feparated from Oranfay, merely by a narrow channel, which is dry at low water, Colonfay and Oranfay may be confidered but one ifland. Although the eminences of the former cannot correctly be termed mountains, they are high, rugged, and covered with heath. The arable land, which confifts of about 3000 acres, produces early and tolerable crops, as the foil is light and mixed with fand along the fhores; part of this land has lately been converted into pafture, and numbers of black cattle are fed on the two ifles. A monaftery of Ciftertian monks formerly flourifhed in Colonfay, and the remains of the walls of the abbey gave place fome years paft to a farm houfe; a priory attached, ftood in Oranfay, where the ruins ftill remain, and are confidered fuperior to any other religious building in the Hebrides, with the fingle exception of Icolmkill; there are befides fragments of feveral chapels in Colonfay. The inhabitants make large quantities of kelp from the feaweed found on the coaft; and the banks which furround the iflands produce plenty of fine coral. The population is eftimated at about 720, and the duke of Argyll is the principal proprietor.

Colonsay, *Little*, an ifland, and one of the Hebrides, fituated between Gometra and Staffa. There are feveral fpecimens of bafaltic pillars in the Leffer Colonfay, but it has no other inhabitants than one family who attend a few fheep.

COLONUM, a place of Greece, in Attica. Here was a foreft

a foreſt conſecrated to the Eumenides. Sophocles, according to Suidas, was born in this place.

COLONUS, an huſbandman, or villager, who was bound to pay yearly a certain tribute, or at certain times of the year, to plow ſome part of the lord's land; and from hence comes the word *clown*, who is called by the Dutch *boor*.

COLONY, Colonia, is properly a number of perſons of all ſexes and conditions, tranſported into a remote province, with a view of remaining there, and for the purpoſe of cultivating and inhabiting it; but among commercial nations, the term is uſed in a larger but leſs proper ſenſe, and applied to the temporary reſidence of merchants and agents in another country. The word colony originally ſignified no more than a *farm*, i. e. the habitation of a peaſant, *colonus*, with the quantity of land ſufficient for the ſupport of his family; "quantum colonus unus arare poterat." It is derived from the Latin word *colo*, I till or cultivate; hence *colonus*, a huſbandman, and *colonia*, a body of farmers, ſent to cultivate the ground in a diſtant country, and, by metonymy, the place itſelf. From the Latin the word has paſſed, with ſcarcely any alteration, into the modern languages of the weſt of Europe.

We may diſtinguiſh, generally, four kinds of colonies; *viz.* 1. Thoſe that ſerve to eaſe or diſcharge the inhabitants of a country, where the people are become too numerous, ſo that they cannot any longer conveniently ſubſiſt together. 2. Thoſe eſtabliſhed by victorious princes and people, in the middle of vanquiſhed nations, to keep them in awe and obedience. 3. Thoſe that are formed by emigrants, driven from their native country by oppreſſion and perſecution to ſeek a foreign ſettlement, and to ſubſiſt firſt by agriculture, and afterwards by commerce. 4. Thoſe that may be called "colonies of commerce;" becauſe trade is the ſole occaſion and object of them.

To the *firſt* claſs we may refer the colonization which took place in the earlier ages of the world, and which ſerved to diſſeminate the human race, firſt through the various regions of the eaſt, and afterwards through other more remote parts of the globe. At this early period colonization was of courſe more frequent than it is at preſent. The increaſe of a tribe beyond the limits of a comfortable ſubſiſtence upon the lands which were occupied, would be a ſufficient motive for inducing the younger members of the ſociety to remove from the proſpect or actual preſſure of want, to ſome unoccupied territory. Some authors, however, are of opinion that ſoon after the deluge, when the deſcendants of Noah became numerous, a diviſion of the ancient continent and its adjacent iſlands was made, probably by lot, among the heads of the ſeveral families. This opinion ſeems to be in ſome meaſure ſupported by the authority of Moſes, who ſays, (Gen. x.) on mentioning the children of Eber, that the name of one of them was "Peleg" (diviſion), for in his days was the earth divided." (See Dispersion.) However this be, the gradual extenſion of the habitations of mankind muſt have correſponded with their increaſe; and it ſeems to have been unreſtrained by claims made upon the uncultivated ſpots. But this unlimited right of diſperſion has long ſince ceaſed in moſt parts of the world; and hence it has become neceſſary for coloniſts, who ſeek new ſcenes for their labours, either to unite with the natives as friends, or to ſubdue them by conqueſt, if the colony is founded upon hoſtile principles. At a ſubſequent period, the different ſtates of ancient Greece, ſuch were Athens, Sparta, Corinth, and Argos, poſſeſſed territories of very limited extent; and the increaſe of population gave riſe to various emigrations from all thoſe ſtates. The colonies of the Dorians reſorted chiefly to Italy and Sicily, which, in the times preceding the foundation of Rome, were inhabited by barbarous and uncivilized nations; thoſe of the Ionians and Eolians, the two other great tribes of the Greeks, to Aſia Minor and the iſlands of the Ægean ſea, the inhabitants of which ſeem at that time to have been pretty much in the ſame ſtate as thoſe of Sicily and Italy. The emigrations now mentioned, and ſome others of a ſimilar nature, were undertaken by private individuals, with no authority from the government; and as they were generally directed towards diſtant and tranſmarine ſettlements, they retained but a ſlight connection with their original countries. The parent ſtate, indeed, conſidered the colony as a child, at all times entitled to great favour and aſſiſtance, and owing in return much gratitude and reſpect; but, moreover, conſidered it as an emancipated child over whom no direct authority or juriſdiction was claimed. The colony ſettled its own form of government, enacted its own laws, elected its own magiſtrates, and made peace or war with its neighbours as an independent ſtate, which had no occaſion to wait for the approbation or conſent of the parent city. The coloniſts, indeed, remembered the land of their fathers with filial affection and reſpect; they honoured its gods, by offerings of firſt-fruits to their temples; they retained a predilection for its cuſtoms and laws, as well as its religion and language; they yielded to its citizens the place of diſtinction at public games, and to its prieſts the holy honour of firſt inſpecting the entrails of ſacrifices. In war they generally followed the fortunes of the metropolis, as allies upon equal terms; but as they were perfectly independent, received no protection from her, and often equalled her in reſources, they always refuſed to come forward as auxiliaries, when unfair terms were propoſed. Thus, the Sicilian colonies refuſed to admit an Athenian army into their territories, for the purpoſe of reſting, on an expedition; and, in the Perſian war, the republic of Syracuſe, when intreated by the Lacedæmonians to aid the common cauſe, refuſed to ſend any aſſiſtance, unleſs their chief magiſtrate, Gelon, were allowed to command the united forces. Sometimes the parent country, conſcious of her ſuperiority and ſtrength, attempted to exact from the colonies, as matter of right, the uſual marks of filial attachment. Thus, Corinth was deſpiſed by her colony at Corcyra, for her inferiority of wealth and trade; and ſhe endeavoured to obtain by force, the uſual tokens of remembrance. The coloniſts appealed to Athens, who took their part, and retained them as uſeful allies, eſpecially during the Peloponneſian war. Potidæa, another Corinthian ſettlement, took the part of Athens, until her impolitic tyranny urged it to throw off the yoke, and appeal to Sparta and Corinth. After a long and ſevere ſtruggle, the Athenians were ſucceſsful; ſent new colonies to occupy the confiſcated and vacant lands; continued their oppreſſive government; and retained their dominion over Potidæa, until the invaſion of Philip. When the progreſs of Cyrus expoſed the Aſiatic colonies of Greece to extreme danger, they in vain applied to Sparta for aſſiſtance; and, being ſoon conquered by the Perſian monarch, they remained in ſubjection, until the victories of Platea and Mycale reſtored them to freedom; but deſpairing of long maintaining their independence, they formed a ſtrict alliance with Athens, who availed herſelf of the opportunity of a general alarm, to propoſe an univerſal contribution from all her colonies and allies, for the great purpoſe of reſiſting the Perſian power. We might cite many other inſtances to exemplify the independence of the Grecian colonies on the ſtates from which they originated. Neverthelеſs, the benefits in point of civilization reſulting to barbarous countries from colonies of private adventurers, migrating

grating from countries more advanced in the knowledge of thofe arts which meliorate the condition of human life, have entailed honour on thofe who imparted them, and claimed returns of refpect and gratitude from thofe on whom they were beftowed. From this mode of colonization, reciprocal advantages have been derived. The natives already in poffeffion of the country, to which colonies have migrated, are benefited by the introduction of new arts; while, at the fame time, the adventurers receive the reward of their knowledge, valour, and conduct, by the fuperior degree of influence which they acquire beyond what they would have poffeffed if they had remained in their own country. Thus individual adventurers, who have fitted out expeditions at their own charge, and conducted colonies to a permanent fettlement by their own fkill and valour, have, in fome memorable inftances, attained even to fupreme authority. This feems to have been the cafe with regard to the colonies anciently eftablifhed by Ægialeus in Sicyon, by Inachus in Argos, by Cecrops in Attica, by Janus in Italy, and by Cadmus at Thebes in Greece. From the veneration in which the memory of thefe adventurers, who were moftly of Egyptian origin, were held, it is evident that they had imported into the countries where they fettled great and important improvements. The great literary renown which Athens acquired in progrefs of time has rendered us better acquainted with its early hiftory; fo that we can form fome idea of its primitive laws. The regulation of the connexion between the fexes is recorded as being due to Cecrops; from whence fome etymologifts, as Euftathius, deduce the origin of the appellation διφυὴς, by which he was diftinguifhed. The collection of the inhabitants into towns and villages, is faid to have been an improvement of his immediate fucceffors, who, it is probable, alfo introduced the regulation of local jurifdictions, and the divifion of the land in property among the then exifting heads of families, to be inherited by their defcendants. This feems to be, in fact, the main foundation of perfect civilization, by introducing this inequality of condition, as fome of the families increafed or profpered more than others, which, notwithftanding the reveries of fome fpeculative politicians, is abfolutely neceffary to civilized life. This mode of colonization is feldom attempted in more modern times, becaufe the maritime nations of Europe have laid claim to all heathen lands which their fubjects difcovered, and have prevented even their own fubjects from endeavouring to ameliorate the condition of thefe countries, by attempting the formation of independent Chriftian ftates. The Jefuits had, indeed, formed a confiderable eftablifhment for the improvement of the natives in South America; but it gave umbrage to the Portuguefe government, and the neglect of military affairs rendered the overthrow an eafy undertaking. The Moravian brethren have fimilar fettlements in the moft northern parts of America and Europe, where the inhofpitality of the climate is fuch, that the country is not worth contending for. The eftablifhment of the Macedonian dynafties in Afia and Egypt; and, in later times, that of the northern tribes in the fouthern parts of Europe and of Afia, are fignal examples of this mode of colonization. It is notorious, that it was for the eftablifhment of colonies, referred to the firft clafs abovementioned, that, during the declenfion of the Roman republic, thofe torrents of barbarous nations, iffuing, for the generality, out of the north, over-ran the Gauls, Italy, and the other fouthern parts of Europe; and, after feveral bloody battles, divided it with the ancient inhabitants, and blended their own habits and manners with thofe of the nations which they fubdued, or in which they obtained either temporary or permanent fettlements.

To the *fecond* clafs of colonies belong thofe of a military nature, which ferved as guards or garrifons, for the maintenance of a conquered country. The Romans recurred to this mode of colonization more frequently than any other nation; and added, to the original motive, that of providing retreats for the aged and worn-out foldiers; as alfo for the fettlement of the poorer claffes of Roman citizens. Nor were the interefts of the rich forgotten, in the eftablifhment of Roman colonies. The fpirit of the Roman laws having reftrained the mercantile claffes to their proper rank in fociety, the capital accumulated by their commanders, during the long continued and widely extended fucceffes of the Roman republic, was of courfe invefted in land. The extent of Italy was too fmall for the capital, thrown, by this means, into agriculture; and the capitalifts were therefore obliged to feek new lands, on which it might be employed. It appears that the eaftern fhores of the Mediterranean fea were, at the time of their falling under the Roman dominion, in the higheft poffible ftate of cultivation. The provinces feated on thefe fhores, were, therefore, the fcenes of oppreffion rather than of improvement, and the plunder, accumulated there, was transferred to Gaul, and other weftern provinces, to be employed in the purchafe and improvement of land, or in loans to thofe who refided there. The high rate of intereft allowed by the Roman laws, made it alfo far better to employ money in loans than in commercial fpeculations, which cannot be fuppofed, in the reftricted and degraded ftate of Roman commerce, to have yielded the fame profit as the former. Seneca, the philofopher, is faid to have had, at the time of his death, no lefs than 600,000 *l.* fterling due to him from the colonifts in Britain; the fudden calling in of which produced a rebellion. Befides, Rome, like moft of the other ancient republics, was originally founded upon an Agrarian law, which divided the public territory in a certain proportion, among the different citizens who compofed the ftate. The courfe of human affairs, by marriage, by fucceffion, and by alienation, neceffarily deranged this original divifion, and frequently threw the lands, which had been allotted for the maintenance of many different families, into the poffeffion of a fingle perfon. To remedy this diforder, a law was made reftricting the quantity of land which any citizen could poffefs to 500 jugera, or about 350 Englifh acres. This law, however, was neglected or evaded, and the inequality of fortunes went on continually increafing. The greater part of the citizens had no land, and without it the manners and cuftoms of thofe times rendered it difficult for a freeman to maintain his independency. The people, therefore, became clamorous to get land, and the rich and great, we may readily imagine, were determined not to give them any part of theirs. To fatisfy the unquiet and clamorous people, it was frequently propofed to fend out a new colony. Accordingly, Rome affigned them lands, generally in the conquered provinces of Italy, where, being within the dominions of the republic, they could never form any independent ftate; but were, at beft, merely a fort of corporation, which, though it had the power of enacting by-laws for its own government, was at all times fubject to the correction, jurifdiction, and legiflative authority of the mother city. The fending out of a colony of this kind, not only gave fome fatisfaction to the people, but often eftablifhed a fort of garrifon, too, in a newly conquered province, of which the obedience might otherwife have been doubtful and precarious. Some of thefe colonies were of a civil, and others of a military nature. In their manners and internal policy, the colonies formed a perfect reprefentation of their great parent; and they were foon endeared to the natives by the ties of friendfhip and alliance; they effectually diffufed a reverence for the Roman name, and a defire, which was fel-

dom disappointed, of sharing, in due time, its honours and advantages. A Roman colony, whether we consider the nature of the establishment itself, or the motives for making it, was altogether different from a Greek one. The words, accordingly, which, in the original languages, denote those different establishments, have very different meanings. The Latin word, *colonia*, signifies simply a plantation. The Greek word ἀποικια, on the contrary, signifies a separation of dwelling, a departure from home, or a going out of the house. In conformity to this distinction of names, we may observe, that the colonial settlements of the Greeks were planted in distant countries, and amongst barbarous tribes. They were established, not in Greece, or in the states immediately in the neighbourhood, which had already been well peopled, but in Gaul, Sicily, and the south of Italy; in Cyrene and Egypt; in Illyria and Asia Minor. The Roman colonies, on the other hand, were at first planted in the immediate vicinity of Rome. During the second Punic war, the city was surrounded by no fewer than 30 establishments of this kind; which served as so many garrisons or advanced posts for her defence. Ancient authors mention no less than 164 colonies settled in Italy, from the foundation of Rome to the death of Augustus; whereas those planted in all the provinces were only 199. From this consideration it appears, that the Italian colonies were materially different in their constitution and uses from the colonies of the provinces. The emigrations from Rome to the conquered towns and lands of Italy, and afterwards of the foreign provinces, were the operations of war and plunder. Whenever an Agrarian division of conquered territory was proclaimed, the discontented citizens presented themselves in a body; and if a sufficient number did not offer to form a legion for retaining the conquest, which they called a colony, the deficiency was supplied from all the tribes by lot. As this system of conquering policy was effected slowly, until the whole of Italy had been subdued no emigration ever took place to any transmarine, or transalpine countries. Among the Romans there were two kinds of colonies; those sent by the senate, and those that were military, consisting of old soldiers, broken and disabled by the fatigues of war, who were thus provided with lands, as the reward of their services. The colonies sent by the senate were either Roman or Latin, *i. e.* they were composed of Roman or Latin citizens. The colonies of Roman citizens had the right of suffrages, and could reclaim the rights of citizens whenever they chose to remove to the capital. The Latin colonists lost their rights for ever, nor had they any right of suffrages without an express permission. According to Ulpian (lib. i. D. de Cens.), there were other colonies, which had little more than the name; only enjoying what they called *jus Italicum*, *i. e.* they were free from the tribute and taxes paid by the provinces; such were the colonies of Tyre, Berytus, Heliopolis, Palmyra, &c. Between all the Roman colonies and the metropolis, there subsisted the closest connexion. The form of colonial government was modelled upon that of Rome. The laws, if not changed at once, were gradually moulded by the spirit of the Roman jurisprudence; the officers were almost all sent from the capital; the mandates of the republic were more promptly obeyed in the provinces than in the city itself;—in a word, the establishments which have been called colonies, and, compared to those of modern times, or of the Greeks, were military stations; garrisons, placed in conquered countries; advanced posts of a great army, of which the commander in chief held his head quarters in Rome, and occasionally made a progress through the different cantonments. From these settlements taxes were levied, according to a census; and, after paying the expences of their own government, they transmitted a revenue to the Roman treasury. Men were raised for the Roman army according to a muster-roll. When the grandeur of the Roman name extended across the ocean and the Alps, the rights of citizenship became valuable, as the title to power, honours, and plunder. The allies, or colonial and provincial settlements of Italy, then demanded the communication of this privilege; and the refusal produced that "Social war," which may be justly deemed the end of the regular republican constitution. In consequence of the Julian law, which terminated this war, and of other laws afterwards passed, all the states of Italy, whether allies, colonies, or prefectures, obtained the full rights of Roman citizens. Until the year U.C. 640, no colony but one, which never flourished, had been planted beyond the confines of Italy. The military colonies, introduced by Sylla, and much favoured by Augustus, were remarkable only for a form of government more entirely military than that of the other settlements. All were equally subordinate to the central government, and equally obedient to its decrees.

The first foreign colony which the Romans planted was in Carthage, A.U.C. 710, when Julius Cæsar formed the plan of restoring that deserted city by means of a colonial establishment. The first colony planted in Italy was that of Cænina, A.U.C. 4. The practice of sending Roman colonies to the provinces, where they did not enjoy all the privileges of the Italian colonists, was very common after the experiment of Julius Cæsar. He himself transplanted 80,000 citizens in this manner. (Sueton. in Jul. Cæs. c. 42.) After the time of Augustus, who planted 28 colonies in Italy (Suet. in Octav. c. 46.), the custom of planting Italian colonies seems to have been abandoned. His successors did not plant so many as 20; and preferred forming those settlements beyond seas. Livy does not even mention a transmarine or transalpine colony; although he constantly relates the foundation of those in Italy. Dacia and Britain, the most difficult and insecure of the Roman conquests, had only, the former four, and the latter five, Roman colonies. Twenty-five colonies were settled in Spain; and Africa, the most peaceable of all the Roman possessions long before the downfal of the commonwealth, received, after the usurpation of Julius Cæsar, no less than 57 colonies, exclusive of Egypt. From these circumstances we may be led to conclude, that the Italian establishments were founded with different views, and in a different age of the Roman history, from the settlements in the provinces.

M. Vaillant has filled a volume in folio with medals struck by the several colonies, in honour of the emperors who founded them. The ordinary symbol they engraved on their medals was either an eagle, as when the veteran legions were distributed in the colonies; or a labourer holding a plough drawn by a pair of oxen, as when the colony consisted of ordinary inhabitants. On all the medals are seen the names of the Decemviri, who held the same rank, and had the same authority there as the consuls had at Rome.

In the political relations of the Roman settlements with their parent city, there is some resemblance to the political relations of modern colonies with their mother countries. But in the policy of a state so neglectful of every thing, except war, we cannot expect to find any parallel to those commercial views, by which the plantation of modern colonies has been undertaken, and their connexion with the European governments maintained. The objects of the Romans, in planting their colonies, were conquest and plunder; so that detachments of emigrants incorporated with, and governed, the old possessors of the soil. In modern

dern times the chief objects have been trade and agriculture; the moſt important ſettlements have been made in deſert countries, or diſtricts, whoſe ancient inhabitants were extirpated by the firſt ſettlers. In this reſpect then, the Roman colonies rather bear a reſemblance to the Aſiatic eſtabliſhments of modern Europe; but they differ from theſe too, in the ſtructure of their government. The conſtitution of the Italian colonies was formed upon the Roman model, and varied with its changes. The provincial governments of Hindooſtan, and the iſlands of the Indian ocean, very little reſemble thoſe of their European maſters, and are rather allied to the ſpirit of the oriental legiſlation. The provincial governments of the Roman tranſmarine territories bore, in every reſpect, the ſame kind of relation to the metropolis, which the Eaſt Indian eſtabliſhments do to the ſtates of Europe. The inhabitants retained, in a great degree, their own laws; they were ruled and oppreſſed by a Roman magiſtrate, and an army, compoſed partly of Roman, partly of native troops; their country was the ſcene of every criminal exceſs in politics and manners, and the ſource of large ſupplies to the plunderers of the world.

The ſpecies of colonies now deſcribed is not reſtricted to the Romans, but it has been adopted by almoſt every nation, both ancient and modern, with very little variation. To it we may refer the eſtabliſhment of the Normans in England, and of the Engliſh in Ireland. In a ſtill later period, the Portugueſe and Dutch have eſtabliſhed themſelves in India; but the Engliſh Eaſt India company have, on the contrary, repreſſed, as far as poſſible, the colonization of the countries they poſſeſs there, as theſe directors obſerve that "the energy of the European character becomes obliterated in the courſe of a few generations."

The commerce of Carthage, together with her extenſive continental poſſeſſions, enabled her to provide for her increaſing population at home. The want of an outlet for inhabitants formed no part of the motives that induced the Carthaginians to ſettle foreign colonies. Their colonial eſtabliſhments, indeed, were moſt probably founded in the ſame manner with the tranſmarine and tranſalpine provinces of the Romans;—conquered countries, retained in ſubjection, from ambition and pride, by means of a Carthaginian governor, and a few followers, prompted by idleneſs, or the love of change, or the deſire of diſtinction to follow in his retinue. However, the relations of the new eſtabliſhments with the mother country were different, in ſeveral reſpects, from the relations which connected the diſtant parts of the Roman dominions with the metropolis. The Carthaginian colonies were, in reality, trading correſpondents to the mother country; and ſhould have found a place under the 4th claſs of colonies rather than here, if they had not been immediately connected with the Roman. It is probable that the Carthaginians received the ſurplus of the rude produce of Sicily, Sardinia, and Spain, which Africa did not yield, and exported thither thoſe manufactures, which would naturally be raiſed in a country fully peopled, and long habituated to traffic. From the ſuperiority of their navigation too, the ſkill of the Carthaginian merchants, their connexions long eſtabliſhed with the Levant, more particularly with the great emporiums of the Eaſt, Tyre and Smyrna, and from the greater trading capitals of thoſe rich merchants; they would moſt likely furniſh the colonies or provinces with Aſiatic commodities, of which Carthage would be the natural entrepôt for the countries to the weſt of the Mediterranean. Hiſtory has preſerved two treaties of commerce and navigation between the Carthaginians and Romans, conceived in the true ſpirit of the modern colonial policy; for which ſee Polyb. l. iii. c. 22. or Brougham's Colonial Policy, &c. vol. i. p. 21, &c.

In this connection we might mention another ſpecies of external colonies, produced by the diſpoſſeſſion of weaker ſtates by thoſe who are ſtronger, in order to extend their borders, or to poſſeſs ſome advantageous ſituations for trade, or for war. The bigotry of the Europeans, at the time of the diſcovery of the Weſt Indies, led them to look upon the natives of thoſe countries in a very unfavourable and contemptuous light, on account of their being heathens and idolaters, and made them heedleſs as to the meaſures they adopted for their own ſecurity, ſo that they could but obtain the object of their wiſhes. The great diſproportion alſo in the numbers of the invaders and of the natives, in ſome meaſure, impelled the Europeans to adopt the moſt ſevere methods, to perpetuate the terror which the natives had originally manifeſted at the effects of their fire-arms. The conſequence of thoſe ſeverities was, that the natives of moſt of the iſlands were ſoon exterminated, except in ſome very ſmall ones which the Europeans left unnoticed. On the continent, however, the natives ſtill exiſt, as they have there ſufficient ſpace to retire from the neighbourhood of their viſitors.

To the *third* claſs belong thoſe colonies that have been formed by refugees from countries, in which they were oppreſſed or perſecuted. Thus the emigrants, who fled from the religious broils in which France, the Low Countries, and Germany have been involved, found ſafety in England, and introduced many of thoſe manufactures and arts, which have contributed to the commercial ſuperiority of Great Britain. Norwich, Canterbury, and even ſome of the moſt populous diſtricts of the metropolis, have owed the induſtry and productions of their inhabitants to theſe colonies; and, in like manner, part of Pembrokeſhire, in South Wales, has been peopled by a colony from Flanders. The colonies of North America were originally planted by men who had quitted their native country, either from a love of civil and religious liberty; or from a deſire to better their fortunes, by laying out a ſmall capital in the improvement of land; or from the neceſſity of finding employment in a country where labour bore a high price. Anxious only to live in peace and freedom, with a competency for themſelves and their families; theſe men centered all their views in the ſpot to which they removed their fortunes and perſons; they gave up for ever the thoughts of returning to the countries which they left behind them; and transferred to their new homes all thoſe ties which had formerly bound them to Europe. The woods of the northern continent were cleared by men of ſmall capital content with a living profit, attached to the ſoil, which owed its cultivation to their labours, and entertaining no idea of removing from it. By degrees the influence of local attachment binds them to a ſpot, which neceſſity had made the object of their choice; and in proceſs of time the deſire of depoſiting their bones in a country which had received and cheriſhed them, ſucceeded to the obliterated partiality for the place of their birth. The firſt ſettlers of all the colonies of N. America were men of irreproachable characters, though not very enlightened in their views, or poliſhed in their manners. Many of them fled from perſecution; others on account of an honourable poverty; and all of them with their expectations limited to the proſpect of a bare ſubſiſtence in freedom and peace. The greater part of them viewed their emigration beyond the Atlantic, as a taking up of the croſs; and bounded their hopes of riches to the gifts of the ſpirit, and their ambition, to the deſire of a kingdom beyond the grave. A ſet of men more conſcientious in their doings, or ſimple in their manners, never founded any commonwealth. It is, indeed, the peculiar glory of N. America, that, with a very few exceptions, its empire was originally founded in charity and peace. In proceſs of time, however, new emigrants

grants flocked to this extenfive country, as it became more open and improved, whofe views, principles, and character were very different from thofe of the firft fettlers. Many of them were perfons in very indigent circumftances; they were of different fects, or of no perceptible religion at all; and of different nations, though the Englifh greatly predominated. Some of them were convicts, who after confinement in goals were banifhed for their crimes; many of them perfons of defperate fortunes, to whom every place was equally uninviting; or men of notorioufly abandoned lives, to whom any region was acceptable, that offered them a fhelter from the vengeance of the law, or the voice of public indignation. But a change of fcene would naturally produce fome falutary effect upon characters the moft diffolute. This mixture of various population was foon blended, by the influence of thofe fimple manners that are formed by an agricultural life, into one nation of hufbandmen, whofe character has communicated itfelf, in a great degree, to the moft profligate of thofe whom compulfion or defpair from time to time introduced. While purity of manners was in this way preferved, that firmnefs of principles in religion and politics was maintained, which had fo eminently contributed to the eftablifhment of the colonies. Sentiments of freedom might find an afylum in America, when, even in Swifferland, it fhould no longer be lawful to think beyond the rules. Neverthelefs, the circumftances of the N. American colonies produced fome other effects not quite fo favourable, upon the tafte, and in what, in common converfation, we call the manners of the people. The folitary nature of agricultural labour, and the feclufion of the hufbandman's refidence, furrounded only by his own family and fervants, are very inimical to all forts of refinement, and to every ornamental accomplifhment; whilft the fettlers of the new colonies were occupied with the ufeful, they neglected the agreeable arts of life; and voluntarily threw themfelves back fome centuries, in moft branches of civilization, inftead of profecuting the improvements of thofe branches, from the point to which the mother country had brought them at the æra of their emigration. In confequence of their peculiar circumftances and occupations, the Americans have always poffeffed a numerous, virtuous, and athletic peafantry; but they have numbered few fine artifts, or accomplifhed orators; and, indeed, an ingenious writer, to whom we are much indebted in the compilation of this article, proceeds fo far as to obferve, with a latitude of expreffion fcarcely allowable, that "the word American has never yet (fo far as I know) been coupled with either poetry, or painting, or mufic." The hiftory of manners in N. America, fays this writer, is the general hiftory of manners in every new community, of which agricultural induftry forms the bafis. The peculiarities (perhaps accidental), which marked the fituation and habits of the firft fettlers, have likewife produced fome effect upon thofe of their defcendants, without in the leaft modifying their character as an agricultural nation. The love of civil and religious freedom was connected with an anxious attention to all matters of controverfy, whether in politics or in faith; and as the fettlers were equally incapable of underftanding either, fo they were chiefly captivated with the more abftrufe of the two fciences; and affected great depth in the things appertaining to grace, fpirit, incarnation, and all the fublime myfteries of the Chriftian difpenfation. Thefe fruitlefs fpeculations were the only literary inheritance which they tranfmitted to their children. But although they had left the old world for the fake of liberty of confcience, they too foon manifefted what they underftood by liberty of confcience. By that term they meant (like many other advocates of liberty) the propagation of their own peculiar tenets; and they fhewed that they only wanted the power to propagate their creed (like their European oppreffors) by that method of mental perfuafion which confifts in burning the body. They allowed every man entire liberty of confcience, provided that he ufed that liberty in adopting their own ftandard of faith. Accordingly, while in Old England the fpirit of fanaticifm was operating the downfal of government, and mingling itfelf with every purfuit of the age, to the univerfal debafement of manners and fentiment; in New England, the heterodox were perfecuted by the impulfes of the inward light; or parties were formed, and armies marfhalled, and millions led by the fubtle principles of a metaphyfical theology. But the Falklands and Sydneys had no parallels to temper the unclaffical rage of the American bigots; and even the Cromwells and Bradfhaws found but poor reprefentatives in the ftupid fanatics of Bofton and Salem. Long after the mother country had relinquifhed, for ever, the acts of perfecution, they found votaries in the conftituted authorities of the colonies; and the northern ftates at the end of the 17th century, afforded the difgraceful example of that fpiritual tyranny, from which their territories had originally ferved as an afylum. The century, which has juft elapfed, moderated this odious fpirit; but to this day, the northern ftates are chiefly diftinguifhed from the others, by a taint of religious bigotry;—as the character of the middle ftates is modified by the greater mixture of different nations, which have contributed to people them;—and that of the fouthern provinces, by the admixture of negro flaves. In the middle ftates, the mercantile fpirit has gained more ground than in any of the reft: the diverfities of race have rendered the fentiments of patriotifm, and the love of liberty, lefs ardent; while the variety of religions has prevented the introduction of that fanaticifm, of which we have traced the effects in the north. In the fouthern ftates the contraft of fervitude has mingled an ariftocratical fpirit with the manners of fimple hufbandmen; and the climate, by promoting the growth of an article, belonging to the clafs of luxuries, has given rife to a fpecies of agriculture bordering upon the great gains and uncertain profpects of commercial fpeculation. In all the colonies, however, of the northern continent, a refpectable national character may be faid to prevail. If their intercourfe with the mother country would have had no tendency to civilize or adorn her, it could certainly have in no degree contributed to the corruption, either of her moral or political habits; and the moft rapid interchange of population could only have tended to embellifh the American fociety and to vary its accomplifhments, while it rendered a fervice to the Britifh manners, by the intercourfe of a more fimple and virtuous people. Unfortunately, the very circumftances which neceffarily laid the foundation of thofe habits and that national character infulated the population of the country from that of the old world. The colonies were ftationary for the fame reafon that they were refpectable; and the circulation of its inhabitants, with all its effects upon both parts of the empire, has been maintained and accelerated in other colonies, placed in circumftances which rendered thofe effects unfavourable, at leaft to the mother country. For the change that has taken place with regard to the principles and manners, the religion and liberty of the feveral colonies of N. America, fince they have acquired a new government, and been formed into the *United States*; fee this article, and alfo an account of the feveral ftates themfelves under their appropriate titles.

The *fourth* clafs of colonies comprehends thofe that are denominated *commercial*, and which have been eftablifhed at different periods, by the Englifh, Dutch, French, Spaniards, Portu-

Portuguefe, and other nations; and which are ftill maintained, in a greater or lefs degree, with a view of keeping up a regular intercourfe with the natives, or of cultivating the ground, by planting fugar-canes, rice, indigo, tobacco, cotton and other commodities. See CHARTER *Governments*.

The principal of this kind of colonies are thofe that have been eftablifhed in North and South America; particularly Peru, Mexico, Canada, Virginia, New England, Carolina, Louifiana, Hudfon's bay, the Antilles iflands, Jamaica, Domingo, and the other iflands of the Weft Indies: alfo, in Africa, Madagafcar, the cape of Good Hope, cape Verd, and its iflands, and all the coafts extended thence as far as to the Red fea; and likewife in Afia, the famous Batavia of the Dutch, and Ceylon; Goa, Diu, of the Portuguefe; and fome other lefs confiderable places of the Englifh, French, Danes, and other nations, in the Eaft and Weft Indies.

The eftablifhment of the European colonies in America and the Weft Indies, if we except thofe of North America to which we have already alluded, did not originate in neceffity; but it was the refult of ambitious and interefted views. The Dutch, indeed, may plead in favour of the extenfion of their own fettlements and commerce, that the colonial fyftem is neceffary to their fubfiftence and profperity. Their territory is fmall, and generally undiftinguifhed by its fertility; and therefore they have recurred for the neceffaries of life to the ports of more fruitful and lefs populous countries. Habituated to induftry, and excelling other nations in nautical fkill, inftead of confining themfelves to the exchange of their own manufactures for the rude produce, or the manufactures of other nations, they employed themfelves in circulating the produce and manufactures of other countries; and, more attentive to this occupation than to the arts of working up the produce which they imported or raifed, they became a nation, not of farmers or manufacturers, but of fifhermen, merchants, and failors. Conftrained by other circumftances belonging to their country, when compared with other nations, they were obliged, by the difadvantages of their fituation and the oppreffion of their Spanifh mafters, to put forth every poffible effort of fortitude and perfeverance. By induftry, frugality, and labour, thefe people not only foon outftripped all their contemporaries in riches and naval fkill, but amaffed a much greater fhare of wealth, and gained a more formidable influence over the deftinies of the world, than fo fmall a tribe ever acquired in any age. Their fteady attachment to the principles of freedom and toleration ferved as a concurring mean of their advancement and profperity. The neceffary confequence of extenfive opulence, acquired by a people who have not a proportionably great territory, is, that the means of advantageoufly employing their capital will become gradually more and more difficult; the profits of its employment more confined, and its accumulation more flow. Such a people will naturally feek fome new opening for fettlement or commerce, by acquiring territory in diftant quarters of the globe. Should they fail in this way, the overflowing wealth of the nation muft infallibly emigrate, as it were, into the fervice of foreign countries, where the profits are greater than they are at home. Hence we find that the Dutch became, in a fenfe, the brokers of Europe; and that they advanced fums to foreign ftates and their fubjects, which were enormous. It is probable, fays an ingenious and accurate writer, (Mr. Brougham), that the Dutch have frequently been creditors, at one time, to the amount of much more than 300 millions fterling to their own government, and to foreign ftates, of which we may reckon two-thirds in foreign loan: an immenfe fum of furplus capital to have been accumulated by a nation poffeffed of no greater territory than the principality of Wales, without any good harbours, or any natural produce fit for exportation; a territory, 120 times lefs extenfive than the European dominions of Ruffia, which is conftantly running in debt with all the world! A people poffeffed of fuch an overflowing capital, was, of all people, that which ftood the moft in need of foreign colonies; and this for two reafons:—in order to obtain a new opening, of whatever kind, for the ftock which could not be employed at home, or which, for want of this employment, was drawn into the fervice of foreigners; and in order to fecure the poffeffion of this opening at all times under its own command. The acquifition of colonial poffeffions is the only means by which the United Provinces can poffibly avoid the decline of its mercantile profperity and political importance, and fupply their natural deficiency of territory, the caufe of their inftability, as it was the caufe of their rife and progrefs. An opening for capital may then be obtained always under the command of the ftate. The poffeffion of colonies muft be as advantageous to the community of the United Provinces, as agreeable to individual capitalifts and adventurers. It has certainly preferved the commercial exiftence of the republic for a long feries of years, and enabled this ancient ftate to retain its place among the great powers of Europe inftead of being fwallowed up by its neighbours, or reduced to a few fifhing villages. No nation of Europe depends fo much upon colonial policy as Holland; nor is any fo liable to be affected, in every member, by the flighteft variation of colonial affairs. See *Dutch Eaft India* COMPANY and *Dutch Weft India* COMPANY. The whole return of the Dutch colonies, above 20 years ago, was calculated (fays Mr. Brougham) at 24 millions of florins—exported in 150 veffels, navigated by 4000 men, and paying, in freight, 4 millions 5 hundred thoufand florins—in commiffion and infurance, 2½ millions. The Dutch merchants exported to them merchandize (including negro flaves) to the value of 6 millions. The moft unfortunate circumftance in the colonial policy of the Dutch has always been their bad treatment of flaves. (See NEGROES and SLAVES.) The colonies of Holland have alfo fuffered, in general, from the importation of negroes being too fcanty to anfwer the demands of the proprietors. Upon the whole, it is obferved by the writer fo often cited in this article, that in no country is there fo great a demand for new colonies as in the United Provinces. To no part of Europe are colonial poffeffions fo valuable; none would be fo irretrievably ruined by their lofs; none would be fo much benefited by their extenfion.

The views of Spain in its colonial eftablifhments were directed from the beginning of their connection with America to the pecuniary advantages likely to refult from them. In confequence of the reprefentation of Columbus, the council of Caftile determined to take poffeffion of countries of which the inhabitants were incapable of defending themfelves. The pious purpofe of converting them to Chriftianity fanctified the injuftice of the project. But the hope of finding treafures of gold there was the fole motive which prompted them to undertake it; and to give this motive the greater weight, it was propofed by Columbus, that the half of all the gold and filver which might be found there fhould belong to the crown. This propofal was approved of by the council. The tax was eafily paid whilft the defencelefs natives were plundered; but as they were ftripped of all that they had, which, in St. Domingo, and the other countries difcovered by Columbus, was completely done in fix or eight years; and when it became neceffary to dig for it in the mines, it was impoffible, to pay the tax. The rigorous exaction of it occafioned firft the total abandonment of the mines of St. Domingo, which have never been wrought fince; and it was afterwards reduced, by fucceffive defalcations, to a 20th part of the produce of the gold mines.

mines. The tax upon filver, which was a fifth of the grofs produce, was reduced to a tenth in the courfe of the laft century. All the other enterprifes of the Spaniards in the New World, fubfequent to thofe of Columbus, feem to have been prompted by the fame motive. It was the facred thirft of gold that carried Oieda, Nicueffa, and Vafco Nugnes de Balboa, to the ifthmus of Darien, that carried Cortez to Mexico, and Almagro and Pizarro to Chili and Peru. Impelled by the profpect of immenfe gain to eftablifh colonies in America, the firft object of the Spanifh monarchs was to fecure the productions of thefe colonies to the parent ftate, by an abfolute prohibition of any intercourfe with foreign nations. They took poffeffion of America by right of conqueft; and, having reafon to apprehend the lofs of their infant fettlements, on account of their feeblenefs, their extent, and the reluctance with which the vanquifhed nations fubmitted to their dominion, they guarded, by every poffible method, againft the intrufion of ftrangers. As their poffeffions were extended, the fpirit of jealoufy and exclufion increafed; and, in order to their greater fecurity, a fyftem of colonizing was introduced, to which the hiftory of mankind afforded no parallel. In the ancient world, as we have already feen, colonies were of two kinds; either migrations from a country overftocked with inhabitants, or military detachments ftationed as garrifons in a conquered province. The colonies of fome Greek republics, and the fwarms of northern barbarians which fettled in different parts of Europe, were of the firft kind; and the Roman colonies were of the fecond kind. In the former, the connection with the mother country quickly ceafed, and they became independent ftates; in the latter, the dependence continued, becaufe the feparation was not complete. The Spanifh monarchs, in their American fettlements. took what was peculiar to each, and ftudied to unite them By fending colonies to regions fo remote, by eftablifhing in each a form of interior policy and adminiftration, under diftinct governors, and with peculiar laws, they disjoined them from the mother country. By retaining in their own hands the rights of legiflation, as well as that of impofing taxes, together with the power of nominating the perfons who filled every department, civil or military, they fecured their dependence. At firft, as we have already obferved, the precious metals were the only objects that attracted their attention. Afterwards they fought for fuch productions of the climate as, from their rarity or value, were of chief demand in the mother country; and they forbade the eftablifhment of feveral fpecies of manufacture, that were likely to interfere with thofe of the mother country. Their clothes, furniture, inftruments of labour, luxuries, and even a confiderable part of the provifions which they confumed, were imported from Spain. In return, the colonifts fupplied the produce of their mines and plantations, which was conveyed only in Spanifh bottoms. The commercial intercourfe of one colony with another was either abfolutely prohibited, or limited by many jealous reftrictions. All that America yields flows into the ports of Spain; all that it confumes muft iffue from them. No foreigner can enter its colonies without exprefs permiffion; no veffel of any foreign nation is received into their harbours; and the pains of death, with confifcation of moveables, are denounced againft every inhabitant who prefumes to trade with them. Thus the colonies are kept in a ftate of perpetual pupillage; and by the introduction of this commercial dependence, a refinement in policy, of which Spain fet the firft example to the European nations, the fupremacy of the parent ftate hath been maintained over remote colonies, during $2\frac{1}{2}$ centuries. Several maxims were alfo adopted and enforced with regard to the reftrictions of fettlers, the ftate of property, and the ecclefiaftical policy of the colonies, which ferved very much to difcourage emigration from Europe, and the increafe of population in America. If we advert to the ftate of Spain, and compare it with that of Holland, we fhall foon perceive, that the Spaniards, poffeffing a country fifteen times more extenfive than Holland, of incalculably greater fertility, enjoying all the benefits of the fineft climate in the world, furrounded with natural barriers of defence, and bleffed with every advantage of fituation which can facilitate commercial intercourfe, and yet maintaining not much more than one-fourth of the Dutch population, are evidently independent of colonial poffeffions. All the induftry, fkill, and capital of the natives, may find ample employment in raifing, manufacturing, and circulating the produce of the foil, or in exchanging the fuperfluous part of that produce for the commodities which abound in other countries. But, though it would have been founder policy in the Spanifh government to have promoted a fpirit of induftry at home, than to have eftablifhed diftant colonies, yet it cannot be denied, that fhe has received very great benefits from them, and fuch, in their nature and value, as more than counterbalance the injury they have occafioned. At the period of their firft eftablifhment, the interior induftry and manufactures of Spain were fo profperous, that, with the product of thefe, fhe was able both to purchafe the commodities of the New World, and to anfwer its growing demands. Under the reigns of Ferdinand and Ifabella, and Charles V., Spain was one of the moft induftrious countries in Europe. Her manufactures in wool, and flax, and filk, were fo extenfive, as not only to furnifh what was fufficient for her own confumption, but to afford a furplus for exportation. When a market for them, formerly unknown, and to which fhe alone had accefs, opened in America, fhe had recourfe to her domeftic ftore, and found there an abundant fupply. By this new demand, furnifhing anfwerable employment, the fpirit of induftry muft have been enlivened and encouraged; and the manufacture, population, and wealth of Spain might have gone on increafing in the fame proportion with the growth of her colonies. However, by the great and fudden augmentation of power and revenue, which the poffeffion of America brought into Spain fober plans of induftry were overturned, and opulence, rapidly acquired, produced a tafte for what is wild and extravagant, and daring in bufinefs or in action. The genius of Charles V. in fome meafure counteracted the pernicious influence of this inundation of wealth and of the fubfequent interruption of it; but under Philip II. its effect, both on the monarch and the people, became confpicuous. Philip, poffeffing an extravagant opinion of his inexhauftible refources, and, at the fame time, an ambition connected with moderate talents, thought himfelf equal to any undertaking. Accordingly he waged open war with the Dutch and Englifh, encouraged and aided a rebellion in France, conquered Portugal, and maintained armies and garrifons in Italy, Africa, and both the Indies. Thus Spain was drained both of men and of money. Under the weak adminiftration of his fucceffor, Philip III., the vigour of the nation declined, and the bigotry of the monarch expelled near a million of his moft induftrious fubjects; fo that early in the 17th century, Spain felt fuch a diminution in the number of her people, that from inability to recruit her armies, fhe was obliged to contract her operations. Her flourifhing manufactures were fallen into decay. Her fleets, which had been the terror of all Europe, were ruined. Her extenfive foreign commerce was loft. Agriculture was neglected, and one of the moft fertile countries in Europe hardly raifed what was fufficient

for

for the ſupport of its own inhabitants. In proportion as the population and manufactures of the parent ſtate declined, the demands of her colonies continued to increaſe. The rage of emigration prevailed, and the ſtrength of the colonies was augmented by exhauſting that of the mother-country. The emigrants depended upon Spain for almoſt every article of neceſſary conſumption. But Spain, thinned of people and deſtitute of induſtry, was unable to ſupply their increaſing demands. She had recourſe to her neighbours; and the manufactures of the Low Countries, of England, of France, and of Italy, which her wants called into exiſtence, or animated with vivacity, furniſhed in abundance whatever ſhe required. In a ſhort time not above one-twentieth part of the commodities exported to America was of Spaniſh growth or fabric. All the reſt was the property of foreign merchants, though entered in the name of Spaniards; ſo that the treaſure of the New World may be ſaid henceforward not to have belonged to Spain. Before it reached Europe, it was anticipated as the price of goods purchaſed from foreigners. Thus the poſſeſſions of Spain in America have not ſerved as a ſource of population and of wealth to her, in the ſame manner as thoſe of other nations. From the cloſe of the 16th century ſhe was unable to ſupply the growing wants of her colonies; and the pernicious effects of this diſproportion between their demands and her capacity of anſwering them, were farther aggravated by the mode in which ſhe endeavoured to regulate the intercourſe between the mother-country and the colonies. Such was the monopoly at which ſhe aimed, and which ſhe wiſhed to maintain, that ſhe did not veſt her trade with her colonies in an excluſive company; a plan which had been adopted by nations more commercial, and at a period when mercantile policy was an object of greater attention, and ought to have been better underſtood. The Dutch gave up the whole trade with their colonies both in the Eaſt and Weſt Indies, to excluſive companies. The Engliſh, French, and Danes, have imitated their example with reſpect to their Eaſt-Indian commerce; and the two former have laid a ſimilar reſtraint upon ſome branches of their trade with the New World. The wit of man cannot, perhaps, deviſe a method for checking the progreſs of induſtry and population in a new colony, more effectual than this. From this error in policy Spain was preſerved, probably by the high ideas which ſhe early formed concerning the riches of the New World. Gold and ſilver were commodities of too high value to veſt a monopoly of them in private hands. The crown retained this alluring branch of commerce; and in order to ſecure it, enjoined the cargo of every ſhip fitted out for America to be inſpected by officers at Seville, and then to receive a licence for the voyage; and on its return, that a report of the commodities which it brought ſhould be made to the ſame board, before it ſhould be permitted to land them. By this regulation all the trade of Spain with the New World centered in the port of Seville, and was brought into a form, in which it has been continued with little variation, almoſt to our own times. See Galeons and Flota.

The trade of Spain with her colonies being thus reſtricted, was conducted on the ſame principles which directed that of an excluſive company; and the whole of it was exported by a few wealthy houſes, formerly in Seville, and ſince the year 1720 in Cadiz; theſe, by combinations eaſily formed, prevent that competition which preſerves commodities at their natural price; and, by acting in concert, to which mutual intereſt prompts them, they may raiſe or lower the value of them at pleaſure. This reſtraint of the American commerce to one port, not only affects its domeſtic ſtate, but limits its foreign operations. In theſe circumſtances, and whilſt the evils reſulting from them found no effectual remedy, Spain, with dominions more extenſive and more opulent than any European ſtate, poſſeſſed neither vigour, nor money, nor induſtry. At length the violence of a great national convulſion rouzed the ſlumbering genius of Spain. As ſoon as the Bourbons acquired poſſeſſion of the throne, it was the firſt object of Philip V. to prohibit the admiſſion of foreign veſſels into any port of Peru and Chili; and a Spaniſh ſquadron was employed to clear the South Sea of intruders, whoſe aid was no longer neceſſary. After the treaty of Utrecht, which terminated the war, new embarraſſments occurred in conſequence of the aſſiento, or contract for ſupplying the Spaniſh colonies with negroes, conveyed to Great Britain, as the price of peace; (See Assiento.) and the additional privilege of ſending annually to the fair of Porto-Bello, a ſhip of five hundred tons, laden with European commodities. By the operations that ſucceeded theſe grants, and by the activity of private interlopers, almoſt the whole trade of Spaniſh America was engroſſed by foreigners. Guarda coſtas, and regiſter ſhips were introduced. (See each of theſe articles). Since the reign of Philip V., ſentiments with regard to commerce, more liberal and enlarged, began to ſpread in Spain. At length Charles III. in 1764, appointed packet-boats to be diſpatched on the firſt day of each month, from Corugna to the Havannah or Porto-Rico. From thence letters are conveyed in ſmaller veſſels to Vera-Cruz and Porto-Bello, and tranſmitted by poſt through the kingdoms of Terra Fermé, Granada, Peru, and New Spain. Other packet-boats ſail regularly once in two months, to Rio de la Plata, for the accommodation of the provinces to the eaſt of the Andes. With this new arrangement for conveying ſpeedy and regular intelligence, a ſcheme of extending commerce has been more immediately connected. Each packet boat is a trading veſſel, and is uſed for facilitating the exchange of Spaniſh product, for an equal quantity of that of America. This was ſoon followed by a greater degree of enlargement. In the year 1765, Charles III. laid open the trade to the windward iſlands, Cuba, Hiſpaniola, Porto-Rico, Margarita, and Trinidad, to his ſubjects in every province of Spain. He reduced the duties on goods exported to America, to the moderate tax of ſix in the hundred, on the commodities ſent from Spain. He allowed them to return to any port at pleaſure. This ample privilege was afterwards extended to Louiſiana, and to the provinces of Yucatan and Campeachy. Such have been the benefits experienced from the relaxation of the ancient ſyſtem of commerce between the mother-country and her colonies, that Spain has been induced to permit a more liberal intercourſe of one colony with another. In 1774 Charles III. publiſhed an edict, granting to Peru, New Spain, Guatimala, and Granada, the privilege of a free trade with each other. The towns to which Spain has granted the liberty of trade with any of her colonies, are Cadiz and Seville, for the province of Andaluſia; Alicant and Carthagena, for Valencia and Murcia; Barcelona, for Catalonia and Arragon; Santander, for Caſtile; Corugna, for Galicia; and Gijon, for Aſturias. Theſe are either the ports of chief trade in their reſpective diſtricts, or thoſe moſt conveniently ſituated for the exportation of their reſpective productions. Prior to the allowance of free trade, the duties collected at the Cuſtom-houſe at the Havannah, were computed to be 104,208 peſos annually. During the five years preceding 1774, they roſe at a medium to 308,000 peſos a year. In Yucatan, the duties have riſen from 8,000 to 15,000. In Hiſpaniola, from 2,500 to 5,600. In Porto-Rico, from 1,200 to 7,000. The total value of goods imported from

Cuba into Spain, was reckoned, in 1774, to be 1,500,000 pefos. From another ftatement, it appears, that the exports to Spanifh America in 1778, were made in 170 fhips; were worth about 74 millions of reals vellon, and paid above $3\frac{1}{2}$ millions of duty. The imports from thence, in the fame year, were made in 130 fhips, valued at $74\frac{1}{2}$ millions, and paid nearly 3 millions duties. In 1788, the value of the exports had rifen to above 300 millions, and that of the imports to above $804\frac{1}{2}$ millions. The duties upon both exports and imports exceeded 55 millions. This rapid increafe can be afcribed to nothing but the effects of the free trade; and notwithftanding all the clamours raifed by the Cadiz merchants, we find that this city was the firft to enjoy the advantage of the change; for the imports of Cadiz from America in 1788, were three-fourths of the whole colonial imports; and the exports of Cadiz thither were confiderably above two thirds of the whole colonial exports. Spain has likewife directed particular attention to the interior government of her colonies. For an account of the Philippine colony, fee ACAPULCO and MANILA.

The revenues which Spain derives from America, arifes from taxes of various kinds, which may be divided into three capital branches. The firft contains what is paid to the king, as fovereign of the New World; to this belongs the duty on the gold and filver raifed from the mines, and the tribute exacted from the Indians; the former called "the right of figniory," and the latter "the duty of vaffalage." The fecond branch comprehends the numerous duties upon commerce, which are very minute and oppreffive. The third includes what accrues to the king, as head of the church, and adminiftrator of ecclefiaftical funds in the New World. In confequence of this he receives the firft-fruits, annats, fpoils, and other fpiritual revenues, levied by the apoftolic chamber in Europe; and is entitled likewife to the profit accruing from the bull of *Cruzado*, which fee. The whole amount of the net public revenue of Spain, raifed in America, is ftated by Dr. Robertfon as not exceeding a million and a half fterling. Spain and Portugal are the only European powers which derive a direct revenue from their colonies, as their quota towards defraying the general expence of government. All the advantage, that accrues to other nations from their American dominions, arifes from the exclufive enjoyment of their trade; but, befides this, Spain has brought her colonies to contribute towards increafing the power of the ftate, and, in return for protection, to bear a proportional fhare of the common burden. The amount of the Spanifh revenue, above ftated, comprehends only the taxes collected there, and is far from being the whole of what accrues to the king from his dominions in the New World. The heavy duties impofed on the commodities exported from Spain to America, as well as what is paid by thofe which fhe fends home in return; the tax upon negro flaves, with which Africa fupplies the New World, together with feveral fmaller branches of finance, bring larger fums into the treafury, the precife extent of which Dr. Robertfon cannot pretend to afcertain. But if the revenue which Spain draws from America be great, the expence of adminiftration in her colonies bears proportion to it.

The total amount of the public revenue of Spain from America and the Philippines, from the moft recent information ftated by Dr. Robertfon, is as follows:

Alcavalas (excife) and aduanas (cuftoms), &c. in pefos fuertes, - - -	2,500,000
Duties on gold and filver, - -	3,000,000
Bull of Cruzado, - - -	1,000,000
Tribute of the Indians, - -	2,000,000
By fale of quickfilver, - -	300,000
Paper exported on the king's account, and fold in the royal warehoufes, - -	300,000
Stamped paper, tobacco, and other fmall duties,	1,000,000
Duty on coinage of, at the rate of one real de la Plata, for each mark, - -	300,000
From the trade of Acapulco, and the coafting trade from province to province, -	500,000
Affiento of negroes, - - -	200,000
From the trade of *Mathé*, or herb of Paraguay, formerly monopolized by the Jefuits, -	500,000
From other revenues formerly belonging to that order, - - - -	400,000
Total	12,000,000
Total in fterling money	£ 2,700,000
Deduct half, as the expence of adminiftration, and there remains net free revenue, -	£ 1,350,000

From the above detail, and upon a general view of the fubject, it appears to be abfurd to deny, that Spain has derived very great benefits from her colonial poffeffions. Neverthelefs, many very enlightened men have maintained, that the downfal of the Spanifh power has been owing, in a great meafure, to the extenfion of dominion which followed the difcovery of America. To this purpofe an appeal has been made to the authority of Dr. Smith, the well known and much approved author of the "Wealth of Nations." "That the monopoly," he obferves, "of the trade of populous and thriving colonies is not alone fufficient to eftablifh, or even to maintain, manufactures in any country, the examples of Spain and Portugal fufficiently demonftrate. Spain and Portugal were manufacturing countries before they had any confiderable colonies. Since they had the richeft and moft fertile in the world, they have both ceafed to be fo." However, Mr. Brougham has remarked, that the tenor of this obfervation is confined to the ftatement of a fact which cannot be denied, that the period of the decline which the Spanifh and Portuguefe manufactures have experienced, coincided with the period of the Spanifh and Portuguefe colonial greatnefs. But the whole argument proceeds upon a view of the fubject, formerly difcuffed, that colonial monopolies in general have been hurtful, from their effects on the wealth of the mother-country. Mr. Brougham has accurately examined this fubject; and in the profecution of his inquiry, he has fhewn, in what manner the profperity of Spain has been influenced by the difcovery of America; and he has inveftigated the queftion, whether the acquifition of rich and extenfive colonies can be charged with having caufed the decline of the mother-country, and whether, in fhort, any bad confequence whatever is imputable to this augmentation of empire.

By thofe who have maintained, that Spain has been materially injured by her colonies, it has been alleged, that by an immoderate extenfion of territory, the Spaniards have been led to the neglect of the territory, which they formerly poffeffed. But although Spain, and alfo Portugal, may have feverely fuffered in this refpect, it is feldom, if ever, that, from the nature of colonial power, any fuch confequences can arife to the mother-country from the poffeffion of the moft widely fpread colonial dominions. In the cafe of Spain efpecially, whatever neglect there may have been in the management both of the mother-country and the colonies, the mal-adminiftration of both thofe parts of the empire muft evidently have arifen from other caufes befides their being united under one crown. Farther, the vaft outlet to population which the Spanifh colonies

For an account of the colonies of France and England, the limits of our article oblige us to refer to the articles France and England, West Indies, East Indies, and Company, and the feveral individual iflands of the Weft Indies.

There are fome other kinds of colonies, befides thofe above enumerated, of which we fhall give a brief account. Conquered fubjects or prifoners of war have been fometimes removed to particular and felect places, either for fafe cuftody, or for the cultivation of wafte lands. The ancients more frequently practifed this fpecies of colonization than the moderns, who prefer exchanging the prifoners on each fide. The Romans, in particular, were conftantly accuftomed to remove the more active and daring nations to a diftance from their native abodes, and to oblige them to refide in fome felect place which was probably lefs defenfible than their own country, and where, of courfe, they would be more under command. We are not, however, without fome examples of this kind, even in our own times. The Maroons, or remnant of the Spanifh flaves, who had been relinquifhed by their mafters, and left on the ifland of Jamaica, when the Spaniards were expelled by the Englifh, after having long gallantly refifted the forces brought againft them, at laft fubmitted to one of his majefty's officers, upon condition of not being fent off the ifland. To this fubmiffion they were induced by the fear of a new fpecies of warfare with which they were threatened, *viz.* the ufe of blood-hounds to difcover their retreats. But the legiflative affembly of the ifland not only refufed to pay the Spanifh police-runners their ftipulated bounty, but alfo took advantage of fome unavoidable delays in the performance of the treaty to annul it altogether, and to tranfport the Maroons to Nova Scotia, whence they were afterwards removed to Sierra Leone. On account of this flagrant act of injuftice the commanding officer of his majefty's troops indignantly refufed a handfome fword, which the affembly offered him for his fervices in putting an end to a war which had been fo long protracted. See Maroons.

Another kind of colonization is the removal of convicted criminals, or of debtors, to fome defart fpot, in order to work the mines, or break up the land, and thus prepare it for more refpectable colonifts. The Ruffians ufe this mode of colonizing their vaft lands in Siberia. But the moft interefting colony of this defcription, particularly to Englifhmen, is that of New Holland, which fee.—Alfo, Botany-*bay*, and *New South* Wales.

Great fums of money have been, and ftill are, annually expended on this colony, but it has hitherto languifhed; partly from the difproportionate nnmber of the fexes, and the idle habits of the convicts, but ftill more from fome radical defects in its adminiftration, many parts of which render it more like a mere job for contractors and agents, than a well regulated fyftem for the gradual reformation of the criminals, and for rendering them ufeful fubjects in future. The diffentions alfo which have taken place among the officers there, cannot but have tended to injure the colony. Thefe diffentions feem to have originated in fome meafure from the governor being always a naval officer. The abfurdity, for fuch we muft efteem it, of a naval officer commanding in chief on fhore, merely becaufe he went to the place by fea, is fully equalled by feveral others, which demonftrate how inadequate to the undertaking were the framers of the fyftem by which the colony is regulated.

During the firft ten years, *viz.* from 1787 to 1797 inclufive, the number of convicts fent to New South Wales was 5765 men and women, and 93 children, being in all 5858 perfons. The expence of tranfporting, feeding, and governing them, during that period, amounted to 1,087,230*l.* being above 177*l.* for each, exclufive of the expences previous to their embarkation.

The number of convicts remaining was as follows:

Men convicts in the fettlement -	2175
Women - - - -	939
Convicts fent out in 1796 and 1797, Not arrived - -	695
Total -	3802

So that a lofs of 2049 convicts had been fuftained in this fhort period; an evident proof of the moft glaring mifmanagement. On the firft of September, 1796, the agricultural ftate of the colony was as follows:

	On account of government.	In poffeffion of private perfons.
Acres of land in cultivation -	1700	3719
Horfes - - -	14	43
Black cattle - -	150	77
Sheep - - -	191	1340
Goats - - -	111	1316
Swine - - -	59	1810

The later accounts which have been received are equally unpromifing. The fpirit of diffention has increafed, and fpread itfelf to every rank: fo alfo has the depravity of the convicts, in confequence of their not being feparated, and placed under the controul of fteady perfons who have an intereft in watching over their moral improvement. Indeed, the vicioufnefs of the convicts increafed by fellowfhip, and even many of the free fettlers have, from the force of evil example, acquired the fame bad habits. The quantity of land cultivated on the public account is too great, and the numerous public works abforb the labour of the convicts, and leave but few of them to be hired out to fettlers. Thefe circumftances, together with the ill felection of the convicts, and of the fettlers, as to their former employments, contribute to the want of fuccefs in the colony.

It certainly is not improper to fend, as matter of favour, criminals to remote and defart places to procure their own livelihood, furnifhing them at firft with a few neceffaries, and then leaving them to their own induftry, or to fupply the free fettlers in thofe places with convicts for fervants, in order to free them from the heavy expence incident to their procuring fervants from a diftance. But the idea of tranfporting large bodies of criminals to an immenfe diftance, and employing them, under a ftrong guard, in public works, where few fuch works can poffibly be wanted, and in cultivating land in the produce of which they have no intereft, does not feem to have been happily chofen, or very promifing, even in theory; and we may add, that practice, upon a very extenfive fcale, has completely fhewn its futility.

The Romans, it is true, tranfplanted their prifoners of war to diftant countries, and employed them on public works; but thefe works were carried on in well inhabited countries, and were defigned for the facilitation of the intercourfe between the feveral parts of the empire, or for adorning the cities with marks of the Roman grandeur.

We believe, however, that the colony of New South Wales might be made to anfwer much better, if a few fimple regulations were adopted, and particularly if the employment of fo many convicts on account of government was abolifhed, and the convicts left more to their own induftry.

It

It was formerly obſerved in Virginia, that the colony languiſhed ſo long as the cultivation of the ground, &c. was carried on as a public concern, but that it immediately begun to flouriſh when the lands were divided, and every one left to ſhift for himſelf.

The want of capital and experience among the majority of the convicts, forms no objection; as, by furniſhing thoſe accuſtomed to huſbandry, gardening, or uſeful trades, with the neceſſary ſeeds and tools, and "a very ſparing allowance of proviſions, to be gradually diminiſhed," there can be no doubt but that, in a very ſhort time, they would not only be able to repay the advances made them, with intereſt, but alſo to pay a gradually increaſing rent. As to thoſe bred to no profeſſion uſeful in the colony, they might be lett out by auction, for a year at a time, until they had acquired ſufficient experience: and a fourth part of their wages might be deducted and laid by, to form a ſtock when they were capable of uſing it, another part being paid into ſome benefit ſociety.

Hitherto we have ſpoken of external colonies, or thoſe in which the coloniſts recede from their mother-country, and eſtabliſh themſelves in foreign land, without, however, ſubmitting to their form of government.

It now remains to treat of thoſe colonies in which large communities of foreigners are, for ſome particular reaſons, permitted to enter and ſettle in a country; which colonies differ from thoſe founded by private adventurers, only becauſe they do not ſo ſtrongly affect the political ſyſtem of the country.

The Ruſſian government, having immenſe tracks of waſte lands, ſome of which are advantageouſly ſituated for mines or for commerce, has, as we have already ſaid, beſtowed great attention in endeavouring to people theſe tracks, as well by foreigners as by natives. The Pruſſian government has alſo beſtowed the ſame laudable attention to the improvement of the waſte lands in its poſſeſſion; and it even went ſo far as to require from the Poles a tribute of marriageable virgins, with a ſtipulated portion for each.

To this ſpecies of colony belongs what is uſually called the Babyloniſh captivity of the Jewiſh nation, and which is erroneouſly ſuppoſed to have been a removal of the whole nation in a ſtate of ſlavery: whereas it evidently appears, from their own records, that it ſimply meant the reſidence of the Jewiſh chiefs, and of their prieſts, at the court of the king of Babylon. The number of perſons carried off by the king himſelf, was (2 Kings, xxiv.) only 10,000; a number ſurely applicable only to the higher claſſes. The offices which many of them held in the Babylonian court, and ſubſequently in the Perſian, are a proof, that although they were, for obvious political reaſons, required to reſide at court, their ſituation there was perfectly honourable. It is probable, however, that their removal might occaſion the gradual emigration of a number of other families, who followed them for the ſake of employment, and ſpread over the Babylonian dominions; as their number was found to be greatly encreaſed, when they were allowed by the Perſians to return. They then amounted (Nehemiah, vii. Ezra, iii.) to 49.697 perſons.

Many other inſtances may be found, both in ancient and modern hiſtory, of this importation of people. The conquered Greeks filled the capital of the Roman empire, and, by the verſatility of their talents, acquired the ſame influence over the maſters of the world, as the modern French (who frequently boaſt of their Greek origin) have over the faſhionable part of our own country. By means of this influence, they introduced among the Romans all the vices for which they were notorious; and to the baneful effect of their influence, we may juſtly attribute, in great meaſure, the downfal of the empire, ſince they introduced a love of diſſipation, and of ſhowy, but trifling acquiſitions, inſtead of the more ſolid attainments which were required, before they contaminated the public mind.

The importation of ſlaves into a country, may be regarded as a kind of internal colony of the moſt important, becauſe dangerous nature. When the ſlaves are numerous, they are not only retained in ſubjection with difficulty, (being in general far ſuperior in bodily ſtrength) but they are alſo of very doubtful fidelity, and ever ready to join any invader, or to flock to the ſtandard of any military adventurer. There is yet ſtill greater danger if an independent ſtate exiſts in the neighbourhood, and particularly if it ſhould conſiſt of revolted ſlaves (as has lately happened in St. Domingo), becauſe the greater energy of an independent government enables it to proſecute any ambitious deſigns of conqueſt with decided advantage over a delegated authority.

It is, therefore, highly impolitic that ſlavery ſhould be conſtantly permitted in any country; and, although, for the ſake of bringing labourers to any particular ſpot, it it may be tolerated at firſt, it is the bounden duty of every ſtate to take deciſive meaſures to convert the ſlaves, by degrees, into free ſubjects, and to put a ſtop to the importation, as ſoon as the colony has obtained a certain population, and further to take ſome ſteps in order to liberate the ſlaves already imported, or at leaſt to make their offspring free at a certain age. Thus it will be requiſite for the coloniſt to attend to the welfare of his preſent ſtock, and to introduce taſk-work, whereby he will be changed, in time, from a commercial capitaliſt, or a needy planter, into a landed gentleman. He will then be ſolicitous only for his rents, and deprecate the idea of keeping more land in hand than is neceſſary for the ſupport of his eſtabliſhment, or to ſerve as an example of perfect cultivation and grazing to his tenants, to the moſt induſtrious of whom he might furniſh capital and favourable leaſes, in order to enable them to improve his own land.

To a neglect of this ſalutary precaution, we may attribute the preſent dangerous ſtate of the Dutch and Engliſh colonies in the Weſt Indies, ſince, notwithſtanding the length of time that they have been eſtabliſhed, the ſtate of ſociety in them is as crude and ſemi-barbarous as it was at the time of their being firſt ſettled.

It was probably owing to a ſimilar neglect that the weſtern provinces of the Roman empire were ſo ſpeedily ſubdued by the northern adventurers. The Roman provincials, like the planters in the Weſt Indies, ſeem to have had little repugnance to a change of maſters; partly becauſe the reſident planters were thus relieved, at leaſt for ſome time, from the claims of their creditors; partly becauſe the agents were enabled, in many caſes, to convert the plantations to their own benefit; and, laſtly, becauſe both were equally afraid that, in caſe the war was protracted, they ſhould loſe their ſlaves. See Slaves.

As to their intrinſic nature, colonies are either *agricultural*, which grow within themſelves the principal articles of their food and ſubſiſtence; or they are *commercial*, which depend upon other countries for the neceſſaries of life, and devote themſelves to the traffic of a few ſtaple commodities. The northern ſtates of America and the Bermuda iſlands are ſo many inſtances of agricultural colonies; while the Weſt Indian iſlands, together with Virginia and Maryland on the continent, are examples of commercial colonies.

In reſpect to the advantages or diſadvantages of external dependent colonies, no perſon has more thoroughly conſi-

dered the fubject than Mr. Brougham, in his elaborate treatife "On the Colonial Policy of the European Powers." The adoption of all the pofitions advanced by that ingenious writer, may indeed be fomewhat hazardous; efpecially if we confider the great degree of doubt and uncertainty which hangs over all political fpeculations, on account of the difficulty, and ftill more the danger of making experiments on thofe fubjects; to fay nothing of the want of means for afcertaining whether the effects are afcribed to the right caufes, when (as is ufual in human affairs) fo many caufes concur in producing thofe effects.

The firft advantage arifing from colonies dependent upon any country, is the extenfion of the home trade; for fuch in fact the trade between the mother-country and the colony may fairly be confidered, becaufe the whole of the profits is retained within the ftate; whereas in foreign trades, one of the profits, either that of the buying, or of the felling merchant, goes to enrich a foreign ftate. The trade of a colony alfo produces a confiderable augmentation of the mercantile navy of the mother-country, and, at the fame time; as the fhips and their crews are conftantly retained within the power of the ftate, there is far lefs danger of the failors being enticed into foreign fervice, than if part of their time was fpent in foreign ports. The European nations have anxioufly endeavoured to confine the trade of their colonies to the merchants of the mother-country by pofitive regulations; but Mr. Brougham thinks this folicitude is abfurd and even nugatory. Merchants will, in all countries, prefer dealing with their own countrymen, with whofe language, laws, and habits of thinking they are acquainted. And this is more efpecially the cafe in commercial colonies, as they require in general fuch large advances of capital, that few perfons would be inclined to inveft fums upon private foreign fecurity.

But the greateft utility of colonies, is the affording an opening for the employment of the fuperfluous population of the mother-country, which muft otherwife either emigrate to the neighbouring foreign nations, or die of want at home. The inhabitants, indeed, of agricultural colonies, are in general ftationary, and, as it were, loft to the mother-country; but thefe colonies only attract thofe who cannot get employment at home, or in the commercial colonies, or thofe who are in fuch defperate circumftances that they are obliged to fly from home to avoid the importunities of their creditors. Commercial colonies, on the other hand, have for the moft part only a temporary population, as the colonifts, after fpending a part of their time in the colony, generally return home with their fortunes improved, and carry with them, to the mother-country, the fame fpirit of improvement to which they owed their fuccefs in the colony.

Commercial colonies have a further advantage, in furnifhing employment for thofe large capitals which would otherwife be employed upon the more diftant foreign trades, or lent to foreign ftates.

We fhall now fay a few words refpecting the difadvantages arifing from the poffeffion of colonies; thefe are fo great that the economifts have loudly declaimed againft the utility of forming fuch eftablifhments; but they have committed a fundamental error, in confidering colonies as foreign ftates. They ought rather to be confidered as mere extenfions of the parent ftate, into regions adapted to the production of articles which cannot be raifed at home. A circulation of inhabitants is kept up by the commercial intercourfe between the colony and the mother-country, and alfo by the weaknefs incident to parts remote from the feat of government. So that, as the colonies require, at all times, the foftering care of the mother-country, they are generally filled with the troops of the parent ftate and their followers, and the ports are conftantly reforted to by its fhipping, both mercantile and warlike. It were needlefs to infift upon the powerful attractions refulting from their common origin, their identity of language, and their fimilarity of habits in thinking; as the effect of thefe, in producing a good underftanding among nations, muft ftrike the moft inattentive obferver.

One of the principal difadvantages of colonies, is the wars into which they feem to draw the nations which poffefs them. But although it is certainly true that external commercial colonies do, in the prefent times, generally become the feat of warfare between fuch of the belligerent powers as poffefs them, it cannot be allowed that they are the caufes of the war; for as they increafe the frontier to be defended, thofe nations which poffefs them will be lefs ready to engage in hoftilities; and it is the weaknefs of the colonies, (on account of their deficient population preventing the raifing of regular troops in them), that is the principal caufe of the enemy chufing rather to invade them, than to force his entry into the parent ftate. The want of a powerful landed intereft, in colonies of this nature, tends alfo to attract the hoftilities of the enemy, as the poffeffion of them is feldom difputed with the obftinacy which marks the refiftance to invafion in old fettled countries; the defence being limited to the fmall number of troops which the parent ftate can fpare without endangering her own fafety, and whofe exertions are impeded by the mixture of an ill-difciplined militia, and of volunteers, unaccuftomed to fervice, and deploring their fate in being forced from their own homes.

This unfitnefs of external colonies, which are always underftocked with inhabitants, to contribute fupplies of men for the general defence of the ftate, is ufually confidered as a difadvantage; but it cannot in reality be efteemed to be one of much confequence. Even in the parent ftate itfelf, it is only in thofe manufacturing diftricts that produce articles, the demand for which is variable- that the recruiting fervice meets with fuccefs; in thofe where agriculture prevails, or in which a ftaple commodity is manufactured, that fervice is in general unfuccefsful. It cannot, however, be of any confequence, in regard to the general population of the empire, whether the mother-country fupplies foldiers, or whether they are raifed in the colony, and their place fupplied by frefh fettlers.

It is only the total want of fyftem, both in the planting and fubfequent management of the Englifh colonies, that rendered them at firft, and ftill keeps feveral of them expenfive burthens to the mother-country; as thofe of other countries not only pay, in general, their own expences, but alfo furnifh a furplus revenue for the fervice of the empire.

It will appear, from what we have already faid, that a great difference of political ftrength fubfifts between agricultural and commercial colonies. The former are much ftronger internally, and capable of affording, with their own refources, a more obftinate defence to the attacks of the enemy. But this ftrength renders them refractory, and difficult to be controlled; hence they require either early reftraint, and the obfervance of a ftrict difcipline, or they muft be relinquifhed as dependencies, and incorporated into the mother-country, as has recently been found neceffary in refpect to Ireland. On the other hand, although the weaknefs of commercial colonies renders them much more dependent on the ftate to which they belong, yet, from the debts with which they are in general loaded, they are ever ready to fubmit to any invader; efpecially if the change can be made to a ftate, where the merchants poffefs

larger capitals than thofe of the ftate to which they have already been fubjected; as this affords them a hope, not only of being releafed for fome time from the claims of their ancient creditors, but alfo gives them reafon to fuppofe they may be able to procure ftill greater credit from their new mafters. Every perfon acquainted with Weft Indian affairs muft acknowledge the truth of this remark; and with refpect to other parts, we have, ourfelves, twice experienced the facility and even eagernefs with which the Cape of Good Hope was furrendered to us.

The want of mercantile capital which our enemies in the Weft Indies do not as yet poffefs, is the principal fecurity we have that thofe colonifts will rather chufe to remain under our dominion than fall into the hands of other powers, as they would, in that cafe, be obliged to diminifh their cultivation in confequence of the diminution in the advances made by the merchants upon their future crop. And as to any attempts at independence, the mother-country has a confiderable fecurity in the precarious fituation of the inhabitants, in confequence of the number of their flaves and the difcontent that generally prevails among them. This latter circumftance, might, by thofe who think the poffeffion of colonies, and the monopoly of their trade, are of great benefit to a nation, be thought to afford a good argument againft the abolition of the flave trade, as tending indirectly to leffen the dependency of the colonies. But we may remark, that the greater ftrength of the colonies, arifing from their internal improvement in confequence of the abolition of the flave trade, would more than counterbalance the danger of their revolt, as they would, in confequence of fuch ftrength, run lefs hazard of falling into the hands of an enemy. And the event of the American war has fully proved, that even in the cafe of the colonies revolting, when they had acquired fufficient ftrength, the commercial intercourfe between the two countries would continue, and probably rapidly increafe; fo that the government would, at the worft, lofe only an expenfive incumbrance. It can only be by the influx of foreigners, belonging to a mercantile nation, in fuch numbers as to acquire a preponderance in the ftate, fo as to alter the fundamental laws and language of the colony, that any great change in its commercial relations would be effected.

The moft ferious difadvantage of colonies, is that they divert the capital of the nation from the improvement of the mother-country; although this improvement is certainly the moft advantageous employment in which the capital of any nation can be engaged. It has indeed been afferted, that the labour of one man on the continent of America, produced more to the ftate than four at home; but this muft be regarded as the mere rant of vifionary politicians, being totally unfounded and abfurd in the higheft degree; for the fubjects at home being directly taxed, muft yield far more revenue than thofe in the colonies, who are in general only indirectly taxed to the common fervice of the empire, by the cuftoms levied upon the commercial intercourfe of the two countries. The fame perfons afferted that each white perfon in Virginia and Maryland, took off from ten to twelve pounds a year of the growth or manufactures of the mother-country. But the cuftom-houfe books are fufficient evidence that this calculation was much over-rated; for the exports to thofe colonies were never more than 300,000*l.* a year, and therefore, allowing them to contain, as was ftated, 120,000 white perfons, the confumption of each perfon was only 1*l.* 13*s.* 4*d.* a head. The whole of the exports to America, when at the higheft, was only about 834,000*l.* a year; and this tends to fhow that it is better to retain the induftry of the inhabitants of any country within its own fphere, and encourage the cultivation of the wafte lands, than to divert it to diftant colonization. It may, however, be fometimes neceffary, as a meafure of precaution, to fecure the poffeffion of diftant places, when it is known, or fufpected, that the ufual enemies of the ftate intend to colonize them; but it is extremely improvident to fofter thefe diftant colonies at the expence of the mother-country, as is done in refpect to the Britifh colonies. When an old fettled country is improved to the higheft, then, and then only, can it be neceffary to provide outlets for the employment of the furplus capital of its fubjects, by conquering, or purchafing fome poor country, with a view to its improvement.

As to internal colonies, the encouragement of foreigners, and efpecially the importation of foreign flaves, muft, in general, be regarded as errors in politics. The procuring of a ftock of labourers in the firft ftage of breaking up a new and uninhabited colony, the introduction of new manufactures, or of new commercial relations, can alone juftify fuch meafures. And furely it is far better to endeavour to attain thefe ends by other means. The removal of idle and diforderly perfons from great cities, the fending out intelligent travellers into other countries, the encouragement of experimental philofophers and chemifts, together with the apprenticing of clever youths to merchants in foreign countries, would probably be equally efficacious. See Smith's Wealth of Nations, B. iv. chap. 7. Robertfon's Hift. of America, vol. iii. Brougham's Inquiry into the Colonial Policy of the European Powers, 1803, vol. i. and ii. paffim. Paley's Principles of Moral and Political Philofophy, vol. i. p. 381. Edwards's Weft Indies, vol. ii.

Colony *of Bees.* See Hive.

COLOONY, in *Geography*, a fmall poft-town of the county of Sligo, Ireland, remarkable for the check given to the progrefs of the French troops under general Humbert, in September, 1798, by the gallantry of lieutenant-colonel Vereker with about 300 men chiefly of the city of Limerick militia. Though col. Vereker was obliged to retreat in confequence of the number of the enemy, yet he faved the town of Sligo, and by the delay he occafioned, enabled marquis Cornwallis to come up with and entirely fubdue the French force. Coloony is 98 Irifh miles N.W. from Dublin, and five S. from Sligo.

COLOOR, or Colore, a town of Hindooftan, in the circar of Guntoor, which poffeffes a diamond mine on the fouthern bank of the Kiftnah, and not far from Condavir.

COLOPENA Regio, in *Ancient Geography*, a country of Afia in Cappadocia; Sebaftopolis and Sebafte are towns of this country.

COLOPHON, a town of Afia Minor now *Attobofco*, or according to others, *Belvidere.* It was one of the chief cities of the Ionian league, feated near the fea, and not, as Pliny calls it, an inland city, in the fmall river Halefus, N.W. of Ephefus and S.S.E of Smyrna. It was founded by Mopfus, grandfon of Tirefias, and, in procefs of time, Damafichthon and Promether, fons of Codrus, conducted a colony hither. It was deftroyed by Lyfimachus, and its inhabitants were fent to people Ephefus; but after his death it was rebuilt in a more convenient fituation. The Colophonians were fuch excellent horfemen, that thofe, for whom they declared themfelves, were fure of victory; whence the trite proverb "Τον Κολοφωνα επεθηκε, colophonem addere," *i. e.* to put the laft hand to a work, or fuccefsfully to terminate it. Colophon was the birth-place of Nicander, and one of the feven cities that claimed Homer, who lived there fome time, as Herodotus informs us. The ancients mention a famous grove and temple of Apollo Darius in the neighbourhood.

bourhood of this city; whence fome have faid that he derived this appellation, though others fay that he was fo called from a mountain bearing that name. The fmall town of "Notium," on the fame coaft, often mentioned by Livy, belonged to the Colophonians, and the Romans allowed it the fame privileges, which they granted to Colophon itfelf. Pliny informs us, that they collected in the vicinity of Colophon, a refin of a yellowifh red colour, which being bruifed, emitted a ftrong odour; and hence fome have derived the name of *Colyphony*, now frequently called "Spanifh wax," or "Grecian refin," as it is brought from one or the other of thofe countries. Its epifcopal fee was fubject to the metropolis of Ephefus.

Colophon, a town of Greece in Epirus.

COLOPHONIA, in *Botany*, Commers. See Bursera *paniculata*.

COLOPS, in *Geography*, the name given by Dion to a river of Pannonia, called *Colapis*, by Strabo.

COLOQUINTIDA, in the *Materia Medica*. See Colocynthis.

COLOR, in the *Ancient Mufic*. See Colours.

Color *Indicus*. See Indicus *Color*.

Color *nero e roffo*, Ital. black and red, in *Mufic*. We have feen in Bene't college, Cambridge, old mufic books of Henry VII.'s time, in which fome of the notes were black, and fome red.

COLORADO, in *Geography*, a river of New Mexico, in the fouth-weftern part, which flows into the northern part of the Vermilion fea, or gulf of California, called by D'Anville *colorado de los maityres*. The courfe of this river, which is generally from N E. to S.W. fometimes W. may be computed at 600 Britifh miles. It is called Rio Colorado, or Red river, becaufe the waters acquire that colour from the red clay on which the rains fall. Its ftream is deep and copious, and capable of confiderable navigation. The neighbouring favages, who fwim acrofs it by a peculiar artifice, are denominated *cocomaricopas*, which fee. This river is joined from the eaft by a large river, called Gila, which, however, is everywhere fordable. The country between thefe rivers is faid to be an upland defart, without water or pafture. On the other fide of the Colorado, the country is faid, on the contrary, to be very fertile, and the natives rather fond of cultivation. It is thought that confiderable rivers alfo join the Colorado from the weft, flowing from the fame chain of mountains that fupply the fources of the Rio Bravo, in lat. 40°. Among thefe the Zaguananas is the moft lengthened ftream, and may therefore be regarded as the Colorado itfelf. On the weft of the Colorado, the river of Mactyrs, and that of Pyramids, have umbraceous terminations, perhaps in the fame lakes, or, perhaps in the Colorado. In lat. 39° W. long. from Madrid, 110° 30′, there is a large lake without a name, which receives two confiderable rivers from the eaft, one of which is called Buenara. From lat. 40° to 43°, and under the fame meridian, extends another lake, which, though not fully explored, feems to be that of Imparices, where the fathers Velez and Efcalante terminated their difcoveries, and the utmoft inland knowledge of the Spaniards. If, indeed, the Spaniards have explored that part of the country, they conceal their information.

On the eaft of the fame chain, from which fprings the Rio Bravo, arife two rivers, which probably join the Miffvari; and it appears that the eaftern river of Colorado has been confounded with another river of the fame name, with the epithet of Nachitos, which probably joins the Arkanza or Akanfas. See Colorado or *Riviere Rouge*, infra.

Colorado, a river of New Mexico, which runs into the bay of St. Bernard, in the gulf of Mexico.

Colorado, *Riviere Rouge*, or *Red River*, a river of North America, in Louifiana, which runs into the gulf of Mexico, or rather joins the Miffiffippi river, before it falls into this gulf, fome miles above New Orleans.

COLORADOS, Los, a numerous clufter of fmall iflands or rocks, near the N.W. coaft of the ifland of Cuba.

COLORATURA, in the *Italian Mufic*, is ufed to denote all forts of variations, trillos, diminutions, &c. that can render a fong agreeable.

COLORBASIANS. See Colarbasians.

COLOREDO, in *Geography*, a town belonging to the ftate of Venice, in the country of Friuli; feven miles N.W. of Udina.

COLORETTI, Matteo, in *Biography*, was born at Reggio, in the year 1611, and is fpoken of by Tirabofchi and the abbé Lanzi, as a moft excellent painter of portraits.

COLORIFIC *earths*, in *Mineralogy*, a clafs or tribe of earths, in the arrangement of Kirwan, defcribed by him as ftrongly ftaining the fingers. Of thefe he enumerates four families, *viz.* red, yellow, black, and green; the *red* is the reddle, or rubrica fabrilis. Rothel. Lafni, o. 973. Of dark cochineal red colour, or intermediate between brick and blood red, having neither luftre nor tranfparency; fracture, earthy, fometimes conchoidal; fragments, 1; hardnefs, 4; fp. gr. inconfiderable; adhering pretty ftrongly to the tongue; feeling rough; affuming a polifh from the nail; ftrongly ftaining the fingers; falling immediately into powder in water, and not becoming ductile; not effervefcing, nor eafily diffolving in acids. When heated to rednefs, crackling and growing black; at 159° the fpecimen (Lefke, o. 973) melted into a dark greenifh yellow frothy enamel. It differs from red ochres only by containing more argill. The red colour proceeds from oxygenation, and the abfence of acid. The mere air of water is expelled by heat, the browner it grows. The *yellow*, Gellebarde, Lefke, o. 1098, is of an ochre yellow colour; as to luftre, externally it often hath fome glofs, but internally none; tranfparency, o; fracture earthy, often inclining to the conchoidal; fragments, o; hardnefs, 3; fp. gr. inconfiderable; adheres ftrongly to the tongue; feels fmooth, or fomewhat greafy; takes a high polifh from the nail; ftrongly ftains the fingers; in water it immediately falls to pieces with fome hiffing; and afterwards to powder, without diffufing itfelf through it; does not effervefce with acids, nor is eafily foluble in them; heated to rednefs, it crackles, hardens, and acquires a red colour, and gives a reddifh ftreak. At 156°, Mr. Kirwan melted the fpecimen, Lefke, (o.1098) into a liver-brown porous porcelain mafs. This yellow earth differs from ochres only in containing a greater proportion of argill; the yellow colour proceeds from the calx of iron, highly oxygenated, and probably containing both water and acid. Thofe earths which contain a large proportion of iron, have rather an orange colour. According to the analyfis of M. Sage of Paris, who has the merit of preferving to his countrymen the immenfe gains acquired by the Dutch from converting this yellow earth into what is there called "Englifh red," it contains 50 per cent argill, 40 oxyd of iron, 10 of water, acidulated by vitriolic acid. Mem. Par. 1779, 313. The 3d family, or black, black chalk: Schwartze, Kreide, Zeichen, Schirfer, Lefke, 3.972; Pierre noire of Briffon, p. 163, is of a greyifh black colour; luftre, o; tranfparency, o; fracture imperfectly curved flaty; fragments 1, partly flat, partly long fplintery; hardnefs, 5; fp. gr. 2,114, by Kirwan's trial by Briffon, 2,186 before abforption of, 2,277 after abforption of water; adheres flightly to the tongue, feels fmooth, affumes a polifh from a knife; gives a black ftreak, and marks black; in water

ter does not readily moulder, but if taken out cracks in a ſhort time; does not effervefce with acids, nor eaſily diſſolve in them; heated to redneſs, it crackles and becomes reddiſh grey; and contains ſomewhat vitriolic. The 4th family, green earth. Leſke, 0.1013, is of a greyiſh green colour; found generally in lumps in the cavities of other ſtones, or externally inveſting them; luſtre, 0; tranſparency, 0; fracture, earthy, ſometimes uneven, ſometimes verging to the conchoidal; fragments, 2; hardneſs, from 6 to 7; ſp. gr. 2,637; ſometimes feels ſmooth, does not aſſume a poliſh from the knife, nor adhere to the tongue, nor ſtain the fingers, nor mark while dry, and when wet but lightly, in water it often crumbles after ſtanding about half an hour; does not effervefce with acids, nor is eaſily ſoluble in them; heated to redneſs, it crackles and becomes of a dark reddiſh cream colour; at 147°, the ſpecimen (Leſke, 0.013) melted into a black compact glaſs, reſembling that of baſalt; which ſhews it to conſiſt of ſilex, argill, iron not much oxygenated, and oxyd of nickel, from which the green colour is derived, beſides water. Kirwan's Elem. of Mineralogy, vol. i.

COLORINA, or Colarina, in *Ancient Geography*, a town of Arabia Felix. Ptolemy.

COLORISATION, or Coloration, in *Pharmacy*, a term applied to the ſeveral changes of colour which bodies undergo in the various operations of nature, or art; as by fermentations, lotions, coctions, oxydations, &c.

COLORITES, in *Eccleſiaſtical Hiſtory*, a congregation of Auguſtin monks, inſtituted about 1530, and ſo called from *Colorito*, a mountain near Morano, in Calabria, where a church was erected to the Virgin Mary.

COLORNO, in *Geography*, a town of Italy, in the Parmeſan; 7 miles N. of Parma.

COLOS, a town of Tranſylvania; 4 miles N. of Coloſvar.

COLOSER Salt Mine, in Hungary; the ſtratum of rock ſalt in this famous mine, is of the enormous thickneſs of 60 fathoms; the diameter of the excavation made therein by the miners, is 50 fathoms. "Born's Hungary," p. 140, 143.

COLOSVAR. See Colosvar.

COLOSSAL Column. See Column.

COLOSSE, in *Ancient Geography*, now *Chonos*, or *Konos*, a city of Phrygia Major, in that part called Pacatian, ſeated on an eminence, on the ſouth ſide of the Meander. It was built by the river Lycus, near the place where, according to Herodotus (l. vii. c. 30.) it begins to run under ground, as it does for five furlongs before it riſes again, and flows into the Meander. This city was ſituated at an equal diſtance between Laodicea and Hierapolis, and to this place Xerxes came in his expedition againſt Greece. All theſe three cities periſhed by an earthquake, ſays Euſebius, in the 10th year of Nero, or about two years after St. Paul's epiſtle was ſent to the Chriſtians at Coloſſe. The government of this city was democratic, and its firſt magiſtrate bore the title of archon and prætor. This city, having been forcibly transferred to the Perſians by the Macedonians, paſſed afterwards to the Saleucidæ. After the defeat of Antiochus III. at the battle of Magneſia, it became ſubject to Eumenes, king of Pergamus. And when Attalus, the laſt of his ſucceſſors, bequeathed his dominions to the Romans, this city, with the whole of Phrygia, formed a part of the proconſular province of Aſia, which diviſion ſubſiſted till the time of Conſtantine. After the reign of this prince, Phrygia was divided into Phrygia Pacatiana, and Salutaris, and Coloſſe was the ſixth city of the firſt diviſion. It afterwards took the name of Chonos, or Konos.

COLOSSIANS, *Epiſtle to the*, in *Biblical Hiſtory*, a canonical epiſtle, addreſſed to the Chriſtians at Coloſſe by the apoſtle Paul, and conveyed to them by Tychicus and Oneſimus, towards the cloſe of St. Paul's firſt impriſonment at Rome, which was about the year of our Lord 63, or the 9th of the emperor Nero. As Timothy joins with the apoſtle in the ſalutation at the beginning of this epiſtle, he was ſtill at Rome, and not yet ſent away to Philippi; and hence Dr. Lardner concludes, that this epiſtle was written about the ſame time with that to the Philippians, in the year 62, and ſome time before the end of it. Although it appears from this epiſtle, that a Chriſtian church was eſtabliſhed at Coloſſe; we have no account by whom, or at what time, it was founded. Some have concluded from chap. ii. 1. that St. Paul had never been there himſelf. It is not, however, improbable, though no mention occurs of this fact in the hiſtory of the Acts, that the Coloſſians might have been converted while Paul reſided at Epheſus, conſidering more eſpecially that he ſpent no leſs than three years in that city, and preached with ſo much ſucceſs, that St. Luke tells us, (Acts, xix. 20.) that "all they who dwelt in Aſia heard the word of the Lord, both Jews and Greeks." (See Acts, ch. xvi. 6. xviii. 23.) Dr. Lardner, arguing from the teſtimony of Theodoret (tom. iii. p. 342, 343.), who lived in the 5th century, alleges a variety of conſiderations, inducing him to think, that the churches of Coloſſe and Laodicea, had been planted by St. Paul, and that the Chriſtians there were his converts. Of theſe we ſhall only ſelect the three following, *viz.* that the apoſtle was twice in Phrygia, in which were Coloſſe, Laodicea, and Hierapolis (Acts, xvi. 6.); that he does in effect, or even expreſsly ſay, that he had diſpenſed the goſpel to the Coloſſians (Epiſt. ch. i. 21—25.): and that from ſeveral paſſages which occur in this epiſtle, it appears, that the apoſtle is not writing to ſtrangers, but to acquaintance, diſciples, and converts.

The Chriſtians of the church at Coloſſe ſeem, from the honourable teſtimony that is born to them in this epiſtle, to have maintained an honourable character for their party, and the zeal they diſcovered for the goſpel; nevertheleſs, we find, from the cautions addreſſed to them in the ſecond chapter, that they were in ſome danger of being drawn aſide by the ſubtleties of the Heathen philoſophers, and the inſinuations of certain Jewiſh zealots, who inſiſted upon the neceſſity of conforming to the ceremonies of the Moſaic law. Accordingly, the grand deſign of this epiſtle is to excite the Coloſſians, by the moſt perſuaſive arguments, to a temper and behaviour worthy of their ſacred character, and to ſecure them from the influence of thoſe Pagan ſophiſts, or Jewiſh bigots, who would ſeduce them from the purity of the Chriſtian faith.

COLOSSUS, a ſtatue of enormous or gigantic ſize.

The moſt eminent of this kind was the coloſſus of Rhodes, one of the wonders of the world, a brazen ſtatue of Apollo, ſo high, that ſhips paſſed with full ſails betwixt its legs. It was the workmanſhip of Chares, a diſciple of Lyſippus; who ſpent twelve years in making it: it was at length overthrown by an earthquake, B. C. 224. after having ſtood about ſixty-ſix years. Its height was a hundred and five feet: there were few people who could encompaſs its thumb, which is ſaid to have been a fathom in circumference, and its fingers were larger than moſt ſtatues. It was hollow, and in its cavities were large ſtones employed by the artificer to counterbalance its weight, and render it ſteady on its pedeſtal.

On occaſion of the damage which the city of Rhodes ſuſtained by the above-mentioned earthquake, the inhabit-

ants fent ambaffadors to all the princes and ftates of Greek origin, in order to folicit affiftance for repairing it; and they obtained large fums, particularly from the kings of Egypt, Macedon, Syria, Pontus, and Bithynia, which amounted to a fum five times exceeding the damages which they had fuffered. But inftead of fetting up the coloffus again, for which purpofe the greateft part of it was given, they pretended that the oracle of Delphos had forbidden it, and converted the money to other ufes. Accordingly the coloffus lay neglected on the ground for the fpace of 894 years, at the expiration of which period, or about the year of our Lord 653, or 672, Moawyas, the 6th caliph or emperor of the Saracens, made himfelf mafter of Rhodes, and afterwards fold their ftatue, reduced to fragments, to a Jewifh merchant, who loaded 900 camels with the metal; fo that, allowing 800 pounds weight for each load, the brafs of the coloffus, after the diminution which it had fuftained by ruft, and probably by theft, amounted to 720 thoufand pounds weight.

Some critics obferve, that the coloffus of Rhodes gave its own name to the people among whom it ftood; and that many, at leaft among the ancient poets, call the Rhodians *Coloffians:* hence they advance an opinion, that the Coloffians in fcripture, to whom St. Paul directs his epiftle, are, in reality, the inhabitants of Rhodes. Of this fentiment are Suidas, Calepine, Munfter, &c.

The bafis that fupported it was of a triangular figure: its extremities were fuftained by fixty pillars of marble. There was a winding ftair-cafe to go up to the top of it; from whence one might difcover Syria, and the fhips that went to Egypt, in a great looking-glafs that was hung about the neck of the ftatue. This enormous ftatue was not the only one that attracted attention in the city of Rhodes. Pliny (l. xxxiv. c. 37.) reckons 100 other coloffufes not fo large, which rofe majeftically in its different quarters. Befides thefe, here were to be feen five others, the work of Briaxis, and reprefenting divinities. Among the antiquities of Rome, there were feven famous coloffufes: two of Jupiter, as many of Apollo, one of Nero, one of Domitian, and one of the Sun.

COLOSTRUM, or Colostra, in *Medicine*, the firft milk of any animal after bringing forth young, called in common *beaftlings*.

It is remarkable that this milk is generally cathartic, and purges off the meconium; thus ferving both as an aliment and medicine.

The fame name is likewife given to a difeafe which this thick coagulated milk fometimes occafions.

An emulfion prepared with turpentine, diffolved with the yolk of an egg, is fometimes alfo called by that name.

COLOSVAR or Clausenburg, in *Geography*, the *Zeugma* of the ancients, by the Hungarians called *Kolofvar*, and in Latin *Claudiopolis*, a town of Tranfylvania, feated on the firft branch of the river Samos, and furrounded by an ancient thick wall, where the ftates of the province ufually affemble. The univerfity was fuppreffed in the year 1782. The Unitarians, who formed one of the fects received in Tranfylvania, eftablifhed their principal feat in this place: 255 miles E.S.E. from Vienna, and 45 N.N.E. from Belgrade. N. lat. 46° 57′. E. long. 22° 21′.

COLOT, Germain, in *Biography*, a famous lithotomift, of the 15th century, practifed furgery at Paris, during the reign of Lewis IX., from the year 1461 to 1480, and was in great favour with that prince. He was the firft regular bred furgeon who practifed lithotomy. The operation before his time had been engroffed by perfons practifing no other part of furgery. Regular practitioners had probably been deterred from interfering in the bufinefs, from reverence to the authority of Hippocrates, who obliged his difciples to fwear they would not perform the operation, "Nec vero calculo laborantes fecabo." He ingratiated himfelf with fome of the itinerant practitioners, faw them perform the operation, and began with cutting dead bodies. Having communicated his ideas to the phyficians of the court, they obtained leave from Lewis, that he might operate on a condemned criminal, who was attacked with the ftone in the bladder. The criminal confented, on the condition promifed, that he fhould be pardoned the crime he had committed. The operation was fuccefsfully performed, the patient recovering, it is faid, in fifteen days. Colot obtained great reputation by the cure, which was rewarded by a penfion from his fovereign. The time of his death is not known. Eloy. Dict. Hift.

Colot, Laurence, a defcendant of Germain, from whom he acquired the art of cutting for the ftone, was in great reputation, in the early part, and to the middle of the 16th century, for his fkill in performing the operation, by what is called the greater apparatus. By this method the urethra and neck of the bladder are neceffarily cut through, which fubjected the patients, not unfrequently, to fiftula, and other inconveniences, yet by his dexterity in operating thefe accidents were often avoided, which gave him fo much credit, that he was fent for to vifit patients in Flanders, and other diftant countries. To retain him in France, Henry II. made him his furgeon in ordinary in the year 1550, rewarding him with a penfion, adequate to the lofs he fuftained, by being prevented vifiting patients in foreign countries. He alfo created for him the poft of lithotomift to the royal family, which was continued to three of his defcendants. Philip, the laft of them, died in 1656, aged fixty-three years.

Colot, Francis, fon of Philip, appears to have inherited, with the name, the fkill and dexterity of his anceftors, in performing the operation of lithotomy. He left a treatife on the operation, which was publifhed in 1727, under the title of "Traite de l'Operation de la taille, avec des obfervations fur la Formation de la Pierre, et les Suppreffions d'Urine," 12mo. Paris. In this work he gives a fhort hiftory of the method of operating by the greater apparatus. It was invented, he fays, by John de Romanis, a phyfician of Cremona, in Italy, in 1525, and by him communicated to Marianus Sanctus, who inftructed Octavian de Villa, a furgeon at Rome. Marianus publifhed, in 1535, "Libellus Aureus, de lapide e Vefica per incifionem extrahendo," 8vo. Venet. Of Octavian de Ville, who was feveral times called to France, to perform the operation, Laurence Colot is fuppofed to have obtained fome valuable information on the fubject, which contributed much to the celebrity he afterwards enjoyed. The method of operating by the greater apparatus has been long fince abandoned for a more fimple and eafy operation, therefore called, by the leffer apparatus, firft difcovered, Mr. Sharp fays, by Mr. Foubert, an ingenious French furgeon, but much improved by Mr. Chefelden, in which the urethra and neck of the bladder are avoided by the operator: with Francis Colot, the celebrity of the family, feems to have been extinguifhed. Eloy. Dict. Hift.

COLOUR, or Color, from the Latin, *color*, in *Philofophy*, means that property of bodies which affects the fight only; thus the grafs in the fields has a green colour, blood has a red colour, the fky generally appears of a blue colour, and fo forth; nor can thofe colours be diftinguifhed by any of our other fenfes, befides the fight. The variety of colours, as they are prefented to us by the fubftances that

ſurround us, is immenſe, and from them ariſes the admirable beauty of the works of nature in the animal, in the vegetable, and in the mineral kingdom, or, more properly ſpeaking, in the univerſe. The ſcience, which examines and explains the various properties of the colours of light and of natural bodies, and which forms a principal branch of optics, has been properly denominated *chromatics*, from the Greek word, χρωμα, which ſignifies *colour*. We ſhall, however, ſtate this theory in the preſent article, as being much more obviouſly recurred to by thoſe perſons who wiſh to be informed on the ſubject. A diſtinct idea of what is meant by the word *light*, may be eaſily formed by its contraſt with darkneſs, which is a privation of light. With our eyes ſhut we have darkneſs; if we open our eyes, whatever we perceive through them is occaſioned by the agency of light, and the various colours of bodies are parts of that light.—It has ſometimes been pretended by certain ignorant perſons, that they could diſtinguiſh colours by the touch; but the teſtimony of divers intelligeut perſons, who have had the misfortune of being blind, in conſequence of which their touch has, from neceſſity, become very exquiſite, has conſtantly contradicted thoſe vain aſſertions. Beſides, it will appear from the following theory of colours, that to diſcriminate colours by the touch is utterly impracticable. There are indeed certain pigments of common uſe in painting, which, either from their roughneſs, ſmoothneſs, unctuoſity, or other quality, may affect the touch, and with a little practice a perſon may learn to diſtinguiſh the feel of vermillion which looks red from that of ſap-green, which looks green, and ſo forth; but this is not the art of diſtinguiſhing colours by the touch. It is only the art of diſtinguiſhing certain peculiarities of ſurface. In fact if two pigments exactly of the ſame texture (and ſeveral ſuch there are) but of different colour, be preſented to the fingers of a man with his eyes ſhut, he will pronounce them to be exactly of the ſame colour.

The queſtions which naturally occur to the human mind in the contemplation of colours, are, whence do they derive their origin?—Are they produced by the coloured bodies themſelves, or by ſomething external?—Do they move from the coloured bodies to our eyes, and ſtrike upon them, or enter them; or are they owing to ſome medium interpoſed between the various bodies of the univerſe?—Are they material or not?

The ideas entertained by the ancients concerning the nature of colours, were moſtly wild and abſurd; nor has the preſent theory, imperfect as it is, been formed without an innumerable variety of experiments, obſervations, and the concurring inveſtigations of a great many ingenious perſons. The followers of Pythagoras called colour the ſuperficies of bodies; Plato conſidered it as a flame iſſuing from them; Zeno called it the firſt configuration of matter; and Ariſtotle ſaid it was that which rendered bodies actually tranſparent. We need not add a formal refutation of thoſe extravagant ideas, which were the mere offspring of the imagination, unſupported by experience and by reaſon. The philoſophers of thoſe times paid little or no regard to experiments; hence they made no diſcoveries or improvements worthy of being recorded. A long and unprofitable period of nearly 2000 years elapſed, from the commencement of philoſophical ſtudies in Greece, until about the time of Deſcartes, when the revival of learning in Europe renewed with additional vigour the enquiries concerning the nature of light and colours. And it is curious to obſerve by what ſmall ſteps, and what circuitous ways, any uſeful diſcoveries were made. See Prieſtley's hiſtory of viſion, light, and colours. Deſcartes conſidered colour as a modification of light, and he attributed the difference of colour to the prevalence of the direct or rotatory direction of light. Grimaldi, Dechales, and others, ſuppoſed that a certain elaſtic medium of a peculiar kind filled the univerſe, and that the differences of colour depended upon the quick or ſlow vibrations of that medium. Rohault imagined that the different colours were produced by the rays of light entering the eye at different angles with reſpect to the optic axis. And Dr. Hook imagined that colour is cauſed by the ſenſation of the oblique or uneven pulſe of light; which being capable of no more than two varieties, he concluded there could be no more than two primary colours. Such were the ideas of philoſophers reſpecting the nature of colours, when Sir Iſaac Newton began to examine the ſubject in his cautious experimental manner, by which means, about the year 1666, he diſcovered the foundation of a theory of colours, which has been juſtly adopted and admired by his contemporaries, as well as by the preſent ſucceeding generation.—Rays of light iſſuing from a luminous object, proceed in ſtraight lines as long as they paſs through a uniform medium. If they meet with a tranſparent medium of different denſity, they will alſo proceed through it in ſtraight lines, provided they enter that medium in a direction perpendicular to its ſurface, otherwiſe they are cauſed to bend their courſe, ſo that beyond the abovementioned ſurface they proceed in ſtraight lines alſo; but theſe ſtraight lines form a certain angle with the ſtraight lines of their direction before they entered the laſt medium. The bending of the rays is called the *refraction* of light, and the angle that has been juſt mentioned is called the angle of refraction. See REFRACTION. Newton, having preſented a glaſs priſm, or kind of wedge, to the light of the ſun, which entered a dark room through a ſmall hole, found not only that the rays were bent from their courſe, *viz.* refracted, but he likewiſe obſerved that the image of the ſun was thereby conſiderably elongated; and this elongated image inſtead of appearing of a uniform bright white light, was reſolved into a ſeries of colours, which exactly reſembled the colours of the rainbow. This elongation of the ſolar image thus formed, is called the diſperſion of light. Theſe colours paſs from one to the other by very ſmall, and altogether imperceptible gradations; ſo that it is impoſſible to ſay where one begins and the next ends. Various methods have been tried for the purpoſe of rendering the colours of this priſmatic ſpectrum more limited and diſtinct; none, however, has been attended with complete effect. The following ſeems to be the beſt method. Let the light of the ſun paſs through a hole of about one-tenth of an inch in diameter, into a dark room. Place a ſcreen at a little diſtance from the hole (for inſtance ſix or ſeven inches) within the room, and let the middlemoſt part of the light paſs through a ſimilar hole in the ſcreen; the object of which is to prevent, in great meaſure, the ſcattered light or penumbra, on the ſides of the ſpectrum. Let the light then fall perpendicularly upon a convex lens; at the diſtance of about 10 feet, by which means a defined image of the ſun will be formed upon a ſcreen placed at the focal diſtance of the lens. Now, if a priſm be placed cloſe to the lens, ſo that the light, after having paſſed through the lens, may paſs through, and be refracted by, the priſm; then a coloured ſpectrum will be formed upon the ſcreen. The long ſides of this ſpectrum are very well defined; but its narrow terminations are ſemicircular, and its whole length conſiſts of circular coloured images of the ſun intermixed with each other, eſpecially about the middle or axis of the ſpectrum; yet the moſt predominant colours are more diſtinguiſhable from each other, eſpecially towards the ſides of the ſpectrum, ſo that their boundaries may be marked with tolerable accuracy. The glaſs priſm fit for this experiment muſt be well formed, and

and free from veins, fcratches, bubbles, &c. Thofe principal colours are feven in number, *viz.* red, orange, yellow, green, blue, indigo, and violet. They do not occupy equal fpaces in the fpectrum; but for the proportion of their breadths, and likewife for a more accurate defcription of the prifmatic experiments on light, fee the article REFRACTION.

The above defcribed experiment with the glafs prifm gave fir Ifaac Newton reafon to conclude that the white light of the fun confifted of feven colours, which had different powers of being refracted, fo that the red rays were refracted lefs, the orange a little more, the yellow ftill more, and fo on; hence the image of the fun was converted into an oblong variegated fpectrum. In confirmation of this theory Newton inftituted a variety of other experiments, which were attended with remarkable refults, and the principal of them are as follows:

If the light which has been refracted and difperfed by a prifm, be received again upon another prifm which muft be fituated in a direction perpendicular to that of the former; the fpectrum will by that means be removed from its original fituation into a lateral one; but its breadth and its colours will remain unaltered. Now if the elongation of the beam of white folar light, and its refolution into different colours, were a modification of light produced by the prifm only; then the fecond prifm ought to expand the fpectrum in breadth, fo as to form a quadrilateral figure of equal fides; but inftead of that we find that the colours and their breadths remain unaltered.

If the refracted and difperfed beam of folar light, be received upon a concave reflector, the different coloured rays will be reflected to a focus, where they will form a white or colourlefs image of the fun But if any of the colours be ftopped by the interpofition of a wire, or other flender and opaque body between the prifm and the reflector, then the image will become coloured with fome mixture of colours. This proves that white light confifts of coloured rays, intermixed in a certain proportion, and that by a mixture of the rays of the feven primary colours in that due proportion, white light is produced. Therefore, white arifes from a certain mixture of colours, and blacknefs arifes from a ftoppage or abforption of all colours. This property of light and colours, may be familiarly illuftrated by the following experiment: Divide the flat furface of a wheel, or the upper flat furface of a top, fuch as boys ufe, by means of lines going from the centre to the circumference, into feven parts, having the fame proportion that the breadths of the colours have in the prifmatic fpectrum, and let thofe portions be pointed refpectively with the feven colours. This done, if you fpin the wheel or the top, fo as to caufe it to turn very faft, in the light of the fun; you will find that the painted furface will look white; for by the quick motion of the wheel, the impreffions of the colours in the eye become mixed, and of courfe they form a white light. Stop the wheel and the feven colours will appear very diftinct.

If, when a fpectrum is formed by the light which has paffed through a prifm upon a fcreen, a fmall hole be made through the fcreen, and the rays of one colour only be permitted to pafs through it on the other fide of the fcreen; then whatever is viewed in that homogeneous light, will appear of that particular colour. Thus, if the red light only has paffed through the hole, then blood, or grafs, or milk, &c. viewed in that light behind the fcreen, will all appear red; excepting that the blood will appear of a ftronger red colour than the grafs or the milk. If the blue light only has been tranfmitted through the hole; then the abovementioned fubftances will all appear blue; and the like muft be underftood of the other homogeneous colours. This proves that the colours, which feem to proceed from coloured bodies in general, do not belong to thofe bodies; but they are the component parts of the white light, in which thofe bodies are viewed, and that certain bodies have the property of abforbing fome of thofe coloured rays of the white light which falls upon them, and of reflecting others. Thus, grafs reflects the green rays and abforbs the reft, hence, the green rays coming to our eyes, render the appearance of grafs green; thus blood abforbs every other coloured ray excepting the red, and fo forth. Black bodies abforb all the feven coloured rays, and white bodies reflect them all.

If two holes, at about a foot diftance from each other, be made in the fhutter of a dark room, and two prifms be ufed, *viz.* a prifm be placed to receive the light at each hole, two fpectrums will thereby be formed upon the fcreen; and by turning the prifms gently round their axes, the fpectrums may be caufed to fall one upon the other. Let the yellow of one fpectrum fall upon the blue of the other, and at that place the mixture of thofe two colours will appear green. Let a fmall hole be made exactly at that place, and that green light will pafs through the hole behind the fcreen, and will form a green circular image upon another fcreen placed to receive it. Now, if exactly behind the perforation of the firft fcreen, you fix the refracting angle of a prifm, then the image upon the fecond fcreen will not only be moved from its place, but will appear oblong, with a yellow border at one extremity, and a blue border at the other extremity; for that fpot or image of the fun confifts of two primitive colours of different refrangibilities. The fame thing muft be underftood of any other colour formed from a mixture of any two primitive prifmatic colours; for any two of thofe colours will form, or rather will look like an intermediate colour; thus, red and yellow form an orange, blue and violet form an indigo, and fo forth.

If the experiment be performed with one folar fpectrum: *viz.* a fingle prifmatic colour; for inftance the green be permitted to pafs through a hole in the fcreen, and be then received upon another fcreen, the image will be of the fame colour as in the preceding experiment, *viz.* green, and circular. Now, by placing a prifm behind the perforation of the firft fcreen, the green image will be moved from its place, but it will not be elongated nor altered in colour, becaufe this image confifts of one uniform primitive colour. (Newton's Opt. b. i. p. ii. prop. iv.) This remarkable experiment fhews, that though a green may be formed from a combination, or any other prifmatic colour may be formed from a combination of the two adjacent colours; yet each of thofe colours in the prifmatic fpectrum, is a primitive uniform or homogeneous colour.

Notwithftanding the conviction which naturally attends the refult of the above-mentioned experiments, feveral perfons have fuppofed that the primitive colours of light are not feven, but three only; namely, red, yellow, and blue; and they have been led to this fuppofition, by obferving that the painters can produce all the other colours, by mixing either all thofe three colours together, or two of them, in due proportion.

A recent writer of eminence in the philofophical world, (M. C. A Prieur) has ftarted another theory. He thinks that the primitive colours. (*viz.* the components of white light) are three in number; but he fuppofes them to be the red, the green, and the violet; and that the other colours of the fpectrum are formed from a mixture of thofe; that is the yellow from the red and the green, the blue from

from the green and the violet, &c. See l'Annales de Chimie. Sept. 1806.

Hitherto we have treated of the formation of colours by refraction; from which it appears that the white folar light confifts of coloured rays; that whenever that light enters a tranfparent medium in an oblique direction, it is caufed to deviate from its rectilinear courfe; and at the fame time its component coloured rays, are feparated in confequence of their different refrangibility. The next feries of facts, upon which the theory of colours depends, relates to the *inflection* of light, it having been found, that the rays of light are bent in their courfe, and refolved into their component colours, not only by refraction, but likewife by merely paffing by the furfaces of bodies. It feems that the rays of light are attracted by bodies, when they come within a certain diftance of their furfaces, and that the coloured rays of white light being attracted more or lefs, are feparated from each other. A great variety of experiments relating to this inflection of light, were originally made by Newton, and have, fince his time, been inftituted by other able philofophers. But, though feveral remarkable facts have been difcovered; yet the prefent ftate of knowledge does not admit of their being reducible to a fingle principle, or to any general and comprehenfive laws.

In order to give our readers fome idea of this property of light, we fhall now fubjoin an experiment related by a recent anonymous writer; referring, then, the reader to the article *Inflection of* LIGHT, for a full account of whatever belongs to it.

"Acrofs a beam," fays the above mentioned author, "of folar light, admitted into a dark chamber, through a fmall hole in a thin piece of lead, nearly $\frac{1}{50}$ of an inch wide, I interpofed a hair of a man's head, and receiving the beam on a fcreen, or fheet of white paper at a diftance, and with an obliquity convenient for the purpofe, I noted the following appearances.—At the termination of what may be confidered as, and therefore may be called, a fhadow, whofe intenfity or darknefs was not confiderable; the following orders and diftinctions of colours appeared. Firft, and neareft to the dark or black parts of the fhadow, might be feen a diluted blue, changing into a breadth of white light, followed by breadths of yellow and red. To thefe fucceeded an interval of diluted fhade, then breadths of diluted violet, blue, diluted green, yellow, red; then green diluted yellow, red; diluted green, red; white, diluted red; and finally white light. Thefe are the more general orders of the colours. Of thefe orders, the three firft were fufficiently obvious and diftinct; the laft evanefcent and requiring accommodation of circumftances to produce, and attention to perceive them." Obfervations concerning the Inflection of Light, &c. London 1799.

The laft fet of facts that remains to be mentioned, as relating to colours, confifts of the phenomena exhibited by thin tranfparent bodies, efpecially by thofe of variable thicknefs. Every perfon muft recollect to have feen the bubbles of a folution of foap, or of other thickning fubftance, exhibit a variety of colours fimilar to thofe of the folar fpectrum, or of the rainbow. Thefe bubbles are nothing more than thin veficles of the folution, whofe thicknefs varies continually. But a variety of thin folid fubftances exhibit the like phenomenon, fuch as plates of mufcovy glafs, or of talc; thin plates of glafs; metallic and glafs plates moiftened with a variety of fluids, &c. Newton took two object-glaffes of telefcopes, one of which was a plane convex, and the other a double convex one. He laid the latter on the flat fide of the other, and preffed them gently. Inftantly circles of colours appeared about the point of contact, which increafed and decreafed both in number and in fize, according as the lenfes were more or lefs forcibly preffed againft each other. The central fpot was black, and circles of colours appeared round this fpot, which were brighter near it than farther off. Their order, commencing from the black fpot, was blue, white, yellow, red; violet, blue, green, yellow, red; purple, blue, green, yellow, red; green, red; greenifh, blue, red; greenifh, blue, pale red; greenifh, blue, reddifh, white. (Newton's Optics, b. ii. p. 1. Obferv. iv.) Experiments fimilar to the above have alfo been performed with flat glaffes, lenfes of various curvatures, and other fubftances, by other philofophers fuch as Moraldi, Grimaldi, Delifle, Mairan, Mazeos, Du Tour, Mufchenbroeck, &c. See an account of their experiments in "Prieftley's Hift. of Vifion, Light, and Colours." p. 6. fect. 6. After the above fuccinct account of the principal experiments that have been inftituted, and the various important difcoveries that have been made, concerning the nature of light and colours; it is proper to obferve, that the fubject is not only very far from being exhaufted; but that the theory arifing from thofe experiments and difcoveries is doubtful in almoft all its parts. The number of primitive colours diftinct from one another, if fuch do really exift, is not quite determinate; the attraction between the rays of light and other bodies is an hypothefis not clearly underftood; for it is a prevailing opinion with feveral philofophers, that the rays of light are attracted within a certain diftance, and repelled beyond that diftance. The reflection of coloured rays from the furfaces of bodies is likewife involved in much uncertainty; it being unknown whether the reflection takes place at the very furface, or at a little diftance beyond it by fome power inherent in bodies, or, laftly, from fome other furface a little within the bodies, which fuppofition is founded upon the hypothefis that all bodies are tranfparent, as far as a very fmall part of their bulk, which hypothefis is founded upon the obfervation that feveral denfe and opaque bodies, when much attenuated, become, in fome meafure, tranfparent; and fuch is the cafe with gold leaf, which, when placed againft the light, appears of a greenifh caft.

Notwithftanding this uncertainty refpecting the theory in general, the following particulars feem to be fufficiently eftablifhed; namely, that by refraction and inflection the white light of the fun is refolved into coloured light. Here it may be naturally afked whether the light of other luminous objects is not refolved, by the like means, into the fame colours? The obfervations made in relation to this particular are not fo numerous, nor fo exact as might be wifhed; it appears, however, that fome luminous objects yield rays of particular colours more abundantly than of other colours. The abbé Rochon having placed a prifm before an achromatic telefcope, obferved through it the light of the ftars; and found that the white light of Sirius was refolved into an oblong fpectrum, which confifted almoft entirely of three colours, *viz.* red, green, and violet. An indication of yellow was barely difcernible between the two firft, and a flight degradation between the two laft. Through Dr. Herfchell's powerful telefcopes moft of the fixed ftars feem tinged with peculiar colours, *viz.* fome evidently incline to a green, others to a red, and fo forth. The light yielded by particular combuftibles is alfo tinged with peculiar colours, and the flame of fpirit of wine is a ftrong inftance of this nature; for if common falt be mixed with the fpirit, the light of its flame feems to be entirely deftitute of red, yellow, and violet, and it is owing to this peculiarity that children frequently play with it in order to give a ghaftly appearance to the furrounding

company. When baryt (ponderous earth) is mixed with ſpirit of wine, its flame is yellow; boracic acid renders it green, and ſtrontian earth gives it a purple colour.

The phenomena of coloured bodies, as they occur to us, in general, may be diſtinguiſhed into five claſſes, *viz.* 1ſt. The colours that ariſe from evident refraction, ſuch as the colours of the rainbow, of the bubbles of a ſolution of ſoap, &c. 2dly. Thoſe of opaque bodies that are fixed. 3dly. The colours of tranſparent bodies formed by the light paſſing through them. 4thly. The colours that are changeable, according to the ſituation of the eye, like the colours of certain ſilks, feathers, flowers, thin laminæ, &c.; and 5thly. Thoſe which are changeable in conſequence of a chemical alteration of the nature of the body. We ſhall now add a few obſervations reſpecting each of thoſe five claſſes.

1. That in paſſing through a tranſparent medium, like the drops of rains, the thin pellicle of a bubble of ſoap, a thin lamina of talc, &c. the light ſhould be decompoſed or rather reſolved into colours, is eaſily underſtood, after the above-mentioned properties of the priſmatic ſpectrum; but the only circumſtance which may require explanation is, that we perceive the colours, &c. not when the refracting body is between us and the luminous object, but when both our eyes and the luminous object are on the ſame ſide. With reſpect to this, it muſt be obſerved, that a tranſparent body, like a plate of glaſs, a drop of water, &c. reflects with both its ſurfaces at the ſame time that it lets part of the light paſs quite through its ſubſtance. Direct your eyes to the ſurface of a common glaſs plate ſo as to ſee the reflection of an object, as in a looking glaſs, and if you obſerve attentively you will perceive two reflected images cloſe to each other, *viz.* one from the anterior, and the other from the poſterior, ſurface. In moſt looking glaſſes, if you place a lighted candle on one ſide, and view the reflected image of it from the other ſide, you will generally ſee a ſucceſſion of images of the candle fainter and fainter, in proportion as they recede from the principal image. The reaſon of this appearance is, that ſince both ſurfaces reflect, the image formed by the reflection of the poſterior ſurface is partly tranſmitted to the eye of the ſpectator, and partly reflected from the anterior ſurface to the poſterior one, the latter of which is again reflected, and ſo on. Now, in the caſe of the drops of rain, when they form the rainbow, the light of the ſun falling obliquely on the ſurface of the drop is refracted and reſolved into colours, in which ſtate it proceeds through the drop to its farther ſurface, from which it is partly reflected to the eyes of the ſpectator. The ſame explanation is evidently applicable to the colours of the bubbles of ſoap, thin tranſparent laminæ, and the like. See Rainbow.

2. The fixed colours of opaque bodies are in all probability owing to their abſorbing ſome of the coloured parts of white light and reflecting others; their immenſe variety ariſing from a mixture of the reflected primitive colours in various number and proportion; but it is impoſſible to ſay at preſent whether that reflection is effected at the very ſurface, or at ſome diſtance from it, either within or without the body; alſo to what cauſe the diſpoſition of reflecting certain colours in preference to others may depend upon. Mr. Delaval's experiments ſeem to indicate that the colour of opaque bodies ariſes from the light that has paſſed through a thin layer of tranſparent coloured particles, and is then reflected by the ſmooth ſurface immediately under them.

3. The greateſt number of accurate experiments, concerning the colours of tranſparent bodies, was made by Edward H. Delaval, eſq. F.R.S. (See his Paper in the Memoirs of the Lit. and Philoſ. Society of Mancheſter, vol. ii.) His experiments were performed with an immenſe variety of liquors differently tinged by metallic ſolutions, decoctions, and infuſions of flowers, reſins, gums, woods, mineral and animal matters. Thoſe liquors he placed in phials of flint glaſs, of a parallelepiped form, with an oblong cylindrical neck. "I covered," he ſays, "the bottom, and three of the ſides of each of theſe phials, with a black varniſh; the cylindrical neck and the anterior ſide, except at its edges, were left uncovered."

In order to examine what colour thoſe liquors would exhibit, either by tranſmitted or by reflected light, he viewed them through the neck of the phials, or looked into the phial through the ſide which had been left uncovered by the varniſh. But with reſpect to this latter caſe, he ſays, "the uncovered ſide of the phial ſhould not be placed oppoſite to the window, through which the light is admitted; becauſe in that ſituation the light would be reflected from the farther ſide of the phial, and would be tranſmitted through the coloured liquor; and it is obſervable that ſmooth black ſurfaces reflect light very powerfully. Now, as it is a principal object in the experiment that no light be tranſmitted through the liquors, this will be accompliſhed by placing the uncovered ſide of the phial in ſuch a direction that it may form a right angle with the window."

All the coloured liquors, which Mr. Delaval tried in the above-mentioned manner, appeared tinged with their peculiar colours, when viewed through the necks of the phials; but when he looked on that part of the liquor which filled the body of the phials, he perceived no colour whatever, the whole appearing black; which proves an important fact, namely, that tranſparent coloured liquors do not yield any colour by reflection, but by tranſmiſſion only. "If theſe liquors," he obſerves, "are ſpread thin on any white ground, they appear of the ſame colours which they had exhibited when viewed in the necks of the phials; as the light reflected from the white ground is, in this caſe, tranſmitted through the coloured medium. But when they are ſpread upon a black ground they afford no colour. The black ground, however, ſhould not be a poliſhed body; as the light reflected thereby would be tranſmitted through the thin medium on its ſurface, and be tinged by paſſing through it."

Next to the above, Mr. Delaval relates various other experiments which he made with tranſparent ſolids, *viz.* with coloured glaſſes, which he made on purpoſe, by tinging the ſubſtance of the glaſs with metallic and other matters, in imitation of real gems. Theſe coloured glaſſes exhibited phenomena ſimilar to the coloured fluids. "Having," this author ſays, "formed pieces of ſuch glaſſes, about two inches thick, I incloſed all their ſides with black cloth, except at their farther and anterior ſurface. Each of theſe pieces of glaſs vividly exhibited its colour, when viewed by tranſmitted light: but when the tranſmitted light was intercepted, by covering the farther ſurface, the anterior ſurface afforded no colour, but appeared black. When plates of tranſparent coloured glaſs, ſomewhat thicker than window glaſs, are viewed by tranſmitted light, it is well known that they exhibit their ſeveral colours. I intercepted the light, which was tranſmitted through ſuch coloured plates, by fixing a piece of black cloth contiguous to their farther ſurface. The plates, thus prepared, when placed in ſuch a direction that they form a right angle with the window, appear perfectly black; which ſhews that the coloured particles do not reflect any light."

It

It is hardly neceffary to obferve that wherever light is tranfmitted through any coloured tranfparent body, a greater part of it is loft, than when that body is quite colourlefs; for by tranfmitting one fort of coloured rays more copioufly, it ftops a great part of the oppofitely coloured rays.

Befides thefe tranfparent coloured bodies which have been juft noticed, there is a vaft gradation of others between them and thofe that are perfectly opaque. Thefe, which are called femipellucid, or femitranfparent, exhibit a vaft variety of phenomena arifing from the various proportion of the opaque and the tranfparent particles which enter in their compofition. Thus fome appear of the fame colour, whether viewed by tranfmitted, or by reflected light, others exhibit one colour by tranfmitted and another by reflected light; others again appear of various colours, according to their thicknefs, &c. See Newton's Opt. l. i. p. ii. prop. x.

4. The laft paragraph may, in fome meafure, tend to illuftrate the nature of thofe coloured filks, feathers, &c. which change their colour according to the angle in which they are viewed, and in which the light falls upon them; other circumftances, however, are concerned in the phenomena of thofe bodies. Thus the furfaces of fome of them are very irregular, in confequence of which they reflect with fome of their particles, whilft they abforb moft of the light with other particles; hence, when by a lateral view, the former or the latter are placed out of the direction of the eye, the colour of the whole appears different from what it does in another point of view. Certain bodies of this fort may likewife be tranfparent to a certain fmall depth, in which cafe they become vifible partly by reflected and partly by refracted (confequently decompofed white) light; hence the eye of the fpectator muft, according to its fituation, fee fome coloured rays in preference to others. The phenomena of thofe changeable bodies, meaning with refpect to colour according to fituation, are far from being clearly underftood; it is moft probable, however, that in them all, the three principal properties of light are concerned, namely, its reflection, refraction, and inflection.

5. In the practice of various arts, wherein colours are concerned, fuch as in dyeing, enamelling, painting in oil or water colours, &c. a change in colour of moft of the materials is commonly obferved, which is evidently produced by the action of the air, the fire, the oil, or other agent to which the colouring materials are expofed, and by which they undergo different degrees of chemical alteration in their nature. This obfervation, and a defire of inveftigating the nature of thofe changes, with a view of improving the practical arts dependant upon them, induced feveral perfons to try a variety of experiments, and Mr. Delaval, the fame above-mentioned gentleman, who inveftigated other branches of the prefent fubject, became one of the greateft labourers in this field of inquiry. Were we acquainted with the nature of thofe particles in bodies which reflect or refract the coloured rays, and had we a fufficient knowledge of the alterations produced on thofe particles by the action of different agents or menftrua, be they oils, acids, air, alkalis, &c. a juft idea might perhaps be formed of the changes in colour, which muft arife from certain combinations; but as the prefent ftate of knowledge does not admit the formation of fuch a theory, the whole muft reft upon conjecture, and the practical part muft depend upon the refult of particular experiments.

Sir Ifaac Newton thought, that bodies reflect and refract light, by the fame power in different circumftances. Alfo, that the forces of bodies to reflect and refract light, are very nearly proportional to the denfities of the fame bodies, excepting that unctuous and fulphureous bodies refract more than others of the fame denfity. In fupport of this affertion he relates feveral experiments, the refult of which he expreffes in a table, wherein the proportion of the fines which meafure the refractions of the feveral bodies, the denfities of the bodies eftimated by their fpecific gravity; and their refractive powers in refpect of their denfities are ftated in feparate columns. Mr. Delaval conceived that the denfer fubftances ought, by their greater refractive powers, in like circumftances, to reflect the lefs refrangible rays; and that fubftances of lefs denfity, fhould reflect rays proportionably more refrangible, and thereby appear of feveral colours in the order of their denfity. Agreeably to this fuppofition he gives inftances of natural bodies, which differ from each other in denfity, though circumftanced alike in other refpects, excepting in their colour, which colour follows the order of their denfity; the denfeft being red, the next in denfity orange, the next to that yellow, then green, &c. In fupport of this hypothefis Mr. Delaval made feveral experiments with glafs tinged by metallic particles, in which the colour of the glafs, in a great meafure, correfponded to the denfity, or to the fpecific gravity, of the metal concerned. But this feries of experiments is not extended to that degree, nor is it conducted with that caution, which a confirmation of the hypothefis demanded. Mr. Delaval alfo inftituted fimilar experiments with coloured liquors, in which he endeavoured to fhew, that by an incraffation or an attenuation of their particles, their colours may be changed in one order or in the reverfe. His mode of attenuating thofe liquors was accomplifhed, as he fuppofed, by the addition of acids, and that of incraffating, by the addition of alkalies. But however fpecious this hypothefis may at firft fight appear, a ftrict examination of facts will eafily fhew the fallacy of it in almoft all its parts, and feveral writers have pointed out fome of its defects, but none better than Dr. Bancroft, F.R.S. in his "Experimental Refearches, concerning the Philofophy of permanent Colours," vol. i. chap. i. In this excellent work, Dr. B. fhews that Mr. Delaval has not noticed the change of nature, as well as of fpecific gravity, which the metals undergo by their being expofed to different degrees of heat, together with the glafs. He alfo obferves, that if, according to Mr. Delaval's hypothefis, the denfeft bodies are of a red colour, or approximating to it, platina, the heavieft of all known metals, ought to be red; whereas it is white, like tin, and the lighteft metals. Alfo gold, the heavieft metal next to platina, is much farther removed from the red colour than copper, which is much lighter. With refpect to Mr. Delaval's experiments on coloured liquors, Dr. Bancroft fays, "inftead of choofing and employing mechanical means, which alone are fuited to produce thofe effects, and only thofe effects, he has recourfe to mere chemical agents, whofe actions in the ways which he fuppofes muft have been almoft doubtful, though their powers of producing other, and very different effects from what he fuppofes, is moft certain. Mr. Delaval, however, adopting fir Ifaac Newton's fuppofition, that acids always attenuate, and alkalis always incraffate, prepared what he confidered as a diffolving or attenuating liquor; which confifted of water with about $\frac{1}{80}$ part of *aquafortis:* and when he wanted to leffen the diffolving force of this liquor, inftead of weakening it by the addition of water (which would certainly have been the moft obvious and unexceptionable expedient), he chofe to do it, as he fays, by adding a fmall quantity of a folution of pot-

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afh, or some other alkaline liquor, and thereby produced a new composition, the effects of which must, in many cases, prove different from those of a mere diminution of the supposed dissolving power of the former liquor. And on the other hand, when he wanted to increase the force of his acid liquor, instead of doing it by a farther addition of *aquafortis* (obviously the most proper expedient), he recurs to an addition of *oil of vitriol*, an acid possessing very different properties, and producing very different effects, on a great variety of substances, and particularly on colouring matters; of which we could easily allege hundreds of instances, but shall content ourselves with only mentioning what is well known, that even the strongest and most concentrated oil of vitriol (used to dissolve indigo for dyeing the Saxon blue, &c.) does not destroy, or even weaken, its blue colour, though a very weak nitrous acid, or aquafortis, will wholly destroy it, and convert the indigo to a dirty brown mass, of no use whatever." For farther observations of Dr. Bancroft on Mr. Delaval's Theory of Colours, we refer our readers to his abovementioned work. But with respect to the practical part of the subject, *viz.* the art of colouring glass, porcelain, &c. or the methods of forming pigments, they are requested to consult the articles, PAINTING, ENAMELLING, DYEING, STAINING, CRAYONS, and PIGMENTS.

COLOUR *of the clouds*, is thus accounted for by sir Isaac Newton. Concluding from a series of experiments, that the transparent parts of bodies, according to their several sizes, reflect rays of one colour, and transmit those of another, he hence observes, that when vapours are first raised, they are divided into parts, too small to cause any reflection at their surfaces, and therefore do not hinder the transparency of the air; but when they begin to coalesce, in order to form drops of rain, and constitute globules of all intermediate sizes, these globules are capable of reflecting some colours, and transmitting others, and thus form clouds of various colours, according to their sizes. Mr. Melville controverts this doctrine, in its application to the red colour of the morning and evening clouds. "Why," he says, "should the particles of the clouds become at that particular time, and never at any other, of such a magnitude as to separate these colours? And why are they rarely, if ever, seen tinctured with blue and green, as well as red, orange, or yellow? Is it not more credible, that the separation of rays is made in passing through the horizontal atmosphere, and that the clouds only reflect and transmit the sun's light, as any half-transparent colourless body would do? For since the atmosphere reflects a greater quantity of blue and violet rays than of the rest, the sun's light transmitted through it ought to incline towards yellow, orange, or red; especially when it passes through a long tract of air: and thus it is found, that the sun's horizontal light is tinctured with a deep orange, and even red; and the colour becomes still deeper after sun-set." Hence he concludes, that the clouds, according to their different altitudes, may assume all the variety of colours at sun-rising and setting, by barely reflecting the sun's incident light as they receive it. Edinb. Ess. vol. ii. p. 75. Priestley's Hist. of Vision, p. 446, &c.

For the distinct properties, &c. of the several colours, see BLACK, WHITE, BLUE, &c. See also RAINBOW, &c.

COLOUR, and COLOUR-*Making*, in *Calico-Printing*. The preparation of colours for calico-printing, constitutes one great branch of that beautiful art, and involves in it a series of interesting and important processes. As an art, its operations are more dependent than almost any other, on those minute differences and changes in the constitution of bodies, which it is the business of chemistry to investigate. Hence that liability to error and uncertainty which, in the hands of the ignorant, pervades many of its processes, though conducted according to long established and approved formulæ. Our present volume would scarce suffice for the various receipts in which the art abounds; yet, in the following article, we shall endeavour to lay down general principles, rather than more practical directions; convinced, that by presenting our readers with a clear and concise theory, deduced from such practical illustrations, as may be necessary for this purpose, we shall render them a more acceptable service.

The term *cola*, in calico printing, is applied not only to those vegetable, animal, and mineral solutions, which impart their own colour to the cloth on which they are applied, but also improperly to those earthy or metallic solutions, which, possessing little or no tingent properties themselves, yet retain or fix the colours of other substances, when afterwards applied to the cloth. Thus the acetite of alumine, or printers' red liquor, when pure, is almost colourless, and only becomes red by the process of dyeing, as will be explained hereafter. The acetite of iron, or iron liquor, in like manner, when used of a determinate strength, is called *black colour*, and when weaker *purple colour*, though the cloth impregnated with these solutions becomes black or purple, only as being raised, like the other, in the dye-copper.

1. The colours produced by means of these earthy or metallic solutions (which, in the language of science, are called *mordants*), form the most valuable and important series, whether considered with regard to the almost infinite variety of shades, or to their solidity and durability. These colours, from the mode in which they are produced, (the mordant being first applied to the cloth, and the colour afterwards raised by dyeing), are called *dyed colours*.

2. Sometimes the mordant is previously mixed with a solution of colouring matter, and in that state applied to the cloth, so as to paint or stain it, at one operation, and without the process of dyeing. Thus, another class of colours is produced, many of them possessing great brilliancy indeed, but much inferior to the former in durability. The colours called chemical, by calico printers, belong chiefly to this class.

3. In the third and last class, we may place all those where the colouring matter is simply held in solution by an acid or alkali, and in this state applied to the cloth, without the intervention of any mordant. To one or other of the foregoing classes, may be referred all the colours used in calico printing; with the exception, however, of those systems of colours which have been produced by calico printers in this country, within a short period, by processes, and upon principles which have hitherto not been made known.

Class I.

The colours of this, as has been already observed, are produced, by first impregnating the cloth with an earthy or metallic solution, or mordant, and raising the colour afterwards by dyeing. In this article we shall confine ourselves to the preparation of the different mordants, and the enumeration of colours they afford, with different colouring substances. The operations of the dye-house, and the mode of raising the colours in the dye-copper, will be detailed hereafter.

The two great and most important mordants used in calico printing, are those that we have already noticed, *viz.* the solution of iron in acetous acid or vinegar, called iron liquor, and the acetous solution of alumine, or the earth of alum, called red liquor, or red colour, and sometimes yellow liquor.

With these two solutions, either separately applied, and of

of various ſtrengths, or mixed together, and in various proportions, an infinite variety of ſhades of colour are produced. Almoſt all the hues in nature may be obtained by raiſing them, and their various combinations with different colouring ſubſtances. From madder, with the acetite of alumine, or red liquor, we obtain various ſhades of red, from the darkeſt blood colour to a pink. From weld and quercitron bark, yellows, varying in intenſity from a deep orange to a pale ſtraw colour, according to the ſtrength of the mordant employed. From logwood, various ſhades of violet; from cochineal, Brazil, and Hicaragua wood, pink and crimſons of different hues; and, in ſhort, from almoſt every different colouring ſubſtance, a different ſhade of colour. With the acetate of iron, or iron liquor, of different ſtrengths, we obtain from madder all the intermediate hues between black and pale purple, or lilac. From weld and bark, olives, browns, and drabs, of various hues; from ſumac, logwood, galls, and other aſtringent ſubſtances, all the varieties of grey, from the paleſt ſhades to the deepeſt, in which all the minute differences of hue are loſt till they approach to black. Theſe various ſhades are further modified by applying two or more colouring ſubſtances to the ſame mordant, as madder and weld, for example, to the acetite of alumine, which produces orange, light cinnamon, nankeen, &c.; and again ſtill further, by mixing the mordants themſelves in various proportions, and raiſing them with either one or more of the different colouring matters. By theſe means ſhades, and varieties of colour, may be produced from a few ſubſtances only, which baffle deſcription, and for which language has no preciſe or definite terms.

The acetite of iron, or iron liquor, is variouſly prepared. In this country it is chiefly made with the pyroligneous acid, which Fourcroy has proved to be identical with the acetous. Malt acid is preferred by many on account of its being free from volatile oil and reſinous matter, with which the other abounds; but the great difference in price, and the facility with which it is obtained, has brought the acid of wood almoſt into general uſe. A ſeries of caſks filled with ſcraps and turnings of iron upon which the acid is poured, is almoſt the only apparatus neceſſary for making iron-liquor; yet when the conſumption is great, or when it is prepared for ſale, vats capable of holding ſeveral hundred gallons are ſubſtituted for caſks, and the acid is kept in a ſtate of circulation through the iron by means of pumps. The ſaturation is much accelerated by this motion, which prevents any depoſition on the ſurface of the iron which might defend it from the action of the acid, and alſo brings freſh portions of unſaturated acid more frequently in contact with the metal. In a few weeks, ſooner or later in proportion to the ſtrength of the acid, the ſaturation is completed, and the liquor is then removed from the vat into caſks for uſe, and freſh acid poured upon the iron as before. This is an eaſy and ſimple mode of making iron liquor, and as it requires but little trouble and attention, is the one moſt generally in uſe. The precautions neceſſary to be obſerved are, that the acid, if it be the pyroligneous, ſhould not be uſed too ſoon after its preparation. It holds much eſſential oil and reſin in ſolution, part of which ſeparates on being kept a few weeks, and the clear acid may then be drawn off. It may be ſtill further freed from reſin by boiling; a portion of eſſential oil is thus thrown off, and the reſin, if held ſuſpended, is precipitated after ſtanding ſome time. We ſhall have occaſion to recur to this ſubject again, when we come to treat of the pyroligneous acid, and its formation, under the article *Diſtillation of* Wood. It is neceſſary alſo, that the iron ſhould be perfectly clean and all of it malleable. Caſt iron is not ſoluble in acetous acid. Hoop iron cut into lengths of from eight to ten inches is preferable to any other. It is readily cleaned and more eaſily taken out of the vat, and returned into it again than misſhapen maſſes ſold under the name of old iron. When malt acid is employed, ſimple heating and waſhing is ſufficient to free it from any foulneſs it may have contracted in the vat; but when the pyroligneous acid has been uſed, it becomes ſo coated with reſin on its upper ſurface after a ſecond or third ſolution, as to prolong the period of ſaturation to twice or thrice its uſual length. In this ſtate it muſt be removed from the vat and heated to redneſs in oven, through which there is a current of air. The reſin is conſumed, and the iron by heating is freed from any remains of carbonaceous matter that may adhere to it, and is again ready for the vat.

The only objection to this mode of making iron liquor is the time required to ſaturate the acid, which to thoſe, whoſe conſumption is very great, or who manufacture it for ſale, is oftentimes of importance. Different proceſſes have therefore been deviſed to remedy this inconvenience, in many of which the ſaturation is accelerated by means of heat which is applied in various ways, as beſt ſuits the convenience of the manufacturer; but the moſt expeditious mode is that of preſenting the iron to the acid in a ſtate of oxydation, by which means the ſolution is effected immediately. Calico printers have long been in the habit of uſing an extemporaneous acetite of iron, formed by mixing together ſolutions of acetite of lead and ſulphate of iron. A very pure acetite of iron may be obtained by this means, but the price of acetite of lead renders this mode too expenſive for general uſe. By forming a ſolution of lead, however, in pyroligneous acid and decompoſing it with ſulphate of iron or copperas, an iron liquor may be obtained ſufficiently cheap to render this proceſs advantageous in many caſes, though ſtill more expenſive than the ordinary mode. A patent was lately taken out for making iron liquor by a proceſs ſomewhat ſimilar to this, which, however, we underſtand has not anſwered the expectation formed of it. A ſolution of lead in pyroligneous acid is digeſted on clear metallic iron. The iron becomes oxydated at the expence of the lead and is diſſolved, whilſt the lead is precipitated in the metallic ſtate, and may again be uſed for a freſh ſolution. All theſe modes are evidently more expenſive than the ordinary one of ſimple ſolution of metallic iron in pyroligneous acid, and the only conſideration with the manufacturer is, whether this extra expence is counterbalanced by the economy of time or not.

The proceſs adopted ſome years ago by Mr. Thomſon, is perhaps the moſt expeditious, and next to the common mode, the moſt economical of any yet in uſe. It conſiſts in ſaturating the pyroligneous acid with quicklime, and pouring the clear boiling ſolution on as much ſulphate of iron or copperas as will precipitate the whole of the lime. A caſk of iron liquor may be made by this mode in a few hours, and when care has been taken rightly to proportion the ingredients ſo as to produce complete decompoſition, it is inferior to no ſolution whatever in any of its properties.

The properties of the acetous ſolution of iron fit it eminently above all others for the purpoſe of the calico printer, and having detailed its preparation we ſhall endeavour to point out in what this ſuperiority conſiſts.

The acetite of iron exiſts in two ſtates, dependent on the quantity of oxygen combined with the iron. When pure, and recently prepared, it is of a pale greeniſh hue, but by expoſure to air ſoon becomes tinged with brown. In this ſtate the iron is at its loweſt point of oxydation, ſtrongly attractive of oxygen, and if precipitated by an alkali, of a deep green colour. By expoſure to the atmoſphere, and conſe-

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quent abforption of air, the folution paffes to a deep red brown, and, if concentrated, depofits orange oxyd of iron, and becomes ftrongly acidulous. With this excefs of acid, the folution now becomes permanent; the iron is almoft wholly at the maximum of oxydation; and, when precipitated, of a dark red colour.

The fame takes place only in a lefs degree, and more flowly with the fulphuric and muriatic folutions of iron. Of a pale greenifh hue in their recent ftate, they gradually attract oxygen from the atmofphere, and become flightly red, depofit red oxyd of iron and pafs to a ftate of acidity, at which the folution becomes permanent, and the oxydation of the iron proceeds no further.

If the folutions, properly thickened with gum or flour, are applied to cloth, the fame change takes place, but with more rapidity, from their diffufion over a thin furface, and more complete expofure to the air. The aqueous and volatile part of the folution fpeedily evaporates, and as the oxydation goes on, the oxyd of iron is depofited on the cloth, and a portion of acid fet free. When this acid is volatile, as is the cafe with the acetous, and alfo in a great degree with the muriatic, it is diffipated. The oxydation of the iron then goes on, frefh portions of acid are again liberated and drawn off till the whole of the folution is decompofed, and the oxyd of iron depofited in the cloth. When the acid is not volatile, however, as is the cafe with the fulphuric, the firft portions of acid that are liberated not being drawn off, the oxydation proceeds more flowly till the excefs of acid becomes fo great as wholly to interrupt it, and great part of the iron in the operation of rinfing is again carried off the cloth. Another and more ferious inconvenience attending the ufe of the fulphuric folution is its action on the cloth itfelf. The difengaged acid being in a ftate of great concentration acts upon its fibres, weakens, and at laft deftroys them. The fame takes place with the muriatic folution alfo, for though the excefs of acid is flowly diffipated, yet it has fufficient time and concentration to act very powerfully, and is, if poffible, ftill more deftructive than the fulphuric, fince its action is not confined to the part on which it is applied, but from its volatility extends over the whole furface of the cloth.

It is neceffary, therefore, that the acid fhould be not only volatile, but harmlefs in its action on the vegetable fibre, which conditions are more completely fulfilled by the acetous than by any other folution whatever. From the preceding obfervations on the properties of the acetite of iron, and the changes it undergoes on the furface of the cloth, may readily be deduced the reafons for that expofure to heat and air which calico printers have, from long experience, found neceffary to goods printed with this folution. By expofure to air the iron becomes oxygenated and depofited on the cloth, whilft the heat favours the liberation of the acid, and accelerates the procefs. From what has gone before it may alfo be inferred, that the acetite of iron fhould be ufed in its recent or *green* ftate, fince in that ftate the acetous acid is capable of holding a greater quantity of oxyd of iron in folution, and that confequently after its faturation and removal from the iron, it fhould not be too much expofed or agitated in contact with the air. On this account, alfo, it is wrong to pump the liquor in the vats too much when it approaches the point of faturation, fince the oxygenated iron is almoft all precipitated, and frefh portions immediately diffolved, fo that the liquor might in time be rendered quite thick with precipitated oxyd of iron.

The preceding ideas are at variance with the general opinion refpecting the ftate in which the acetite of iron fhould be employed. All the fpeculative writers, and even many well acquainted with the proceffes of calico printing, recommend the oxygenation of the folution by expofure to air and removal from the iron, as effential to the goodnefs of the iron liquor. Even Berthollet, in the laft edition of his "Elements of the Art of Dyeing," has fallen into the fame miftake, the fource of which, and the facts which feem to countenance it, we fhall point out in a future article.

It is an object of importance to the calico printer to know the precife ftrength of his iron liquor, and to be able to afcertain this at all times, with little trouble or chance of error. Great mifchief and inconvenience often arifes from uncertainty in this refpect, efpecially in the pale fhades of purple, which are obtained from madder, with diluted acetite of iron. The hydrometer has been objected to, as indicating not merely the quantity of iron in a folution, but alfo the effential oil, refin, and mucilage which thefe impure folutions often contain. This objection, however, only applies where the fame inftrument and graduation is employed to afcertain the relative ftrengths of iron liquors, prepared with different acids, as the pyroligneous which contains much effential oil and refin, and malt acid which abounds in mucilage. In this cafe the hydrometer may indicate great differences in folutions containing equal quantities of acid and iron, but varying in the quantities of mucilage, oil, or refin. Iron liquor, however, prepared conftantly by the fame procefs, and from the fame acid, varies fo little in the relative proportion of its ingredients, that the hydrometer may be ufed to afcertain its ftrength in preference to any other mode whatever; provided the neceffary precautions are ufed to correct any error arifing from variation of temperature.

In a work of this kind, not illuftrated by actual fpecimens, and without reference to fome particular kind of iron liquor, it is impoffible to point out the fpecific gravities of the different folutions required for producing the various fhades, we have enumerated. An acetite of iron, of fpecific gravity 1.047, with madder or logwood, will produce a black, and with weld or fumac an olive, and diluted with fix, eight, or ten times its bulk of water, various fhades of purple, drabs, or olives, according to the colouring matter employed. A ftandard folution of iron once obtained, the neceffary ftrength for producing the different varieties of colour is eafily afcertained by actual experiment, and to this we muft refer our readers.

When thickened with flour or gum, and tinged with a decoction of logwood or Brazil, the better to enable the workman to obferve the progrefs and ftate of his work, it forms, as we have before obferved, the printers black colour, a purple colour, &c. according to the ftrength of the folution and the purpofe it is intended for. Various ingredients were formerly added to iron liquor, to improve its quality, or vary the hue of colour it produced. Verdigrife and copperas were added to the folution intended for black; and fal ammoniac or nitre to the diluted folutions for purple. Thefe are, however, now almoft univerfally laid afide, as being for the moft part ufelefs, and often hurtful: the fimple acetite of iron being found to anfwer every purpofe of the more complicated and heterogeneous folutions.

The *acetite of alumine*, or red liquor, is always prepared by the decompofition of alum, by an earthy or metallic falt, fince the aluminous earth is not foluble in acetous acid, except in its newly precipitated and minutely divided ftate. The pureft folution, and that which is generally ufed for the fineft and moft delicate colours, is produced by decompofing alum with Dutch fugar of lead, generally in the proportion of two parts by weight of the former, to one of the latter. The proportion of the two falts, and alfo the quantities of each gallon, as ufed by different calico printers, vary yet

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with little difference in effect. The alum in general predominates so far as completely to saturate the liquor. The printers' aluminous mordant therefore is a compound solution. It is an aceto-sulphate of alumine, consisting of a saturated solution of common alum, and more or less acetite of alumine, according to the quantity of sugar of lead employed. In the neighbourhood of London, the proportions are 6lb. of alum, and 3lb. of sugar of lead to a gallon of water: when these are completely dissolved, one ounce of Spanish white is added, and the whole briskly stirred till the effervescence has in great measure subsided. In a few hours the solution becomes clear, and forms a standard liquor from which, by greater or less dilution, may be obtained all the various shades of red, yellow, &c. already enumerated. In the above formula the proportion of alum is somewhat too great, a part of it remains undissolved, or immediately recrystallizes, and falls to the bottom along with the precipitated lead. This excess of alum is however strongly insisted on by many calico printers, as essential to the purity of the mordant, from an idea that the *purest* part of the alum only is taken up in the solution. This fact however may be readily disproved by employing this undissolved or recrystallized alum in the formation of fresh solutions, whose purity will be found in no respect inferior to the former. The purity of the alum and sugar of lead, and especially their being free from iron, is of great importance in the preparation of this mordant, and on this account the Dutch sugar of lead is preferred; but its high price renders it too expensive except for the pale reds of light chintz, and other kinds of work, whose great delicacy in the red tints is required. A substitute for it has been found in the solution of litharge in vinegar, or pyroligneous acid, which is afterwards decomposed by the addition of alum, and the excess of acid neutralized by Spanish white as in the former case. Great part of the acetite of alumine manufactured and sold under the name of red liquor is prepared in this manner. It is in general used for yellows, dark shades of red, and for those compound mordants into which the acetite of iron enters, and when its purity is of course of little consequence. The acetite of lime has long been substituted with great advantage by the writer of this article for the solution of lead, and its use is becoming daily more known and extended. When carefully prepared, it is scarce inferior to the best sugar of lead, and the impure solutions answer equally with the best, for the compound mordants before mentioned. The theory of these processes is the same in all. The object being to obtain a solution of alumine or earth of alum in acetous acid. On mixing acetite of lead, and sulphate of alumine together, a change of bases takes place; the sulphuric acid unites with the lead, and falls down in the form of a white heavy precipitate, whilst the earth of alum combines with the acetous acid, and remains in solution. The same takes place with the solution of litharge in pyroligneous acid, which is indeed an impure acetite of lead, and when the acetite of lime is employed instead of lead, the sulphuric acid and lime unite and form an insoluble powder, which subsides, though less quickly than the other, whilst the acetite of alumine remains in solution above; the addition of the Spanish white is necessary to saturate a small excess of acid which exists in the solution. This excess is taken up by the lime, and immediately converted into acetite of alumine, by the decomposition of a fresh portion of alum.

The acetite of alumine when pure, is almost colourless. It has a slight acetous smell, and when boiling throws off acetous acid in great abundance, and deposits a portion of alumine. When evaporated it acquires a thick gummy consistence, but does not crystallize a property which gives it a decided advantage over common alum as a mordant. It unites readily with gum, but when concentrated and holding much alum in solution, forms with flour a watery pulpy kind of paste, which has little adhesion, and from which the fluid soon separates. The sulphuric salts have indeed all a disposition to injure the thickening quality of flour.

The affinity of cotton for the earth of alum, is so strong as to separate it from its combinations even with the mineral acids. When a solution of common alum properly thickened is applied to cloth, a portion of alumine unites with it, and the acid, which held it in solution, is set free. When this is accumulated to a certain degree, it prevents any further decomposition, and in rinsing carries off the greater part of the earth again. When the acid however is volatile, like the acetous, and is dissipated as soon as disengaged, there being no longer any obstacle, the decomposition goes on till the whole of the acid is driven off, and the alumine combined with the cloth. In the infancy of calico printing, and before the theory and constitution of the different mordants was properly understood, a variety of substances were added to the solution, some of which are retained to this day. Verdigrise in the proportion of two ounces to a gallon, is recommended by many as tending to exalt the hue of yellows, and may in some cases be useful. Corrosive sublimate has been but lately laid aside, and the nitro-muriate of tin was long thought to give fixity and brillancy to reds, when used in a small proportion with the aluminous mordant. In general, however, the aceto-sulphate of alumine is found adequate to every purpose of the calico printer; we shall not, therefore, perpetuate error by detailing any of those unmeaning mixtures which are still retained by the ignorant and prejudiced. These two mordants, the acetites of iron and alumine, and their various combinations, are those only in general use in calico-printing, for producing colour of the first class. This application is so extensive, and at the same time so simple, as to supersede the necessity of any other. The solutions of copper are sometimes used as mordants, but they afford colours of little solidity. The solutions of tin have also been employed, but we shall speak of these and other earthy and metallic solutions which have been used with partial success, when we come to treat of mordants in general.

Class II.

In this class the colours are produced by combining a solution of colouring matter with some earthy or metallic salt, capable of giving it fixity when applied to the cloth. The mordant and colouring matter are here applied at once, and the cloth is painted, as it were, or stained, with the colour it is intended to retain, and requires, in general, no farther operation than that of rinsing, to free it from the paste or gum with which it was thickened.

The colour of this class possesses, as we have before observed, in general great brilliancy, but wants that solidity and fixity which characterise the colours of the former class. The union of the mordant with the cloth is weakened by its previous combination with the colouring matter, and not being favoured by heat, as in the former case; the triple combination of vegetable fibre, mordant, and colouring matter, wants that solidity which is so necessary to constitute what is called a fast colour.

Many of these, however, are sufficiently durable to be partially introduced, and intermixed with other colours of greater durability, and some are indispensably necessary, as no better mode has yet been devised of producing them. When the chemist's

chemift's art fhall have difcovered means of giving fixity to colours thus topically applied, the art of calico printing will have arrived at perfection. Syftems of colours may then be combined, which are at prefent incompatible, and the tedious operation of dyeing and bleaching, with their attendant difficulties, be banifhed from the art. Nor is the hope fo chimerical as might at firft be imagined; feveral of the moft ufeful and permanent colours are of this defcription, as will be fhewn hereafter.

We fhall content ourfelves with defcribing the leading and moft ufeful colours of this clafs, giving, at the fame time, the theory of their conftitution. The mere enumeration of all the varieties that have or may be formed, would be endlefs, and foreign to our purpofe.

Chemical Black.

This is the moft ufeful colour of the clafs, and one of indifpenfible neceffity in certain combinations of colours, where, for inftance, it is mixed with drab, olive, and yellow, raifed in the dye-copper with weld quercitron bark, or any fimilar colouring matter, and where the prefence of any fubftance, fuch as logwood or madder, capable of producing a full black, would be ruinous to the other colours. A deep olive, approaching to black, might, indeed, be produced, by employing a ftrong iron liquor, as mordant, and ufing fumac in the dye-copper; yet as this would bear no comparifon in point of intenfity with the madder or logwood black, and as the force of the colouring in fuch courfe of work greatly depends on contraft, the topical or chemical black, which has all the intenfity required, is almoft conftantly employed. The conftitution of this black is pretty nearly the fame in all the different formulæ in ufe. It confifts always of a folution of iron combined with a folution of colouring matter generally of an aftringent nature. On the right proportion of thefe two folutions, and on their due fpecific gravity or ftrength depends, in a great meafure, the goodnefs of the black.

1. If to a decoction of Aleppo galls, in five times their weight of water, made into a pafte with flour, a folution of iron in nitrous acid of fpecific gravity 1.25 be added, in the proportion of one meafure of nitrate of iron to eighteen or twenty of the former, a black will be formed fit for almoft all the purpofes of calico printing, and poffeffing the chief requifites of this colour, namely, tolerable fixity, and a difpofition to work well with the black.

2. In lieu of nitrate of iron, fome calico printers employ copperas, in the proportion of one pound to a gallon of the decoction of galls. Half the copperas is directed to be diffolved in the gall-liquor before it is thickened with flour; the remaining half, diffolved by heat in as much aquafortis as will cover it, is added afterwards. This black has tolerable fixity, but does not work fo well as the preceding.

3. Copperas diffolved in various proportions of from four to twelve ounces per gallon, will form, with decoction of galls or logwood, blacks of lefs folidity indeed than the former, yet applicable, neverthelefs, in many cafes where the others are not.

The conftitution of the two laft-mentioned blacks differs fomewhat from the firft. We fhall point out this difference, and explain, as concifely as poffible, the rationale of the foregoing proceffes.

When a folution of iron in nitrous acid is added to a decoction of galls, as in the firft example, the folution is decompofed, the iron unites with the gallic acid and tanning principle, whilft the nitrous acid is difengaged. This is proved by the blacknefs which the folutions affume immediately on being mixed. The difengaged acid, however, fhortly re-acts on the new compound, the blacknefs gradually difappears, and in a few days, if the nitrate of iron has been added in proper quantity, the pafte, inftead of black, is of a dirty olive green. If the proportion of nitrate of iron be greater than $\frac{1}{13}$, this change will be effected fooner; and if fo high as $\frac{1}{10}$, the pafte, when applied to the cloth, will be a bright orange, like the acetite of iron. By expofure to heat and air, this colour generally deepens, becomes grey, and at laft a full black. In this ftate it is permanent, and adheres powerfully to the cloth. Thefe changes of colour depend on the folution of the tannate and gallate of iron in the difengaged nitrous acid, and the evaporation of the acid when expofed to heat and air on the cloth. This folution of the tannate and gallate of iron is indeed an effential requifite in the goodnefs of the chemical black. If the difengaged acid is not fufficient to effect this, or if it is in too great a ftate of dilution, the colour has but a feeble adherence to the cloth; it is not prefented in a ftate favourable to its union with it, fince the combination into which the iron has entered is infoluble in water. It lies merely on the furface, but does not penetrate its fibres, and yields readily in the various operations to which it is fubjected. The chemical black, therefore, of the firft example is a folution of the tannate and gallate of iron in nitrous acid.

The black of the fecond, but more particularly of the third example, differs from the preceding in the circumftance of the iron in the folution being in a lefs oxygenated ftate. We may confider this black in its recent ftate as a mixed folution of green fulphate of iron, and gallic acid, and tanning principle; for the decompofition of the fulphate is not complete till by expofure to air on the cloth the iron becomes fully oxygenated. When this black is recently applied to the cloth, it is of a pale greyifh colour, has little fixity, fimple rinfing in cold water being fufficient to fetch nearly the whole away. By gradually abforbing oxygen, it becomes deeper, and at laft black. The fulphuric acid has no longer any action on it, and is removed in the firft operation in which it is immerfed in water.

The decoction of galls ufed for chemical black is varioufly prepared. Many calico printers infufe the galls cold in cafks of vinegar, or pyroligneous acid, fuffering them to remain feveral months, occafionally drawing off the lower part, and returning it on the galls. Others fteep them in urine. Both thefe modes are vicious, particularly the laft. Simple boiling in water, till all the foluble matter is extracted is fufficient, taking care to inclofe the galls in a fack, that when foft they may not render the decoction thick.

Grey.

By diluting the chemical black of the firft example with once, twice, thrice, &c. its bulk of water, and thickening the folution with gum, various fhades of grey are obtained, which require rinfing off in water only, and the deeper fhades of which have tolerable permanence.

The theory of thefe mixtures is the fame as of the black, from whence they are derived. On the addition of water to the olive-green folution, mentioned in the preceding article, the colour inftantly becomes deep purple, approaching to black. This is occafioned by the dilution of the free acid, which being no longer able to hold the tannate and gallate of iron in folution, fets part of it at liberty, which inftantly regains its colour. For the reafon already affigned, this has lefs adherence to cloth than that in which the folution is more perfect. The addition of a fmall quantity of nitrous acid effects this. The olive-green colour of the folution is reftored, which,

which, by expoſure to the air, and conſequent evaporation of the acid, diſappears, and leaves the tannate and gallate of iron more firmly fixed on the cloth. The complete precipitation of the combination is afterwards effected in the operation of rinſing off in water.

Yellow.

The falſe or chemical yellows are generally prepared with decoctions of French or Turkey berries, and ſometimes with quercitron bark. The latter ſubſtance produces pale yellows or ſtraw colour, but does not afford the deep bright orange yellow of the berries. Dr. Bancroft, to whom the public is indebted for the introduction and knowledge of this moſt uſeful dyeing drug; indeed, aſſerts the contrary in his work on "Permanent Colours;" and has given a receipt for the bark-yellow, which has, however, never ſucceeded in our hands.

Berry-yellow. Boil two pounds of good berries, ſlightly bruiſed, in a gallon of water during three hours, taking care to replace, from time to time, the evaporated water with liquor obtained from the ſecond boiling of a former quantity of berries. When the liquor is cool, add to it eight ounces of alum, and if it is intended for the block thicken it with flour. If it is meant for thoſe ſmall objects in printed goods, which are generally touched with the pencil, two ounces of ſugar of lead ſhould be added with the alum, and the colour thickened with gum dragon. This yellow is generally paſſed through lime water as the firſt part of the operation of rinſing; by this means the greater part of the earth of alum, which would otherwiſe have been carried off in the operation, is precipitated on the cloth, and the colour conſiderably heightened.

When this operation of liming cannot be performed without injury to ſome other colour, a greater proportion of ſugar of lead ſhould be added. This decompoſes the alum, and forms an acetite of alumine, which being more readily decompoſed by the colouring matter and the cotton than ſulphate of alumine, does not require the aſſiſtance of an alkaline ſolution to precipitate it on the cloth.

The proportion of berries above directed is for a full yellow; one fourth or one-third leſs will form, with the ſame quantities of ſalts, yellows of great brightneſs. Some calico printers add a ſmall quantity of nitrate of copper to the yellows intended to be ſimply rinſed off without liming. This heightens the colour, but what is gained in intenſity is loſt in brightneſs; for if the ſolution of copper be added in ſufficient quantity to produce any very perceptible effort, it imparts a dulneſs to the hue which is very detrimental. This is the invariable effect of copper in any ſhape, whether the acetite, ſulphate, or nitrate of copper be employed.

Bark yellow. For a lemon or ſtraw colour, it will be ſufficient to make a decoction of bark by boiling from four to ſix pounds in as much water as is neceſſary during two hours, and after evaporating down the decoction to one gallon, add to it two ounces of ſugar of lead, and eight ounces of alum. If not limed, the proportion of ſugar of lead ſhould be doubled. For ſtrong yellows, Dr. Bancroft directs the addition of both nitrate of copper and nitrate of lime in quantities ſo great, as near ſeven ounces of the former to a gallon of colour. Experience, however, though it has done juſtice to the merits of Dr. Bancroft's diſcovery of the uſe of quercitron bark, has not verified the expectations he had formed of it as a ſubſtitute for the Turkey berries in the topical or chemical yellow.

The conſtitution of theſe colours, whether formed with the ſulphate and acetite of alumine, or with the ſolutions of copper is the ſame. Alumine, or the earth of alum, and the oxyd of copper, have an affinity both for colouring matter and vegetable fibre. They form the connecting link between theſe ſubſtances, which would otherwiſe counteract a feeble union. When a ſolution of alum is added to a decoction of berries or of bark, a ſlight precipitation takes place by the union of a portion of colouring matter with the earth; the greater part however remains ſuſpended or held in ſolution by the acid of the alum. When applied to the cloth the farther decompoſition of the ſalt is aided by the affinity of this ſubſtance for alumine, and, when the acid is volatile, as the acetous for example, by its conſequent evaporation. The ſame takes place with the ſolutions of copper. The operation of rinſing farther aids the precipitation of the colouring matter and alumine, by thus largely diluting with water; and laſtly, when the goods are previouſly paſſed through the lime tube, the decompoſition is complete, the laſt portions of earth or oxyd are precipitated, and the colour thereby conſiderably exalted.

The ſolutions of tin are capable of forming very bright and beautiful yellows, with decoctions of different yellow colouring ſubſtances; but the exceſs of acid which theſe ſolutions neceſſarily contain, and their powerful action on the cloth, renders their application leſs general than the preceding. The ſolution of tin moſt proper for yellows is the muriatic, and is formed by digeſting, in a low heat for ſeveral days, the common muriatic acid, or ſpirits of ſalt, on fine grain tin. This ſolution forms, with bark, a pale and lively yellow, and with berries a yellow bordering more on orange. Theſe ſpirit yellows, however, as they are improperly called, are ſeldom uſed except upon dyed grounds, and of this preparation for ſuch purpoſes we ſhall treat at large under the head of *Diſcharged* WORK.

Blue.

The only blue belonging to this claſs is that produced by combining the colouring matter of logwood with the oxyd of copper. It is but ſeldom uſed ſince the mode of dipping China blue has become generally known; and indeed its want of durability renders it of little value. It may be produced by combining almoſt any of the ſolutions of copper with a decoction of logwood.

1. Boil two pounds of logwood in a gallon of water, and to the decoction, thickened with gum, add eight ounces of ſulphate of copper.

2. To a decoction of logwood as above, add two ounces of ſulphate of copper, and two ounces of verdigriſe.

Their colours may either be rinſed off or limed, as beſt ſuits the ſtyle of work. The theory of theſe combinations is the ſame as the preceding.

Green.

The chemical or falſe green is a compound colour, and conſiſts of a mixed decoction of logwood and berries, or bark, and a ſolution of copper. Though fugitive, its uſe is in ſome degree authorized by the impoſſibility of obtaining a green of greater durability that can be applied in figures with the block. The faſt green of the calico printers is the product of two operations, and is of courſe limited in its application, and tedious in its uſe. The production of a faſt green at one operation, or rather by one application to the cloth, either with the pencil, block, or preſs, is one of the great *deſiderata* of calico printing.

1. One pound of logwood and two pound of berries boiled together during two hours, and ſtrained whilſt hot

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upon two ounces of fulphate of copper, and two ounces of verdigrife, and thickened with gum, form a good and lively green, the hue of which may be varied at pleafure by the increafe or diminution of the proportion of logwood. To this fome calico printers add two ounces of common falt, and two ounces of fal enixon or acidulous fulphate of potafh.

2. To one meafure of blue of the firft example in the preceding article, add two, three, four, &c. meafures of a decoction of bark, made by boiling fix pounds as before directed for the yellow, and to which, when reduced to one gallon, two ounces of fulphate of copper, and two ounces of verdigrife have been added. The tone of the green depending on the relative proportions of blue and yellow, it is, in general, beft to keep the two decoctions feparate, to be mixed, when wanted, in fuch proportions as may beft fuit the purpofe required. The theory of thefe mixtures is the fame as of the blue and yellow already defcribed. To the eye of the mere fpeculative chemift, the addition of common falt and acidulous fulphate of potafh in the firft example, may appear unneceffary and unmeaning. They indeed affect little, either the hue or fixity of the colour, but experience has proved that this addition facilitates its working with the block, more efpecially when thickened with gum dragon. The caufe of this, in the particular inftance before us, is perhaps not very clear. The fulphuric falts in general, fuch as the fulphates of alumine, iron, and copper, are all unfavourable to working, as their folutions, efpecially when concentrated, neither thicken well with flour nor gum. A faturated folution of copperas cannot be thickened with flour, nor can a ftrong folution of the aceto-fulphate of alumine, in which the alum is in great excefs; even with gum it unites with difficulty. But if to a folution of copperas, which refufes to form a pafte with flour, a fmall portion of nitrate of iron be added, the whole forms a good and fubftantial pafte that works admirably with the block; and half a pound of common falt added to the aceto-fulphate of alumine has a fimilar effect. In the inftance more particularly before us, the addition of common falt forms a muriate of copper by the decompofition of the fulphate; but this laft is in too fmall a quantity to affect the working of the colour very fenfibly. The caufe of thefe effects is to be fought for in the very complicated play of affinities, which exift in fuch compounds, and which future inveftigation and difcovery may perhaps unfold. The fpeculative philofopher, who is ignorant of the minute details of an art, that involves in it confideration and difficulties, unfufpected in the laboratory, will hence learn to fufpend his judgment in deciding on the merits of a formula, till experience fhall have proved the inutility of thofe ingredients which theory would reject as abfurd.

But to return to our fubject, there is a wide field open for experiment and difcovery in the production of greens, into which logwood does not enter. A calico printer near London, celebrated for his ingenuity and invention in colours of this clafs, has long employed a green which, from its beauty and durability, when compared with the foregoing colours, indicate the prefence of indigo as a conftituent part. Pruffian blue in a minutely divided ftate, and mixed with bark or berry-yellow has been employed: but the blue in this cafe has fo little adherence to the cloth, that mere mechanical force, the operation of rinfing and wafhing is fufficient to difengage it. With one or other of thefe fubftances, however, it is likely that greens much fuperior in beauty, and probably alfo in durability to thofe generally in ufe, might, by a feries of patient and well conducted experiments, be readily obtained.

Pink.

The pale, and more delicate fhades of red, belonging to this clafs, are chiefly fought after in calico printing. They are employed in giving relief or effect to other admixtures of a more fober caft, and all the fkill of the colour-maker is exerted in giving them brilliancy and richnefs of tint. They are chiefly produced from decoctions of Brazil, nicaragua, or peachwood, and cochineal, raifed and fixed on the cloth with folutions of tin, rarely with the aluminous mordants, though delicate and lively colours may be produced this way.

The nitro-muriate of tin is chiefly employed, though the relative proportion of the two acids, and their degree of faturation with tin, varies almoft with every calico printer. The folution itfelf, made according to eftablifhed rule, and with the fame properties, varies fo confiderably at different times, as wholly to alter the nature of its compounds; without any apparent caufe of failure. The fource of this difcordance is to be fought for in the conftitution of the folution itfelf, which, from caufes that we fhall endeavour to explain, is fubject to confiderable variation.

Firft, from the ftrength or concentration of the acids employed, which are feldom uniform or conftant; muriatic acid from the fame manufacturer varying often in fpecific gravity from 1.12 to to 1.18, and nitrous acid not lefs than from 1.15 to 1.23, without reference to the common diftinction of fingle and double aquafortis.

When the fpecific gravity of the acids is neglected, as is but too generally the cafe, thefe differences occafion ferious inconveniences in the ufe of folutions, whofe properties often depend on the accuracy of their proportions, and on determinate degrees of faturation.

Secondly, from the impurity of the acids. The muriatic acid of commerce always contains iron and fulphuric acid; if the former exift in any notable proportion, it is unfit for the folution of tin; the prefence of the latter is of lefs importance, though, on the whole, unfavourable to delicate colours. The nitrous acid varies confiderably in its purity, being fubject to greater or lefs admixture with the muriatic; the nitre it is made from being feldom free from marine falt. The aquafortis of commerce is, in fact, an aqua regia. This variation of the proportion of muriatic acid in the nitrous, is of the utmoft importance, fince the properties of the folution eminently depend upon this. With muriatic acid only, tin forms a colourlefs and permanent folution, one of whofe diftinguifhing properties is, its ftrong affinity or attraction for oxygen. With decoction of cochineal, it forms a deep and dull purple-coloured precipitate, which, however, gradually abforbs oxygen, and becomes crimfon, efpecially when expofed on the filtre. With decoctions of Brazil and peachwood, it affords crimfon precipitates, varying in intenfity with their faturation with tin. It decompofes all the combinations of iron with colouring matter, deoxygenating the iron which it carries off, leaving the tin in combination with the colouring matter. Thus a madder black becomes a red on the application of muriate of tin. On this property is founded the art of printing on dyed grounds, of which we fhall treat hereafter. With nitrous acid, unlefs very dilute, tin contracts a very feeble union, and is generally precipitated as foon as diffolved, in a ftate fully faturated with oxygen. The addition of a fmall quantity of muriatic acid renders this folution more permanent, provided it be not fully faturated with tin, and the addition of

of larger portions approximates the solution still more to the nature of the former, and renders it capable of supporting a greater degree of saturation. The properties of the solution depend greatly on the proportion of muriatic acid, and consequently of muriate of tin contained in it. When small, the precipitate with cochineal is bright carmine scarlet. It does not decompose the combinations of iron with colouring matter, unless the solution be far from saturation, and this effect is then due to the disengaged acid only.

The purity of the tin is another requisite which should be carefully attended to. The fine tin of Cornwall, commonly called grain tin, should be employed. If alloyed with lead, it is wholly unfit for these purposes.

In lieu of muriatic acid, sal ammoniac and common salt are oftentimes employed to form an aqua regia with nitrous acid. The solution differs little from that formed by a mixture of the two acids, the allowance being made by the portion neutralized by the alkali of the neutral salt.

From this short outline of the history of the substances employed in the formation of the solutions of tin, and of the properties of the solutions themselves, may be deduced such general ideas as will elucidate and explain many anomalous effects in their combinations with different colouring matters, and seem to direct future experiment in the discovery of those minute, but often important, conditions necessary to the formation of particular shades of colour.

The following examples of spirit reds, as they are improperly called by calico printers, will illustrate some of the preceding observations, and may be considered as specimens of the most beautiful and brilliant colours it is possible to form upon cotton.

1. Prepare an equa regia by dissolving two oz. of sal ammoniac in one pound of nitrous acid of specific gravity 1.25. To this add two ounces of fine grain tin; decant it carefully off the sediment, and dilute it with $\frac{1}{4}$ its weight of pure or distilled water.

To one gallon of water add one pound of cochineal, ground as fine as flour; boil half an hour; then add two ounces of finely pulverized gum dragon, and two ounces of cream of tartar, and stir till the whole is dissolved. When the liquor is cool, add one measure of the preceding solution of tin, to two of the cochineal liquor, and incorporate well by stirring. Apply this with the pencil or block, suffer it to remain in the cloth six or eight hours, then rinse off in spring water. This colour will be a bright and beautiful scarlet.

2. Boil 12 pounds of Brazil chips during an hour in as much water as will cover them. Draw off the decoction, and pour on fresh water, and boil as before. Add the two liquors together, and evaporate slowly down to one gallon. To the decoction whilst warm add four ounces of sal ammoniac, and as much gum dragon or senegal as will thicken it for the work required. When cool, add one of the solution of tin before described, to four, six, or eight of the Brazil liquor, according to the colour wanted. Suffer it to remain from 18 to 24 hours on the cloth, then rinse off in spring water as before. The colour will be a pale and delicate pink. If it is required deeper, the decoction must be made stronger, and used in the proportion of three or four to one of the solution of tin. Nicaragua or peachwood, though not so rich in colouring matter as Brazil, yields a colour, however, which is, if possible, more delicate and beautiful. The fine pinks produced by certain houses, which have for years been the envy and admiration of the trade, are afforded by this fine dye-wood.

These colours require no liming, simple affusion with water being sufficient to precipitate the colouring matter in combination with the tin. The theory of these mixtures is the same as the preceding. They require, however, a greater excess of acid to hold the colouring matter in solution. A decoction of cochineal poured into a saturated solution of tin, occasions an instant precipitate which is not redissolved, and the greater part of which, if applied to cloth, would come off in the operation of rinsing. It is sometimes necessary to add a small quantity of muriatic acid to prevent this precipitation, or to correct it when it happens, and sal ammoniac is supposed to have the same effect, probably by engaging the water of the solution.

With the aluminous salts, the decoction of cochineal and Brazil forms colours less brilliant than those we have just described, but which are applicable in cases where the excess of acid in the solutions of tin is attended with inconvenience.

1. To one gallon of water, add eight ounces of finely ground cochineal, and two ounces of bruised galls; boil half an hour, strain the liquor whilst hot through a fine cloth, upon four ounces of cream of tartar and four ounces of gum, and thicken with gum dragon. This colour requires liming.

2. Upon 6lbs. of Brazil and 2 oz. of galls, pour one gallon of water, let them soak some time, then boil two hours, replacing the evaporated liquor with fresh water. Strain through a fine cloth upon 4lb. of gum senegal, and add one pint of the acetite of alumine, described in a former part of this article.

The addition of galls in the two preceding formulæ is supposed to import solidity to the colours in some way analogous to the operation of galling in silk and cotton dyeing, of which we shall have occasion to speak hereafter. Their constitution is otherwise the same as the berry and bark yellows, and most others of this class of colours.

Purple.

1. If the solution of tin directed for the pink in the last article be mixed with six times its bulk of a decoction of logwood poured whilst hot upon four ounces of sal ammoniac, and $2\frac{1}{2}$ lbs. gum senegal, a bright and lively purple will be obtained, the hue of which varies with the strength of the decoction and the proportion of solution of tin employed.

2. If instead of the solution of tin, the acetite of alumine before alluded to, be used in various proportions of one sixth, eighth, &c. purples differing in shade and intensity will be formed, applicable in some cases, but possessing less solidity than most of the colours already described.

The constitution of these compounds is the same as the preceding.

Olive.

Olives are variously compounded, according to the colour required.

1. By mixing chemical black in various proportions with berry or bark yellow. The depth and fulness of the olive depends on the quantity of black.

2. By a decoction of logwood added in greater or less quantity to the bark or berry yellow.

3. By the addition of copperas or nitrate of iron to decoctions of yellow or astringent colouring matters, such as bark, sumac berries, weld, &c. each of these produces a different hue, varying from the green olive to a drab or cloth colour. By mixing these decoctions in different proportions, and by varying their strength, and the quantities of copperas or

or nitrate of iron added to each, a multiplicity of ſhades may be produced, of which it is impoſſible to convey any preciſe or definite ideas.

Theſe colours may be indifferently thickened with flour or gum, as beſt ſuits the work required, but when nitrate of iron is added to ſolutions containing gum, the inſtant coagulation that takes place muſt be counteracted by the addition of a portion of free nitrous acid. This effect ariſes from the ſtrong action exerted by metallic oxyds, at the maximum of oxydation, on mucilage or gum. When the decoction is very concentrated, and contains ſufficient colouring matter to engage the whole of the iron, this effect takes place in a leſs degree, but with ſolutions adapted to the production of the foregoing colours, a coagulation invariably takes place, unleſs counteracted by the preſence of a portion of free acid. Of this action of metallic oxyds on the ſolution of gum we ſhall further treat under the article Gum.

Claſs III.

In this claſs, the colouring matter is ſimply held in ſolutions, by an acid or alkali, and in that ſtate applied to the cloth without the intervention of any mordant.

The moſt important of theſe colours, is the alkaline ſolution of indigo which forms the topical or

Pencil Blue.

1. Prepared ſolution of pot-aſh, by boiling together $7\frac{1}{2}$lbs. of quick lime, and 15lbs. of pot-aſh, in 10 gallons of water. Decant off the clear liquor, and ſeparate the remainder from the lime by means of the filter. To one gallon of this ſolution, add 1lb. of red arſenic, or orpiment, and 1lb. of fine indigo, both previouſly ground together in a mill with ſufficient water to form a thick paſte. Bring them up gradually to a boil, ſtirring carefully all the time, and then withdraw the fire. Thicken the ſolution with the beſt gum ſenegal, and for the pale ſhades of blue, dilute with one, two, &c. meaſures of gum-water.

The quantities and relative proportions of pot-aſh, orpiment, and indigo in a gallon of pencil blue vary conſiderably with different calico printers, and within certain limits, it appears, that the accuracy of theſe proportions is not of great importance. Hauſman, an intelligent French printer, employs 15lbs. of pot-aſh, 6lbs. of orpiment, and 8lbs. of indigo, to 12 gallons of water; and Oberkampf, proprietor of the celebrated manufactory of Tony, a ſtill greater proportion of indigo. Some printers add brown ſugar, and Bancroft has propoſed to ſubſtitute this for the orpiment, but without ſucceſs.

The ſolution, when recently made, is a yellowiſh green, but by expoſure to air, becomes gradually deeper, and at laſt blue. In this ſtate, it is wholly unfit for uſe, it contracts no union with the cloth, and is detached from it in the firſt operation of rinſing.

Of the peculiar nature and properties of indigo, we ſhall have occaſion to treat hereafter, under its proper head, at preſent it will ſuffice to obſerve, that it owes its colour and inſolubility in alkalies, to a portion of oxygen intimately combined with it. To render it ſoluble, therefore, it muſt be deprived of this oxygen, by the action of a ſubſtance having a more powerful affinity for it, and the ſulphuret of arſenic, or orpiment. is uſed for this purpoſe. Sulphate of iron, has a ſtrong affinity for oxygen, and is employed in de-oxygenating indigo for certain purpoſes; but the oxyd of iron not being ſoluble in alkalies, the ſolutions of indigo, formed by it, become quickly regenerated by the abſorption of oxygen, and cannot even be transferred from one veſſel to another. The ſulphuret of arſenic, on the contrary being very ſoluble in alkalies, preſents the double advantage of de-oxygenating the indigo, and of retaining it awhile in that ſtate, till on its application to cloth, it becomes expoſed ſo completely to the action of atmoſpheric air, as to regain its oxygen, colour, and inſolubility; and becomes fixed in its original or blue ſtate.

The copper coloured pellicles, which forms on the ſurface of pencil blue, and is renewed immediately on its removal, ariſes from the abſorption of oxygen, which, in ſpite of the action of the orpiment, is continually taking place. Hence ariſes that diſpoſition to unevenneſs, which is the great diſadvantage of this blue; the unavoidable expoſure to air of ſmall portions of the colour during its application with the pencil, reviving greater or leſs portions of indigo, and conſiderably reducing its ſtrength.

Moſt calico printers boil up the quicklime with the other ingredients, thinking its preſence not leſs neceſſary than the pot-aſh and orpiment; by this means a conſiderable portion of the ſolution of indigo is taken up by the ſediment, which careful waſhing does not wholly ſeparate. As the action of the lime is confined merely to the alkali, which it renders cauſtic, and capable of acting with greater force on the other ingredients; it is certainly much more economical to render the pot-aſh cauſtic before its addition to the indigo. A conſiderable waſte of colour is by this means prevented, and the ſolution may be thickened the moment the ebullition has ceaſed without waiting for the depoſition, which in the old mode takes place.

Orange.

The oxyd of iron, when diſſolved in acetous acid, forms one of the moſt uſeful and important mordants, as we have already ſhewn in the former part of this article. It is alſo capable of imparting a very pleaſing and permanent colour itſelf to cotton, when applied in ſolutions of tolerable ſtrength and purity, and forms the orange, buff, and gold colour of the calico printers.

1. The ſolutions of iron in vinegar, ſtrengthened by the addition of copperas may be uſed, but the pureſt and brighteſt gold colours are obtained from copperas and ſugar of lead, in the proportion of 5lbs. of the former, and 1lb. of the latter, to a gallon of water. When thickened with gum, and employed undiluted, it affords, when limed, a full ſtrong gold colour, and with two, four, ſix, &c. times its bulk of water, various ſhades of orange and buff, which reſiſt the action of air, alkalis, and ſoap; and are rather exalted than impaired by frequent waſhing. The addition of ſugar of lead, is to increaſe the ſtrength of the ſolution. A gallon of water diſſolves about 4lbs. of copperas. The addition of a pound of ſugar of lead, enables it to take up another pound nearly, and the ſtrength of the ſolution may be ſtill further increaſed by equal additions of the two ſalts. The operation of liming is a ſimple precipitation of the oxyd of iron on the cloth, and in caſes when this cannot be performed, the proportion of ſugar of lead muſt be increaſed to nearly that of the copperas. It is only the paler ſhades of orange, however, which are to be obtained this way. The deep gold colour before named, is not to be procured without the aid of a precipitant. Spaniſh brown is ſometimes added to a ſolution of iron, and employed in ſuch a caſe, but it contracts no union with the cloth, and is readily removed by ſimple waſhing and beating. When the orange, or gold colour, is thickened with flour, a ſmall portion of nitrate of iron muſt be added to the paſte, for reaſons we have aſſigned on a former occaſion.

2. A beautiful, but fugitive orange, is obtained by boiling

ing half a pound of annotta with 1lb. of cauftic pot-afh in a gallon of water, and thickening the liquor with gum. This colour acts powerfully on the fieves and blocks, which it very foon deftroys, and on this account, and alfo from its want of permanence is feldom ufed. It may either be fimply rinfed off, or firft paffed through water rendered flightly acidulous with fulphuric acid, or what is ftill better through alum-water. This operation is the very reverfe of liming, for here the colouring matter to be precipitated, being held in folution by an alkali, an acid muft be employed for that purpofe. The colour by this means is confiderably heightened, and when applied with the pencil, is ufeful in fome cafes where the other colours will fupport the action of alum-water without injury.

Borax, and even fpirits of wine, are fometimes added to the alkaline folution of annotta, and are fuppofed to contribute to its ftrength and fixity, though on what principle it is not eafy to difcover.

Green.

The oxyd of copper, diffolved in volatile alkali, affords a pale and delicate green, which is fometimes employed intermixed with other colours. Turnings of copper, or verdigrife, which is more generally ufed, may be digefted in a low heat with fpirits of fal-ammoniac. Care muft be taken that the heat be very moderate, and the veffel in which the folution is made, well ftopped, the ammoniac will otherwife be driven off, and loft. When the alkali has taken up as much copper as it can diffolve, the folution muft be thickened with gum, and applied with the block or pencil. In a few days the ammoniac evaporates and leaves the oxyd of copper on the cloth, which muft be rinfed to free it from the gum and fuperfluous colour.

The blues produced by alternate immerfion in copperas and lime, and alfo in the folution of indigo, by the fame fubftances, properly come under this clafs of colour, as they are folutions of colouring matter in lime and alkalis. As the proceffes by which they are applied, differ however very materially from all thofe that we have been treating of, they claim a feparate and diftinct notice. For the details of thefe operations, and the mode of preparing the paftes for bark and pale blue dipping, and the colours for China blue, we muft therefore refer our readers to the article *Dipping* Blue.

Colours, in *Dyeing*.—There are five fimple, primary, or mother colours, ufed by the dyers: from the mixture whereof all the other colours are formed; thefe are blue, red, yellow, black, and brown colour; each of which fee under their proper head, Blue, Red, &c.

Of thefe colours, mixed and combined, other colours are formed, which are infinitely various, according to the proportion of the different ingredients that are employed, or the proceffes by which they are blended. Thus a mixture of *blue* and *yellow* forms *green*, which is diftinguifhed by dyers into a variety of fhades, according to the depth of the fhade, or the prevalence of either of the component parts. Hence we have *fea-green*, *grafs-green*, *pea-green*, &c. &c. *Blue* and *red* form different fhades of *violet*, *purple*, and *lilac*. A mixture of *yellow* and *red* produces *orange*. Mixtures of *black* with other colours conftitute *greys*, *drabs*, and *browns*. For a more particular account of thefe and other colours; and the method of procuring and applying them; fee the article Dyeing. See alfo the preceding article.

The greateft perfection in the art of colours would be to find the means of preparing the fineft colours without the ufe either of acid or alkaline falts, which ufually fubject the colours to change, or elfe are apt to prey upon the cloth, canvas, &c. as we fee in verdigrife, the blue and green cryftals of copper, &c. It appears highly probable, that the Indians, for making the fine bright and durable colours, wherewith their chintzes and callicos are ftained, make ufe of metalline folutions; for fome ftained callicos, brought from thence, having been kept 40 or 50 years, the bright colours have been obferved to eat out the cloth, exactly in the fame manner as acid fpirits, which diffolve metals, are found to do.

Since thefe, then, are the inconveniences attending fuch colours, we ought to fearch for menftruums with which to extract colours, which are neither acid nor alkaline; and for fuch metalline oxyds, precipitates, or powders, as will not lofe their colours, by being well wafhed to get out their falts; to prepare certain metalline matters, by mere calcination, or the bare affiftance of fire; and laftly, to look out for native colours, wherein no faline matter abounds.

Mr. Geoffroy has given a very curious procefs for making two clear, fpirituous, inflammable liquors, which differ very little in tafte and fmell, and being mixt together give a fine carnation colour, without any fenfible fermentation.

To make the firft of thefe liquors, put a fmall handful of dried red rofes into a glafs bottle; pour on them rectified fpirit of wine, till it covers them an inch; let this ftand in a cold infufion four or five hours; then pour off the liquor, which will be clear and colourlefs, as when put on. The fecond liquor is made by dropping into rectified fpirit of wine, fo much oil of fulphur, by the bell, or fpirit of vitriol, as will be borne in it without giving it any very fenfible acidity when tafted. When thefe liquors are thus prepared, let a fmall quantity of the latter be dropped into fome of the former, and the whole will become of a fine carnation colour, though there is no fermentation, nor any other change perceived in it, but barely that of colour. If inftead of this laft liquor, there be added to the firft a few drops of the fpirit of fal ammoniac, the whole will become green.

Make a flight infufion of galls in water, fo as not to colour the water; make alfo a weak folution of green vitriol in water, fo that it may appear colourlefs; mix thefe two colourlefs liquors together, and an inky blacknefs is immediately produced; add to this black liquor a little oil of vitriol, and the liquor becomes pellucid and colourlefs again; then add to this a little falt of tartar, and the whole is black again.

Put a little bruifed camphor into rectified clear oil of vitriol; fhake the mixture, and it will become black, and the camphor will be diffolved; add to this a little water, and the liquor becomes clear, and the camphor is found feparated at top, in its own form, and native whitenefs.

Infufe lignum nephriticum in cold water, and pour off the clear liquor. This held up againft the light, appears of a fine yellow, but viewed from the light, of a beautiful blue: a little fpirit of nitre put to this liquor makes it lofe the power of reflecting the blue rays, and a little oil of tartar, afterwards added, recovers that power again.

Logwood, infufed in water, gives a red colour. Put to this a little fpirit of urine, and it becomes of a fine purple; and drop in afterwards a little fpirit of falt, and it becomes of a pale red.

A beautiful blue tincture may be made from filings of copper, by digefting them in fpirit of urine, hartfhorn, or the like. The addition of oil of vitriol deftroys the blue colour; and a little fpirit of falt turns it green.

Pellucid oil of vitriol, mixed with pellucid oil of turpentine, produces a thick red balfam. And common oil, mixed with fair water, by means of a little wax, and continued rubbing,

rubbing, turns into a thick white balfam, called cold cream.

Oil of vitriol, diftilled from quickfilver, leaves a white powder behind, which, if water be poured on it, becomes yellow.

Diffolve quickfilver in fpirit of nitre, and to part of it add fpirit of urine, and a white powder is precipitated; to another part of the folution add oil of tartar, and a yellow powder falls to the bottom.

Dip a new pen in fpirit of vitriol, and write with it on common blue paper, and the letters will appear red.

A pellucid folution of faccharum faturni being written with on paper, becomes invifible when dried; but the bare fumes of an infufion of quick lime, and orpiment, in water, will render the invifible writing black and legible.

Volatile falt of fal ammoniac, which is white, mixed with cryftals of copper, which are green, produce a fine purple.

The original and fimple, as well as the mixt, colours are producible by mixture. Thus, if the fun's rays pafs through two pieces of glafs, the one blue, and the other yellow, and be afterwards received upon a white paper, the colour there feen is green. The dyers make cloth blue with woad, and then turn it green by the yellow herb called luteola, or dyers' weed. To a yellow folution of gold in aqua regia add a blue one of copper in fpirit of urine, and the mixture becomes green. The painters every day practife this art of producing new colours by mixture.

Metalline and mineral matters are reducible to a confiderable degree of fubtlety, or fmallnefs of parts by fire, or dry calcination, fo as to leave them durably poffeffed of their native or adventitious colours. Thus lapis lazuli, by being calcined, becomes the fine rich blue called ultramarine; light ochre, by the fame treatment, becomes a light red, or flefh colour, the moft ufeful flefh-colour in painting. Lead, by calcination, becomes durably red, and iron durably brown; but a proper method feems wanting for the dry calcinations of the nobler metals, gold and filver; though, for the ufes of gilding, thefe are eafily prepared by dipping linen rags in their refpective folutions, and then drying, and burning them to afhes, whereby a dry and fine metalline powder is procured.

Colour, in *Heraldry*, the heraldic colours are nine, and were anciently expreffed by the word *tincture*, *viz.* or, argent, azure, gules, fable, vert, purpure, tenney, and fanguine, and alfo by precious ftones and planets; the armorial colours are blazoned in different terms, according to the rank and dignity of the perfon whofe arms are defcribed, as follows:

Colours,	For Commoners by Tinctures.	For Peers by Precious Stones.	For Emperors, Kings, and Princes, by Planets.
Yellow,	Or,	Topaz,	Sol.
White,	Argent,	Pearl,	Luna.
Blue,	Azure,	Sapphire,	Jupiter.
Red,	Gules,	Ruby,	Mars.
Black,	Sable,	Diamond,	Saturn.
Green,	Vert,	Emerald,	Venus.
Purple,	Purpure,	Amethyft,	Mercury.
Orange,	Tenney,	Jacinth,	Dragon's head.
Dark red,	Sanguine,	Sardonix,	Dragon's tail.

For a fuller account of each, fee under the refpective heads.

Or, and argent are metals, and it is an invariable rule in heraldry not to put colour upon colour, or metal on metal; that is if the field be of a colour, the charge or bearing muft be of a metal.

Colour, in *Law*, is a probable or plaufible plea; though in reality falfe at bottom; and only calculated to draw the trial of the caufe from the jury to the judge: and, therefore colour ought to be matter of law, or doubtful to the jury.

In pleading it is a rule, that no man be allowed to plead, fpecially, fuch a plea as amounts only to the general iffue; but in fuch cafe he fhall be driven to plead the general iffue in terms, by which the whole queftion is referred to a jury. But if a defendant in an affife or action of trefpafs, be defirous to refer the validity of his title to the court rather than to the jury, he may ftate his title fpecially, and at the fame time *give colour* to the plaintiff, or fuppofe him to have an appearance or colour of title, bad indeed in point of law, but of which the jury are not competent judges. As if his own true title be that he claims by feoffment, with livery from *A.* by force of which he entered on the lands in queftion, he cannot plead this by itfelf, as this plea amounts to no more than the general iffue. But, he may allege this fpecially, provided he goes farther and fays, that the plaintiff claiming by *colour* of a prior deed of feoffment, without livery, entered, upon whom he entered; and may then refer himfelf to the judgment of the court, which of the two titles is the beft in point of law. (Doctor and Student. 2. c. 53.) Every *colour* ought to have the following qualities. 1. It is to be doubtful to the *lay-gens*, as in cafe of a deed of feoffment pleaded, and it is a doubt whether the land paffeth by the feoffment, without livery or not. 2. *Colour* ought to have continuance though it wants effect. 3. It fhould be fuch *colour*, that, if it were effectual, would maintain the nature of the action, as in affife, to find colour of freehold, &c. (10 Rep. 88, 90, and 91.) *Colour* muft be fuch a thing, which is a good colour of title, and yet it is not any title. (Cro. Jac. 122.) If a man juftifies his entry for fuch a caufe as binds the plaintiff or his heirs for ever, he fhall not give any *colour*; but if he pleads a defcent in bar, he muft give *colour*, becaufe this binds the poffeffion, and not the right; fo that when the matter of the plea bars the plaintiff of his right; no *colour* muft be given. When the defendant entitles himfelf by the plaintiff; where a perfon pleads to the writ or to the action of the trial; he who juftifies for titles; or where the defendant juftifies as fervant; in all thefe cafes no *colour* ought to be given. (10 Rep. 91. Lutw. 1343) Where the defendant doth not make a fpecial title to himfelf or any other, he ought to give *colour* to the plaintiff. (Cro. Eliz. 76.) In trefpafs for taking and carrying away twenty loads of wood, &c. the defendant fays, that *A. B.* was poffeffed of them, *ut de bonis propriis*, and that the plaintiff claiming them by *colour* of a deed after made, took them, and the defendant retook them; and adjudged that the *colour* given to the plaintiff makes a good title to him, and confeffeth the intereft in him. (1 Lil. Abr. 275.)

Thus, e. gr. in an action of trefpafs for taking away the plaintiffs beafts, the defendant urges, that before the plaintiff had any intereft in them, he himfelf was poffeffed of them, as his proper goods; and delivered them to *A. B.* to deliver to him again, when, &c. and *A. B.* gave them to the plaintiff: and the plaintiff, fuppofing the property to be in *A. B.* at the time of the gift, took them, and the defendant took them again from the plaintiff; whereupon the plaintiff brings his action.—This is a good *colour*, and even a good plea. Doct. and Stud.

Colour *of office*, is when fome unjuft action is done under countenance of office or authority. See Bribery and Extortion.

To COLOUR *ſtrangers goods*, is when a free man allows a foreigner to enter goods at the cuſtom-houſe in his name.

COLOURS, *camp*, are a fort of ſmall colours planted on the right and left of the parade of a regiment when in the field. They are about 18 inches ſquare, and of the colour of the facing of the regiment, with the number of the regiment marked on them. The poles, to which they are fixed, ſhould be about 7 feet 6 inches long; except thoſe of the quarter and rear guards, which ought to be about 9 feet long.

COLOURS, *field*. See FIELD.

COLOURS, *guard*. See GUARD.

COLOURS *uſed in the drawings of fortifications and military works*, are chiefly *Indian ink*, *carmine*, *verdigriſe*, *ſap green*, *gum-bouch*, *Pruſſian blue*, *Indigo*, *ſmalt*, *ultramarine*, *umber*, *gum-water*, which articles ſee ſeparately, as well as the article FORTIFICATION.

COLOURS, *Colores*, in the *Ancient Muſic*, was uſed to ſignify the muſical ſpecies belonging to a genus.

In this ſenſe the *chromatic genus* was ſaid to have three *colours;* and the *diatonic* two. The *enharmonic*, having no ſubordinate ſpecies, had but one *colour*. Hence the ancients reckoned three *genera*, and ſix *colours*, in muſic; that is, ſo many different diviſions of the *diateſſaron*, or fourth.

COLOURS, *diatonic*, or *muſical ſcale of*.—In the courſe of ſir Iſaac Newton's experiments on the properties of light, (Optics, book i. part ii. prop. 3.), he diſcovered the remarkable fact, that the ſpectrum of the ſun's image, formed by refracted light, let into a darkened room, is longitudinally divided by the points ſeparating the different colours, *viz.* violet, indigo, blue, green, yellow, orange, and red, into ſpaces which are reſpectively equal to $\frac{1}{9}$, $\frac{1}{18}$, $\frac{1}{12}$, $\frac{1}{12}$, $\frac{1}{15}$, $\frac{3}{80}$, and $\frac{1}{16}$, parts of the double length of the ſpectrum, as, ſuppoſe the ſpectrum to be 360 parts in length, then $\frac{80}{720}$, $\frac{40}{720}$, $\frac{60}{720}$, $\frac{60}{720}$, $\frac{48}{720}$, $\frac{27}{720}$, and $\frac{45}{720}$, will repreſent the length of each colour reſpectively, and adding theſe ſucceſſively in the reverſe order, to $\frac{360}{720}$, we have $\frac{405}{720}$, $\frac{432}{720}$, $\frac{480}{720}$, $\frac{540}{720}$, $\frac{600}{720}$, $\frac{640}{720}$, and $\frac{720}{720}$, which, in their loweſt terms, are $\frac{1}{2}$, $\frac{9}{16}$, $\frac{3}{5}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{8}{9}$, and 1, and appear to be the diatonic ratios anſwering to the *octave*, minor *ſeventh*, major *ſixth*, *fifth*, minor *fourth*, minor *third*, major *ſecond*, and *key* note; or, to VIII, 7th, VI, V, 4th, 3d, II, and key, repreſented in the gamut by *c*, ♭B, A, G, F, ♭E, D and C.

From the experiments of Henry Brougham, jun. eſq. Philoſophical Tranſactions, 1796, it appears, that not only by *refraction*, but by *inflection*, *deflection*, and *reflection*, the rays of light may be ſeparated on a chart or ſcreen: and he mentions numerous experiments, wherein the limits of the ſeveral colours on the ſpectrum were carefully marked with the point of a needle, after which the papers thus marked were put away, and a freſh paper ſubſtituted for other experiments: the meaſurement or compariſon of the lengths of the intervals occupied by each colour on the different papers, being purpoſely deferred, until the whole courſe of experiments was completed, in order to prevent any preconceived opinions from operating, in making the experiments: the reſults are repreſented as agreeing, in the ſpaces $\frac{1}{9}$, $\frac{1}{18}$, $\frac{1}{12}$, $\frac{1}{12}$, $\frac{1}{15}$, $\frac{3}{80}$, and $\frac{1}{16}$, occupied by the violet, indigo, blue, green, yellow, orange, and red colours, being the very ſame, as to arrangement, as thoſe by refraction above-mentioned.

It is obſervable, that the notes compoſing the octave thus produced, do not anſwer to the major-key of ♭B as it might ſeem to do, although ſome writers on muſical intervals have aſſerted, that nature produces only the major-key or diviſion of the octave, and that the minor *third* ♭E or $\frac{5}{6}$ is nowhere to be found in nature. If we were to conſider the *colorific ratios* $\frac{1}{2}$, $\frac{9}{16}$, $\frac{3}{5}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{8}{9}$, and 1, found above as a minor octave, and to belong to the notes in the gamut *a*, G, F, E, D, C, B and A; and find the ratios anſwering to the octaves of C and B, *viz.* $\frac{5}{12}$, and $\frac{4}{9}$, or *c* and *b*; then, if from each of the above ratios we deduct the ratio $\frac{5}{6}$ (or multiply by $\frac{6}{5}$), we obtain $\frac{1}{2}$, $\frac{8}{15}$, $\frac{3}{5}$, $\frac{27}{40}$, $\frac{18}{25}$, $\frac{4}{5}$, $\frac{9}{10}$, and 1, for the notes in the octave *c*, *b*, *a*, G, F, E, D, and C, but which is not a major diatonic octave, becauſe thoſe principal notes, the V and 4th, or G and F, have not the ratio of $\frac{2}{3}$ and $\frac{3}{4}$ as they ought to have. Thus we ſee, that the eight notes anſwering to a colorific minor-key, do not hold the proper relation between themſelves, for forming a major-key, by merely aſſuming the third of the firſt key, as the new key-note: and ſtrictly ſpeaking, the ſame may be obſerved of any other tranſpoſition or modulation whatever, upon eight diatonic notes, or even upon any 12 notes compoſing an octave, taking all the conchords into account; although moſt of the keyed inſtruments, as organs, harpſichords, &c. in uſe, are made and played upon, and the notation or writing of muſic itſelf is founded upon this ſuppoſition, which is far from being correct.

COLOUR, in *Painting*, is applied both to the drugs, and to the teints produced by thoſe drugs, variouſly mixed and applied.

The principal colours uſed by painters, are red and white lead or ceruſs; yellow and red ochres; ſeveral kinds of earth, as umber, &c. beſides orpiment, black lead, cinnabar, gamboge, lake, bice, verditer, indigo, vermillion, verdegris, ivory black, biſtre, lamp black, ſmalt, ultramarine, and carmine; each of which, with the manner of preparing them, their uſes, &c. ſee under their reſpective heads.

Of theſe colours, ſome are uſed ground in oil, others only in freſco, others in water, and others only for miniature.

COLOURS, in an *Eccleſiaſtical Senſe*, are uſed both in the Latin and Greek churches, to diſtinguiſh ſeveral myſteries and feaſts celebrated therein.

In the Latin church are only regularly admitted five colours, viz. *white*, *red*, *green*, *violet*, and *black*: the *white* is for the myſteries of our Saviour, the feaſts of the Virgin, thoſe of the angels, ſaints, and confeſſors; the *red* for the myſteries and ſolemnities of the holy ſacrament, the feaſts of the apoſtles and martyrs; the *green* for the time between Pentecoſt and Advent, and from Epiphany to Septuageſima; *violet* in Advent, Chriſtmas, in vigils, rogations, and in votive maſſes in time of war: laſtly, *black* for the dead, and the ceremonies thereto belonging. Cloths of gold and ſilver, and embroidery, ſerve indifferently for all ſolemnities.

In the Greek church the uſe of *colours* is almoſt obliterated, as well as among us: *red*, among them, was the *colour* for Chriſtmas, and the dead, as black is ſtill for the laſt among us.

COLOURS, *Accidental*. See ACCIDENTAL.

COLOURS, *Local*. See LOCAL.

COLOUR, *rings of*. See RINGS.

COLOURS, *water*. See WATER.

COLOURABLE *title*. See TITLE.

COLOURING, in *Painting*, one of the great component and eſſential parts of painting, is the art of giving to every object in a picture its true and proper hue, as it appears under all the various circumſtances or combinations of light, middle-tint, and ſhadow; and of ſo blending and contraſting the colours, as to make each appear with the greateſt advantage and beauty, at the ſame time that it contributes to the richneſs, the brilliancy, and the harmony of the whole.

It likewife poffeffes powers which, when judicioufly applied, render it highly conducive to the character and expreffion of the fubject reprefented.

A noble author, lord Lanfdown, "fays, that verfification is in poetry, what colouring is in painting, beautiful ornament;" but the comparifon is ill-founded. Verfification is, indeed, an ornament, and fo is colouring; but the former is merely an ornament, whereas the latter is neceffary to the painter to enable him to make his imitation or reprefentation complete. "Should the moft able mafter in defign," fays Mr. Webbe, "attempt by that alone, a rofe or grape, we fhould have but a faint and imperfect image; let him add to each its proper colours, we no longer doubt, we fmell the rofe, we touch the grape."

Colouring, like chiaro-fcuro, may therefore be divided into kinds; that which is *neceffary* for rendering the imitation juft and intelligible, and that which is *expedient* or *ornamental*, as contributing to make the work at once more impreffive to the imagination, and more harmonious and delightful to the eye. Truth in the local tints is alone required in the firft kind; the fecond demands choice in their felection and diftribution. For illuftration, let us fuppofe the principal figure in a piece to be dreft in fky-blue, and another figure near it, of lefs confequence in the ftory, to be reprefented in fcarlet, with an under veftment of bright yellow, and let the light be made to ftrike equally on both: in fuch a cafe, it would be utterly impoffible to give an effect agreeable or harmonious to the picture; although each of thefe objects fhould be painted with the utmoft exactnefs and truth; nay, the combination, though found in nature itfelf, would excite feelings of difguft and averfion; whereas, if the principal figure were dreffed in fcarlet aud white draperies, and the figure next it in blue of not too light or bold a tint, the effect would be harmonious and pleafing; and another point of great importance would be gained, as the eye would then be attracted by the principal figure, which could not have been the cafe in the former inftance, where the gaudy combination of yellow aud red muft infallibly, as is natural with all warm colours, have firft obtruded itfelf into notice. However, as the eye has the fame intuitive abhorrence of unharmonious combinations of colours, that the ear has of difcordant founds; it is, therefore, not furprifing if we fo feldom meet with enormities like the one above fuppofed, even in the works of thofe artifts who leaft of all can lay claim to the fcientific arrangement of colours: to produce effects not unharmonious, or difagreeable, requires no great exertion of talent; but to perform all that can be done by the moft fkilful application of the various powers of the art is the lot of few.

In treating of chiaro-fcuro, we have obferved, that the part of it to which we have given the appellation of neceffary or natural chiaro-fcuro, was in a greater or lefs degree underftood and practifed from the earlieft period of the reftoration of painting: the fame was the cafe with refpect to what we have termed neceffary colouring, or truth in the local tints.

The oldeft painters of Florence, Giatto, Buffalmacco, and others; and ftill more fo, Simone Memmi, Ambrogio Lorenzetti, and the reft of Senefe fchool of the fame period, made frequently not unfuccefsful attempts at truth and even beauty in the tints of the flefh and other parts of their pictures; and fometimes produced a diftribution of colours by no means ungracious in the whole; though the prodigal ufe of gold grounds and gold ornaments bid defiance to an effect truly harmonious. Mapolino da Panicale, Mafaccio, Dominico Ghirlandaja, and Pietro Perugino, went much further, and we rarely find a want of delicacy of colouring in the parts of their pictures, or of harmony in the general effect. But ftill this was the refult of a happy natural feeling for what was beautiful rather than of an approved and well-founded theory. It was not till the period when Leonardo da Vinci laid the foundation of an improved fyftem of chiaro-fcuro, that the Bellini's of Venice began to difcover the beautiful effects refulting from a fkilful combination or oppofition of colours, at the fame time that they attained a richnefs and truth in their local tints, far exceeding any thing hitherto practifed. In both thefe qualities, however, they were foon far furpaffed by their fcholars, Georgione da Caftel Franco, and Titiano Vecelli, who, fuperadding to the moft aftonifhing richnefs of colour, the powerful light and fhade of da Vinci, produced works which, in their way, have baffled all future attempts at improvement. The tone of colour of their pictures is not that of nature in her every day garb; it is ideal, like the chiaro-fcuro of Coreggio or Rubens; that which may be fuppofed, but which, perhaps, is feldom or ever found in nature: the depth and mellownefs of their tints can fcarcely be accounted for but by the fuppofition of a tranquil but vigorous light fhining through the heated atmofphere of a fummers evening. The world was aftonifhed at this new ftyle, and it is no wife furprifing that Tintoretto, Paolo Veronefe, and others who followed, being unable to do better, fhould attempt fomething different; the manly, the fober fenatorial dignity of Giorgione and Titian, was changed for magnificence, for fhow, for glitter, and for ornament; invention, compofition, defign, and expreffion, were all made fubfervient to the inordinate defire of effect of colour; the fubject of the work could in many inftances with difficulty be difcovered, and their pictures may, in moft cafes, be compared to bewitching nonfenfe uttered by the filver tongue of the woman we love; to the fweet but fatal fong of the Syren. There feems to be nothing in the colouring of Giorgione and Titian, incompatible with the greateft purity of defign, fublimity of compofition, or propriety of expreffion; but the fplendid extravagances, the caded ftuffs, the gaudy trappings of the more modern Venetians, are wholly inconfiftent with true grandeur, and too frequently feem to refemble the wretched effort of poverty to perfonate opulence, or the defpicable attempt of the lacquey or courtezan to outvie by their tinfel apparel the dignity of the nobleman, or the fimple elegance of the woman of diftinction.

Whilft the two great founders of the Venetian fchool enraptured the fight by their tranfcendent and novel effects of colour, the Roman and Florentine painters, though principally applying their talents to the attainment of ftill higher objects, were not wholly unmindful of this part of the art. Many of the frefcos of Raffaelle in the ftanzas of the Vatican, and in particular the difpute of the facrament, the St. Peter delivered out of prifon, the mafs of Bolfena, and the Heliodorus, are feverally coloured with the richnefs of Venetian tint, or with the pearly hue of Parma. However, from the latter works of this great mafter, it fhould appear that he did not at all times confider this branch of painting as worthy his attentive regard. Fra. Bartolommeo di San Marco, in his madonnas and apoftolic figures, united grandeur of defign and breadth of chiaro-fcuro to a tone of colour at once dignified, tranquil, and harmonious; and Andrea del Sarto, except in fome of his laft works, where he in fome degree adopted the gay and frivolous ftyle then beginning to be in vogue, painted with a ftrength and fobriety of tint every way adapted to give increafed intereft and expreffion to the devotional or facred fubjects which he generally treated.

At

At this period, as if nature then made holiday, and was prodigally lavifh of her gifts, the great Coreggio appeared, and by his aftonifhing frefcos in the cupolas, and other works at Parma, feemed to caft a new radiance on the world of art. In him the very foul of harmony refided, and the magic of his pictures fo irrefiftibly intrances the fight, as to render us almoft incapable of difcriminating, whether the aftonifhing effect is moft the refult of the breadth and foftnefs of his chiaro-fcuro, or the beautiful combinations and tranfitions of his colours. However, delicacy of tint feems to have been the aim of Coreggio; richnefs and luxuriance of colour that of the Venetians. And it has been obferved of the great artift of Parma, that the flefh in his pictures feems generally of too firm a texture, and to want that humid appearance, the refult of infenfible tranfpiration, which forms one of the particular characteriftics of human bodies, and which Titian and Giorgione fucceeded fo admirably in reprefenting.

Thefe are the great mafters of colouring amongft the Italians. After this period a corrupt and frivolous ftyle for fome time predominated, and more particularly in the Roman and Florentine fchools of painting. With them it was not uncommon to fee yellow draperies fhaded with purple, red ones with blue, or green with fome other tint; as if it had been the intention to reprefent changeable ftuffs; and the eye feemed gradually to have become accuftomed to the moft unharmonious, the moft gaudy and abfurd combinations. Baroccio indeed made an effort to ftem the torrent of this daftard tafte. After having affiduoufly ftudied the works of Coreggio, he attempted to adopt his principle, and fo far fucceeded, that he defervedly had, and ftill has his admirers. But in the works of Baroccio, the red, the blue, and the yellow are too oftentatioufly difplayed, and want blending; which feems to juftify the fame critique on them that was made upon the works of Parrhafius, that his figures looked as if they had fed on rofes.

The Venetian painters it is true, never entirely loft fight of the genuine principles of colouring; but even in this refpect they fell far fhort of the great founders of their fchool above-mentioned, and the general frivolity of their tafte, too frequently occafions even their merits to be paffed by unregarded.

Coreggio had few followers; his divine fpirit found not, like that of Donatello, a kindred place of abode amongft his fucceffors; neverthelefs, the Lombards preferved a certain richnefs and harmony of tint, which ftill, in this particular, entitled them to a higher rank than their contemporaries of lower Italy. The Carracci, towards the latter part of the 16th century, refcued the art from the degeneracy into which it had fallen; and by uniting, as far as they were able, the different beauties of the Roman, Florentine, Lombard, and Venetian fchools, produced a new ftyle, and gave their name to an academy eminent for the various talents which it called forth. Their colouring, however, is not fo rich as the Venetian, nor fo harmonious as that of Coreggio; but it is exempt from glaring defect, fimple and tranquil, and well fuited to the fobriety and dignity of hiftory painting.

Of Caravaggio, their rival at Rome, it was hyperbolically faid, that he dipt his pencil in flefh itfelf: but we have to regret that the black and opaque fhadows which pervade his pictures, probably occafioned in fome degree by the perifhable nature of fome colours which he ufed, deftroy much of that truth of effect, which, from the praifes beftowed on him in his life-time, we have grounds for fuppofing they originally poffeffed.

The pencil of Guercino is broad, and his tints frefh and vigorous, but his effect is generally more the refult of chiaro-fcuro than of any remarkably fkilful arrangement of his colours.

The pictures of Guido, in his firft manner, poffefs confiderable force of tint; but he afterwards abandoned this ftyle for a mode of colouring weak and infipid: neverthelefs, his grace, his knowledge of expreffion, and his unparalleled freedom of pencilling, gained him innumerable followers; till at length, that which ought to have been confidered one of his greateft faults, was numbered amongft his beauties. It is true, that fhortly after this period, landfcape was carried to the higheft pitch of perfection by the Pouffins, Salvator Rofa, and Claude Lorraine; the former giving to their pictures a ftyle of colouring at once folemn and impreffive, the latter a truth of aerial tint, never before or fince attained. Neverthelefs, a flight and flimfy manner of colouring became one of the characteriftics of the Italian fchools, and the deferted daughter of Iris fought an afylum in the lefs congenial climes of Flanders and Holland.

Amongft the Flemifh painters, Rubens undoubtedly holds the firft place; and his works, as fir Jofhua Reynolds obferves, "have that peculiar property always attendant on genius, to attract attention, and enforce admiration, in fpite of all their faults." This, however, is not the place for a *general* inquiry into his merits. With refpect to his colouring, we have to obferve, that it evinces that exuberance and boldnefs of genius, which in every other part of the art peculiarly characterifes him. It poffeffes neither the fober richnefs of Titian, nor the delicate harmony of Coreggio, but feems frequently, by the gorgeous affemblage of tints, to vie with the gaiety of the chaplet or nofegay. It is perhaps, however, a matter worthy of inveftigation, whether the great variety of colours, introduced by Rubens in the draperies and other parts of his pictures, has not, by the too great equality of their diftribution, upon fome occafions proved detrimental, rather than advantageous, to the richnefs and fplendour of effect, which at all times feems to have been his principal object; and whether that object would not have been more effectually attained, had he followed the practice of the early Venetians, in giving to two or three colours a more decided pre-eminence.

The ftyle of Vandyke is more pure and chafte. The modeft tendernefs of his tints gently but irrefiftibly perfuade; and his numerous portraits, by their delicacy and truth of expreffion, ftill captivate and intereft the beholder, even where the perfonages they reprefent have been long buried in oblivion.

Rembrandt is, as Mr. Fufeli obferves, a genius of the firft clafs in every thing which relates not to form; but though as a colourift he certainly holds a pre-eminent rank, the effect of his pictures is, perhaps, as we have faid of Guercino, more the confequence of his aftonifhing chiaro-fcuro, than of the frefhnefs and vigour of his tints. His works prefent not the gorgeous combinations of colour found in thofe of Rubens, or that humid mellownefs of tint in the flefh, fo much admired in the pictures of Titian and Giorgione; neverthelefs, they evince a moft powerful conception of harmony, a beautiful gradation of tint, and great folemnity of tone. His lights have a brilliancy peculiarly his own; fcarcely more owing to the powerful oppofition of his chiaro-fcuro, than to the extraordinary method which he ufed of painting the luminous parts of his pictures with a very great body of colour in almoft a dry ftate; whilft his broad maffes of fhadow poffefs a magic tranfparency, making as it were darknefs vifible.

It would be endlefs to enumerate the many admirable colourifts of Flanders and Holland, who fucceffively trod the

footfteps of the great artifts above-mentioned: indeed, there are few painters of thofe fchools whofe works may not be ftudied with advantage as to this part of the art; the richnefs and harmony of their tints, the beauty and ftrength of their chiaro-fcuro, and the delicacy of their pencilling, comprifing their chief excellence. Sir Jofhua Reynolds, the great colourift of the laft century, fully appreciated their merits; and by combining fomewhat of their principle with the different ftyles of Titian and Coreggio, has fucceeded in producing, in not a few inftances, a richnefs and brilliancy of colour, inferior, perhaps, to neither, and, at the fame time, different from all. Happy for his reputation, if from an infatiable defire of furpaffing, he had not, in fo many of his pictures, indulged himfelf in the ufe of colours and varnifhes, which, like the more delicate bloffoms of nature, are the earlieft fubject to decay.

We have been the more diffufe in our attempt to characterife the principal mafters eminent for colouring, as we are aware that fo little can be faid upon the preceptive part of this branch of art, which, more peculiarly than any other, feems to depend upon the delicacy and perfection of the organs of vifion, and the nice difcriminations of feeling and judgment. The great artift laft-mentioned was perhaps the only colourift who ever wrote upon colouring, and we fhall therefore have recourfe to the affiftance of his admirable difcourfes, in our attempt to give fome idea of the leading principles of this part of the art.

It has already been obferved, that chiaro-fcuro may exift in the greateft perfection, independently of colours; but colouring, without the aid of lights and fhadows, would prefent us nothing more than the geographical chart or the harlequin's coat; and the ftudy of it muft therefore neceffarily imply fome previous knowledge of chiaro-fcuro.

In the commencement of this article we have, for the fake of diftinction, divided colouring into two kinds; the *neceffary*, and the *expedient* or *ornamental*: the *neceffary* that which denotes truth in the local tints of the objects reprefented; the *expedient* or *ornamental*, that upon which the diftribution of the parts, and the harmony of the whole, depends. Although it might, upon firft confideration, appear difficult to fay, which of thefe two kinds or divifions of colouring requires the greateft exertion of talent; yet there feems little doubt but that examples of a very high degree of truth in the local tints in pictures, are more rarely met with than an equal meafure of beauty in the general arrangement of the colours. To this truth of local tint, therefore, the utmoft effort of the artift fhould be directed: nature will be his beft guide, and next to her the works of Giorgione, Titian, and Giacomo Baffano in figures, and thofe of Claude and fome of the Dutch fchool in landfcape, and the other inferior departments of painting.

That fpecies or divifion of colouring, which we have termed the *expedient* or *ornamental*, is of a very extended range, and may be compared to rhetoric which gives additional luftre to truth, and enables the orator, even where proof is wanting, to fupport his argument upon fpecious though fallacious grounds. By a judicious oppofition of one colour to another, the fkilful painter is enabled to give to each an increafed delicacy or an additional fplendour; and by the fame means a colour may be made to appear different from that which it really is; and thus a femblance of truth in the local tint may be frequently attained, even where that truth is in reality very far from exifting. If the tint of the flefh be of too warm a hue, a yellow drapery placed next it, reftores it to harmony; if too red, a crimfon or a fcarlet mantle takes away or diminifhes the imperfection; if it appear cold, blue or purple oppofed to it gives it a proportionable degree of warmth: and thus by contrafting one colour with another, the painter is enabled to give to each the degree of value he defires, according as his fubject and the general effect of his work requires. It was the cuftom of Rubens, when he wifhed to give brilliancy to the principal figures in his picture, to oppofe to the flefh, a map of fcarlet drapery, and another of pure white; by thefe means the tints of the naked parts acquired wonderful air of truth, at the fame time that a fplendid and harmonious effect was produced.

The balance of cold and warm colours in a picture feems to bear a ftrong affinity to the gradation or contraft of the chiaro-fcuro, and demands equal attentiou. "A certain quantity of cold colours," fays fir Jofhua Reynolds, "is neceffary to give value and luftre to the warm colours;" he adds, "that the maffes of light in a picture be always of a warm mellow colour, yellow, red, or a yellowifh-white; and that the blue, the grey, or the green colours be kept almoft entirely out of thefe maffes, and be ufed only to fupport and fet off thefe warm colours; and for this purpofe a fmall proportion of cold colours will be fufficient." "Let this conduct be reverfed;" continues this excellent writer, "let the light be cold, and the furrounding colours warm, as we often fee in the works of the Roman and Florentine painters, and it will be out of the power of art, even in the hands of Rubens or Titian to make a picture fplendid and harmonious. The illuminated parts of objects are in nature of a warmer tint than thofe that are in the fhade: what I have recommended therefore is no more than that the fame conduct be obferved in the whole, which is acknowledged to be neceffary in every individual part. It is prefenting to the eye the fame effect as that which it has been accuftomed to feel, which in this cafe, as in every other, will always produce beauty; no principle therefore in our art can be more certain, or is derived from a higher fource."

We have treated of the doctrine of reflections in our obfervations on chiaro-fcuro; (fee CLAIR, *Obfcure*) it is proper, however, in this place to obferve, that the body which receives a reflected light, receives, together with that light, fomewhat of the colour of the object which gives the reflection; and this, in proportion to the ftrength of light on the body reflecting, and the vicinity of fuch body to that receiving the reflection. The fkilful management of reflections is fo indifpenfible a part of colouring, that it cannot employ too great a fhare of the ftudent's attention: an excellent infight into the principles of it will be afforded him by the works of Rubens and Jordaens; not perhaps the lefs fo from thefe mafters having marked the reflections in their pictures with a precifion and diftinctnefs, perhaps even beyond what is warranted by the appearances of nature herfelf.

With refpect to the application of colouring, it fhould always be remembered, that like the other parts of the art, it is of a nature powerfully to contribute to the fentiment and expreffion of a picture; when the ftyle adopted is in ftrict conformity with the character of the fubject reprefented. This conformity is therefore the firft thing to be confidered. If the fubject is awful or melancholy, a grave fombre tone of colour will be appropriate; if gay or magnificent, the moft brilliant and gorgeous tints may be freely ufed. The dark hue given by Michelagnolo Buonaroti to his celebrated group in the boat, in the laft judgment, with the cold light behind it, renders it perhaps not lefs a mafterpiece of colour, than the Venus and Adonis of Titian, or the fleeping Nymphs of Rubens.

The following remarks of the author before cited feem highly applicable to the prefent purpofe. "To give a general air of grandeur at firft view, all trifling or artful play of little lights, or an attention to a variety of tints is to be avoided; a quietnefs and fimplicity muft reign over the whole work; to which a breadth of uniform and fimple colour will very much contribute. Grandeur of effect is produced by two different ways, which feem entirely oppofed to each other. One is, by reducing the colours to little more than chiaro-fcuro, which was often the practice of the Bolognian fchools; and the other, by making the colours very diftinct and forcible, fuch as we fee in thofe of Rome and Florence; but ftill the prefiding principle of both thofe manners is fimplicity. Certainly nothing can be more fimple than monotony; and the diftinct blue, red, and yellow colours which are feen in the draperies of the Roman and Florentine fchools, though they have not that kind of harmony which is produced by a variety of broken and tranfparent colours, have that effect of grandeur which was intended. Perhaps thefe diftinct colours ftrike the mind more forcibly, from their not being any great union between them; as martial mufic, which is intended to roufe the nobler paffions, has its effect from the fudden and ftrongly marked tranfitions from one note to another, which that ftyle of mufic requires; whilft in that which is intended to move the fofter paffions, the notes imperceptibly melt into one another."

It is not our intention here to detail the various modes adopted by artifts in mixing their colours and varnifhes, or the modes of preparing the different kinds of grounds ufed for painting on. Every fchool, and, more or lefs, every individual differs in his practice from another; and works of fo high a clafs have been produced by each of thefe different methods, that we muft conclude them all to be right, when rightly applied. However, in one point, the beft colourifts feem to agree, that the light parts of a picture fhould be painted with a ftrong body of colour, and the fhadows with as much tranfparency as poffible: and this is the more natural as well the eafieft mode of procedure, as all the light colours, and particularly white, are opaque; whereas all the dark colours are in a greater or lefs degree tranfparent.

Colouring *of Glafs*. See Glass.

Colouring *of Earthenware*. See Glazing.

Colouring *Matter*. For a general account of the nature of colouring matter, fee Dyeing, *the art of*; for the principal colouring materials, fuch as cochineal, indigo, madder, &c. fee thefe articles refpectively.

Colouring *of Porcelain*. See Porcelain.

Colouring *of Spirits*. See Spirits.

COLPE, in *Ancient Geography*, a town of Afia Minor, built, according to Pliny, in the place of *Archæopolis*.

COLPEDI, or Colpidici, a people of Thrace, who inhabited the environs of Ænos. Steph. Byz.

COLPISCIS, a name given by fome to the *falx Venetorum*, or fickle-fifh, commonly called the marmot fifh by the people of Venice. See Falx.

COLPODA, in *Zoology*, a genus of animalcules *(vermes infuforia)* diftinguifhed by being of a fimple form, pellucid, flat, and finuate.

Thefe worms are invifible to the naked eye. They have been difcovered and examined, chiefly by Müller, Adams, Joblot, and other curious writers, whofe attention has been particularly devoted to microfcopical inveftigations. Of the genus colpoda, feven fpecies only appear to be defcribed.

Lamella. Elongated, membranaceous, and bent on the anterior part.

This refembles a long, narrow, pellucid membrane, which is narrower and obtufe behind, curved towards the upper part, and has a ridge or fold paffing through the middle. It is found in water, and when it moves is obferved to proceed on the edge inftead of flat furface. Found in common water.

Rostrum. Oblong, and hooked on the anterior part.

Difcovered in water more pure than the former. The pofterior part of this fpecies is obtufe, and one of the edges from the top to the middle is dilated, thick, and apparently triangular.

Meleagris. Changeable, with the anterior part hooked, and the pofterior folded up.

Lives in water impregnated with vegetables, and is of a variable form, the anterior part clear, the pofterior full of molecules, with the margin finuous.

Cucullus. Ovate, ventricofe, with an incifion beneath the tip.

Generally oval, and containing from eight to twenty-four bright molecules, the margin irregular. Common in a variety of vegetable infufions.

Ren. Thick, and finuate in the middle.

Defcribed by Joblot, who difcovered it in the infufions of hay. The form is flightly kidney-fhaped, of a yellow colour, opake, and filled with molecules.

Pyrum. Convex, oval, the tip produced into a beak.

The body is tranfparent, of a pale colour, and filled with molecules.

Hippocrepis. Thick, narrow in the middle, femilunar, and greenifh. Found in ftagnant meadow water.

COLPUSA, in *Ancient Geography*, one of the ancient names of *Chalcedon*, according to Pliny.

COLSA, a town of Afia, placed by Ptolemy in Armenia.

COLSIR, in *Geography*, a town of Afia, in the country of Thibet; 50 miles N.E. of Harachar-Hotun.

COLT, in *Zoology*. See Foal and Horse.

Colt's-*foot*, in *Botany*. See Tussilago *Farfara*.

Colt's-*foot*, *alpine*. See Cacalia *Petafites*.

COLTHENA, in *Ancient Geography*, placed by Ptolemy near the Araxes, and N. of Soducena.

COLTIE, among the *Timber Merchants*, a word ufed to exprefs a tree which has a defect in fome one of its annual circles, which renders it unfit for many of the ufes it might have been otherwife fit for. In this cafe fome one of the annual circles near the centre is perceived by the eye to be thicker than the reft, and its fap veffels larger. It has an appearance much different from that of the others, and is fo loofely connected both to its inveftient, and invefted circles, that, on fawing a tranfverfe piece of the trunk off, it will flip out from the others, and fo leave the heart loofe, and the reft hollow, feeming to have been only fitted, not connected, to the others. In fplitting the wood for other ufes, it yet more readily drops out, and the timber of fuch a tree is therefore much lefs fit for general ufe than that of others. It is not eafy to fay to what accident, in the growth of the tree, this is owing, but it feems probable that it expofes the tree to other accidents; in particular Bobart feems to think, that among the trees which were fplit by the hard froft, in the year 1683, while other trees of the like fizes and kinds efcaped, this *coltinefs* might be the occafion of the mifchief, as well as of their being wind-fhaken, or lagged. Philof. Tranf. N° 165.

COLUBÆ, in *Ancient Geography*, a people of India, placed by Ptolemy on the other fide of the Ganges, and near to it.

COLUBER, in *Zoology*, a genus of ferpents diftinguifhed

guifhed by having plates on the belly, and fcales on the under parts of the tail.

The fpecies of this genus are numerous. Linnæus defcribes, upon the teftimony of various writers, above ninety; and that number even has been confiderably augmented by naturalifts fince his time. The fpecies differ greatly in fize and habit; fome, as the vipers having the head large, flattifh, and femi-cordated, with the body and tail of a moderate length, or rather fhort; while others, as the greater part of the harmlefs ferpents, have fmall heads, with the body and tail much longer in proportion. In fome, exclufive of the ufual fcales under the tail, are a few fcuta or undivided lamellæ, either at the beginning or towards the tip of the tail. The beft works on this tribe of reptiles are "Synopfis methodica animalium Quadrupedum et Serpentini generis," of Ray. "Synopfis Reptilium," &c. of Laurenti; and thofe of Seba and Catefby. The obfervations of Boddaert, "Specimen novæ methodi diftinguendi Serpentia." Nov. Act. Acad. Nat. Cur.; and "Befchreibungeiner Schlange," &c. of Wiegel. The papers of Mr. Ellis, and another by Dr. Gray in the Philofophical Tranfactions, relative to venomous ferpents, are alfo interefting. Several of thofe defcribed by count La Cepede deferve particular attention. Profeffor Pallas mentions fome new kinds obferved in Ruffia and Siberia; others are mentioned by Sparrman, and a number of the viper tribe occur in the "Hiftory of the Indian Serpents," publifhed by the late Dr. Ruffell.

Linnæus confidered the number of abdominal plates and fcales under the tail as a characteriftic diftinction of the different fpecies of this genus; fuch, however, is the inconfiftency of this criterion that, in defcribing the fame fpecies, fcarcely two writers agree. Characters taken from the number of thofe plates and fcales in the ferpent tribe, like thofe from the number of rays in the fins of fifhes, are not to be relied upon. The colours are liable to fome variation; but the peculiar form and difpofition of the fpots, lines, and other markings, afford, in general, a character by which the different fpecies may be diftinguifhed.

Species.

Vipera. Somewhat ferruginous, fpotted with brown; beneath whitifh; tail fhort and mucronated.

Abdominal fcuta 118, fubcaudal fcales 22. Linn. Haffelq. Act. Upf. 1750. *Afpis Cleopatrae*, Laurenti.

This is the common viper of Egypt. Haffelquift, who appears to have firft defcribed the fpecies with accuracy, informs us, that it is imported in confiderable quantities every year to Venice for the ufe of the apothecaries. Its fize is fomewhat fmaller than that of the common viper; the head not fo flat on the top, but very protuberant on each fide; fnout very obtufe. The body is thick towards the middle, and fomewhat quadrangular, but thin, and cylindric towards the head and tail, which laft is fhort, flender, conical, and terminated by a flightly incurved horny point or tip. The fcales on the upper parts are oval and carinated. Haffelquift defcribes this fpecies as being about two fpans in length, exclufive of the tail, which meafures only an inch. This is fuppofed by fome to be the afp, by the bite of which the celebrated Cleopatra determined rather to die than fubmit to be carried captive to Rome, to grace the triumph of Auguftus. Mr. Bruce, on the contrary, confiders the Ceraftes to be the fpecies employed on that momentous occafion. Schneider is of opinion, that the Egyptian viper (C. vipera) muft be the true *dipfas* of the ancients, a reptile which was popularly reported to kill by occafioning the moft exceffive thirft.

Variegatus. Above chefnut, variegated with grey and white; beneath, and on the fides, pale yellow. *Afpis variegata*, Laur. Amph. Seba, &c.

Confidered as a native of America, and refembles the laft.

Venosus. Reddifh afh, with white tranfverfe veins; head long. *Afpis cobella*, Laur. Amph. Seba.

A native of America, and is probably only a variety of C. vipera.

Intestinalis. Body equal, flender, with a lateral and longitudinal dorfal line, the laft furcated near the eyes. Laur. Amph. Seba.

Inhabits Africa, and like the former is perhaps merely a variety of C. vipera.

Berus. On the head a bilobate fpot; body above cinereous (or reddifh) with a black flexuous zig-zag ftripe down the back, and belly purplifh. *Coluber berus*, abdominal fcuta 146, fubcaudal fcales 39. Linn. Fn. Suec. Amoen. Acad. 148—42. Weigel Abh. der Hall. 177—86. Scop. *Vipera*, Gefner Aldr.

This is the common Englifh viper, and which is not only frequent in this country, but appears to be generally diffufed over the reft of Europe, and fome parts of Afia. If the varieties, defcribed by Gmelin, are of the fame fpecies, it extends alfo as far as India. The var β of this author has the fpots on the top of the head roundifh, and fomewhat confluent or running into a ftripe; thofe near the tail tranfverfe. This inhabits India. γ. Reddifh with the head variegated; neck flender. A native of St. Euftace. δ. The arch of the hind head intercepting a white fpot. Inhabits India. ϵ. Spot on the head multipartite. Inhabits the Celebes. The whole of thofe varieties are defcribed and figured in the works of Seba.

Though the viper varies confiderably in colour from a pale cinereous or yellowifh ferruginous to deep or dull brown, the varieties agree in being marked with a continued feries of confluent rhomboid blackifh fpots, extending from the head to the tail. The head is broad, and fomewhat flattened, and is more or lefs protuberant on each fide at the back part; the front of the head is blackifh, and on the upper part is a large divided and fomewhat heart-fhaped fpot, the obtufe divifions of which are directed backwards; the lips are fomewhat barred or variegated with black and light grey, and along each fide of the body runs a row of roundifh fubtrigonal dufky fpots, continuing to the end of the tail. The fcales on the upper part of the body are carinated, the under parts of a blackifh colour, with a blueifh glofs fomewhat refembling that of polifhed fteel. The general length of the viper is from eighteen inches to two feet, and it is affirmed by fome writers to grow even to the length of three feet. The fangs of the viper, like thofe of other poifonous ferpents, are fituated on each fide the fore part of the upper jaw, and are generally two in number, with a few fmaller ones fituated behind. The poifon, as ufual, lies in a receptacle at the bafe of the fangs, and being perforated, when the animal bites, the compreffion of thofe receptacles forces out a drop of the poifonous fluid, which paffing through the aperture of the fangs is immediately inftilled into the wound. The tongue is forked, and being foft and flexible is fufceptible of great extenfion: it may be perhaps fuperfluous to add that this tongue is altogether incapable of inflicting any wound, or injecting poifon, as fome ancient writers credouloufly affirm; it may affift the animal in the capture of its infect prey. The French naturalifts are inclined to believe it is intended by nature to fupply fome defect of tranfpiration in the fkin.

Hitherto the viper has been confidered the moft poifonous of

of the European ferpents, and many inftances are recorded of the fatal effects refulting from its bite. That the bite of this ferpent is always productive of pain and temporary inflammation in the parts bitten is very evident; fometimes alfo the fymptoms may become alarming, or, in a few inftances, through neglect or injudicious treatment of the wound, may even prove fatal; but upon the whole the bite of this creature does not appear pregnant with all thofe dangers which the terrors and prejudices of the vulgar lead them to fuppofe. In England the bite of the viper is rarely attended with fatal confequences. Fontana feems to doubt whether any well attefted inftance can be adduced of the viper having killed any perfon by its bite, even in the warm climate of Italy. The teftimonies of authors, both as to the nature of the poifon itfelf, and its effects on the animal frame are, however, confeffedly at variance. According to Dr. Mead, and his affociates in the experiment, the poifon of the viper, diluted with a little warm water, proved fharp and fiery when tafted with the tip of the tongue, as if the tongue had been ftruck through with fomething fcalding or burning. This fenfation went off in two or three hours; but one gentleman, who would not be fatisfied without trying a large drop undiluted, found his tongue fwelled with a little inflammation; and the forenefs lafted two days. On the contrary, abbé Fontana and fome others defcribe it as of no particular acrimony of tafte, but rather refembling oil or gum, and Dr. Ruffell, in his work on Indian ferpents, affirms the fame even of the poifon of the cobra de capello. Boerhaave is of opinion that the poifon of the viper may be taken into the ftomach without danger, and quotes the cafe of Jacob Sozzi, who, at the court of the duke of Tufcany, is faid to have fwallowed three drams of this poifon without experiencing any ill effects. This poifon, fays Boerhaave, is rendered inactive by digeftion in the ftomach and bowels, fo that it will not afterwards exert its fad effects upon the blood; for a whole ounce of the venom taken by the mouth will not kill an animal, when, at the fame time, a fmall needle only, dipped in the fame fluid, taking up perhaps no more than a hundredth part of a drop, and then thruft into the blood of the living animal, almoft infallibly kills. Fontana, on the contrary, affirms, that though the poifon of the viper adminiftered internally may not produce the fame violent fymptoms as the bite, that it cannot be taken with impunity. The opinion, pretty generally entertained among the ancients, feems to be in favour of the affertions of Boerhaave.

"The fymptoms which follow the bite of the viper (according to Dr. Mead) when it faftens either one or both its greater teeth or fangs in any part of the body, is an acute pain in the part wounded, with a fwelling at firft red, but afterwards livid, which, by degrees, fpreads further to the neighbouring parts, and occafions great faintnefs, and a quick, though low and fometimes interrupted pulfe; great ficknefs at the ftomach, with bilious, convulfive vomitings, cold fweats, and fometimes pain about the navel; and if the cure be not fpeedy, death itfelf, unlefs the ftrength of nature prove fufficient to overcome thofe diforders: and though it does, the fwelling ftill continues inflamed for fome time; nay, in fome cafes, more confiderably upon the abating of the other fymptoms than at the beginning; and often from the fmall wound runs a fanious liquor, and little puftules are raifed about it: the colour of the whole fkin, in lefs than an hour, is changed yellow, as if the patient had the jaundice. Thefe mifchiefs (although different climates, feafons of the year more or lefs hot, the greater or lefs rage of the viper, the animal itfelf being of a larger or fmaller fize, and confequently able to communicate more or lefs venom, the wound made deeper, in a part more nervous or tendinous, and therefore receiving more of the poifonous liquor, and the like circumftances may varioufly heighten or abate them,) yet ufually difcover themfelves much after the fame manner in all; unlefs the bite happen not to be accompanied with the effufion of that liquor, which is the main inftrument and caufe of this violent and fhocking difturbance." Dr. Mead caufed feveral animals, as dogs, cats, and pigeons to be bitten by an enraged viper, which animals generally died, fome in a longer and others in a fhorter fpace of time; but it was obferved that, immediately after being bitten, they all exhibited figns of acute pain as if affected with ficknefs, faintings, and convulfions. The venomous properties of the poifonous fluid of the viper is not deftroyed even by the death of the animal, as was proved by Dr. Mead; he took the head of a large viper that lay three hours after it was cut off, and was perfectly flaccid and without motion, and wounded a pigeon on the thigh by the fangs of the head; the bird prefently became convulfed, and died feven hours after. The Scythians, as Pliny relates, muft have been aware that the poifon of the viper would retain its venomous properties after being taken from the animal and dried, for they were accuftomed to dip their arrows into its poifon; this they previoufly prepared by mixing it with human blood.

From the following experiment it would feem that no very material difference takes place in the appearance of an animal killed by the bite of the viper, than if its death were occafioned by any other cafe. To afcertain this fact, a viper, being enraged by the members of the Tufcan academy, and then fuffered to bite the nofe of a ftrong bull, the animal expired in a fhort time, and being opened by the moft expert anatomifts, no uncommon alteration could be perceived either in the folid or fluid parts of the beaft.

The viper, though fo much dreaded on account of its bite has been very highly efteemed both by the ancients and moderns as a reftorative and ftrengthening diet. The ancients ufed the flefh of this fnake in leprous and other cafes. The Greek phyfician Craterus, cured, as Porphyrius relates, a miferable flave, whofe fkin, in a ftrange manner, fell off from his bones, by advifing him to feed on viper's flefh in the manner of fifh. Galen fays, that thofe afflicted with elephantiafis are wonderfully relieved by eating viper's flefh dreffed like eels, and relates very remarkable cures of this difeafe performed by means of viper wine. In France and Italy, the broth, jelly, and flefh of vipers is in much efteem as a reftorative medicine. In England we have to inftance the well known circumftance of fir Kenelm Digby, who caufed his wife lady Venetia to feed on capons fatted with vipers to recover her from a confumption. According to Dr Lewis, the dried flefh of the vipers poffeffes none of the nutritious properties of the recent animal, and is totally infignificant. A volatile falt was formerly drawn from vipers and fold at a great price as a fovereign remedy againft the bites of vipers, and other poifonous animals, but it is now found not to be materially different from the volatile alkaline falts procured by diftilling other animal fubftances.

The viper abounds moft in dry, ftony, and chalky countries, or in the low herbage or underwood in thickets. It cafts its fkin twice in the year, namely, in fpring and autumn, and is faid to attain its full fize at the age of fix or feven years, but are capable of engendering when two or three years old. They copulate in May, and go about three months with young. "The viper (fays Mr. White) is vivaparous, producing its young towards the clofe of fummer. On the 4th of Aug. 1755, we furprized a large

a large female viper, which feemed very heavy and bloated as it lay on the grafs, bafking in the fun. When we came to cut it up, we found that the abdomen was crouded with young, fifteen in number; the fhorteft of which meafured full feven inches, and were about the fize of full grown earth worms. This little fry iffued into the world with the true viper fpirit about them, fhewing great alertnefs as foon as difengaged from the belly of the dam: they twifted and wriggled about, and fet themfelves up, and gaped very wide, when touched with a ftick, fhewing manifeft tokens of menace and defiance, though as yet they had no manner of fangs that we could find, even with the help of our glaffes." In the month of May a female viper was opened, which had in it a chain of eleven eggs, about the fize of thofe of a black bird, but not fo far advanced as to fhew the rudiments of the young. Several intelligent folks (adds Mr. White) affure me that they have feen the viper open her mouth, and admit her helplefs young down her throat on fudden furprizes, juft as the opoffum does her brood into the pouch under her belly upon the like emergencies; and yet the London viper catchers infift on it to Mr. Barrington that no fuch thing ever happens.

Sir Thomas Brown feems inclined to believe this circumftance: the young, he obferves, fuppofed to break through the belly of the dam, will, upon any fright, for protection, run into it; for then the old one receives them into her mouth, which way, the fright being paft, they will return again, which is a peculiar way of refuge, and although it feems ftrange is avowed by frequent experience and undeniable teftimony. The fame is afferted by fome other writers of no mean refpectability.

The enemies of the viper are numerous, the herons in particular deftroy vaft numbers. Their prey confifts of frogs, toads, lizards, mice, and various fmall quadrupeds. The viper is capable of fupporting a very long abftinence; it being known that fome have been kept in a box without food for fix months, and yet did not abate of their vivacity. They feed only for a fhort period annually, and as a viper has been known to be a whole month devouring and digefting a frog or toad, two fuch meals would be fufficient to fupport it for a twelve month. It is remarked, that they never eat during confinement, for if mice, their favourite food be thrown into their box, though they will kill they never eat them. The violence of their poifon decreafes in proportion to the length of their confinement. Vipers, when at liberty, remain torpid throughout the winter, but when confined have never been known to take their annual repofe. The beft method of catching them is by putting a cleft ftick on or near the head, then feizing them by the tail, and inftantly dropping them into a bag. The viper catchers are frequently bit, but it is feldom the wound proves fatal: oil of olives, or falad oil, is faid to be the moft effectual remedy. M. Sonnini feems fully fatisfied of the efficacy of *eau de luce* as an antidote to the poifon of vipers as well as other venomous ferpents, the good effects of which he tells us he has experienced on feveral occafions, and particularly at Guiana, where fnakes are equally numerous and formidable. In his travels through Greece and Turkey, M. Sonnini mentions an inftance of a child he faw at Sifour, three or four hours after it had been bitten by a vipour or venomous fnake, in the fmall of the leg. Both the leg and foot were much fwelled, very hard, and of a blueifh colour: the child fuffered great pain, the wound no longer appeared, and the place was not diftinguifhed but by a larger fwelling, and by pains more acute, which were occafioned by touching it. He made the child fwallow a few drops of *eau de luce* in half a glafs of wine, and after fome fcarifications on the part bitten applied to it, a comprefs, fteeped in this fame water, which is known to be compofed of volatile alkali and oil of amber. The refult of this treatment was, that four hours after, the fwelling was confiderably diminifhed; the child no longer felt any pain, and became tranquil; the comprefs of *eau de luce* was again renewed, and the child left in a fair ftate for recovery. The fame application is recommended by Sonnini in all fimilar cafes; he obferves, that the fwelling of the wounded part is fpeedily diminifhed, and the pain entirely removed by this means; but the *eau de luce* muft be taken internally, according to this writer, as well as applied to the wound externally, in order to produce the defired effect. The remedies which the Greeks commonly employ for curing the bite of fnakes, as Sonnini affirms, confift in cataplafms of emollient plants, calculated to promote fuppuration. Sow thiftle is reckoned among them to poffefs, particularly, a fpecific virtue againft this fort of venom. But this treatment, he adds, is very long; it frequently lafts two months, and never lefs than one; neither is it always fuccefsful, and death pretty frequently carries off the patient from the torments which this mode of treatment caufes him to fuffer.

Prester. Black, with deep black, dentated, dorfal line. *Coluber prefter*, abdominal fcuta 152, fubcaudal fcales 32. Linn. Fn. Suec. 287. Lepech Itin. *Coluber vipera anglorum*, Laur. *Vipera anglica nigricans*, Petiv. Muf.

This is the black viper of Englifh authors, and which fo completely refembles the common viper in every particular, except the colour, that we are ftrongly inclined to admit it as a mere variety of that fpecies. The black viper of Auftria appears from a feries of experiments made by Laurenti to be innoxious, fince pigeons and chickens expofed to its bite were no otherwife injured than by mere puncture without fuffering any fymptoms of poifon, but it is not entirely certain that the kind defcribed by Laurenti is of the fame fpecies as the black viper generally found in Europe, and which is almoft univerfally allowed to be as poifonous as the common viper.

Prefter inhabits the northern parts of Afia as well as Europe.

Cacodæmon. Deep black; head broad and tumid; body thick. *Black viper*. Catefby, Carol.

This kind is about the fize of the common viper, but of a much thicker form, and entirely of a rufty black colour; it is flow in its motions, and, when irritated, dilates the head, which is naturally large, to a furprifing width, and threatening at the fame time with a horrid hifs; the fangs are large, and the animal is faid to be as dangerous as the rattle fnake.

It is a native of Carolina, inhabiting chiefly the higher grounds.

Chersea. Dufky-bay, with black flexuous dorfal band, and the head oval, and whitifh beneath. *Coluber cherfea*, abdominal fcuta 150, fubcaudal fcales 34. Linn.

Inhabits the woody parts of Sweden, and is faid to be moft frequent in the province of Smoland, where it is greatly dreaded by the inhabitants, who confider its bite as mortal, unlefs the part bitten be immediately cut out. In the "Memoirs of the Swedifh Academy" is an account of a young man, a labourer, bit by this animal on the toe of the left foot. In the fpace of fix hours, the whole leg and thigh were red and fwelled; the pulfe intermitted, and the patient was oppreffed with pains in the head and bowels. The firft day the patient drank a glafs of the juice expreffed from afh-leaves mixed with wine every half hour, and had befides a cataplafm of the bruifed leaves applied

to

to the wound: in the evening alfo, he took a glafs of warm olive oil. By thefe means the patient was greatly relieved, flept well during the night, and found the fwelling much reduced by the next morning; but neglecting to repeat the remedies the firft fymptoms returned, and were again diffipated by the fame applications, and in two or three days the patient recovered. Linnæus attempted to cure a women wounded by the bite of a viper of this kind by means of olive oil, but his endeavours were unfuccefsful, and his patient died.

The *coluber cherfea* refembles the common viper, but ftill more the common afp, though inferior in fize, not often exceeding a fpan in length. The colour is a dufky rufous brown, with a flexuous dorfal band of a deeper colour; the head ovate, of a pale colour, and marked with a heart-fhaped dufky fpot, the divifions of which are directed backwards, and the body is round.

Scytha. Deep black above, beneath milk white, and polifhed. *Coluber fcytha*, abdominal fcuta 153, fubcaudal fquamæ 31. Pallus It.

Inhabits woods in the mountainous parts of Siberia, where it was obferved by Dr. Pallas. This fpecies is not efteemed very poifonous, and is of a fmall fize, feldom exceeding nine inches in length, or the thicknefs of a finger; the head is fomewhat heart-fhaped.

Redi. Head imbricated with very minute fcales; body ferruginous, with a quadruple tranfverfe dorfal feries of fhort brown ftreaks. *Coluber redi*, abdominal fcuta 152, fubcaudal fquamæ 33. Gmel. *Vipera francifci redi*, Laur. *Otter*, Meyer Thiere.

Allied to the common viper, but efteemed more poifonous; it differs in being marked throughout the whole length of the upper parts, with a quadruple feries of fhort, tranfverfe, alternate ftreaks, of which the intermediate ones are often confluent. The colour of the underparts is rufous, efpecially towards the head and tail. This kind is found in Auftria and Italy near the fea.

Cerastes. Sub-ferruginous, with brown tranfverfe fpots, and horned eye-lids *Coluber ceraftes*, abdominal fcuta 150. fubcaudal fcales 25. Haffelq. Act. Upf. 1750. Linn. *Ceraftes ex lybia*, Aldr. *Ceraftes*, Bellon, Ellis Phil. Tranf. *Ceraftes*, Bruce's Travels Append. *La vipère cérafte*, La Cepede.

The ceraftes viper grows to the length of eighteen inches or two feet, and is diftinguifhed by a pair of horns, or curved proceffes fituated above the eyes and pointing forwards; thefe horns have nothing analogous in their ftructure to thofe of quadrupeds, neither are they to be confidered as weapons either offenfive or defenfive, but they contribute to give the animal an appearance of more than ordinary malignity. The ceraftes is a native of many parts of Africa, and is found principally in fandy deferts and dry places. In Syria and Arabia it is particularly frequent, and is alfo found in many parts of Egypt.

The general colour of this fnake is a pale yellowifh or reddifh brown, with darker fpots difpofed at a diftance from each other, and in a fomewhat tranfverfe direction along the back, and near the fides, the belly is blueifh, or of a pale lead colour, and fome writers fay occafionally almoft white. In its manners the ceraftes bears a very great affinity to the common viper, but is ftill more to be dreaded than that fpecies, as its bite is very dangerous, and the animal is faid to fpring fuddenly to a confiderable diftance, and affail without provocation thofe who happen to approach it.

According to Mr. Bruce, the ceraftes inhabits the greateft part of the eaftern continent, efpecially the defert fandy part of it. It abounds in the three Arabias, and in Africa, I never faw (fays Mr. Bruce) fo many of them as in the Cyrenaicum, where the jerboa is frequent in proportion. He is a great lover of heat; for though the fun was burning hot all day, when we made a fire at night, by digging a hole and burning wood to charcoal in it for dreffing our victuals, it was feldom we had fewer than half a dozen of thefe vipers, who burnt themfelves to death by approaching the embers. The general fize of the ceraftes from the extremity of its fnout to the end of the tail, Mr. Bruce tells us, is from thirteen to fourteen inches; in the Britifh Mufeum, however, is a fpecimen meafuring rather more than two feet, and in that of Paris another ftill larger. The head is triangular, very flat, but higher near where it joins the neck than towards the nofe. The length of its head, from the point of the nofe to the joining of the neck, is ten-twelfths of an inch, and the breadth nine-twelfths of an inch; between its horns is three-twelfths. The opening of its mouth, or rictus oris, is eight-twelfths; its horns in length three-twelfths; its large canine teeth fomething more than three twelfths and a half; its neck at the joining of the head four-twelfths; the body, where thickeft, ten-twelfths; its tail, at the joining of the body, two twelfths and a half; the tip of the tail one-twelfth; the length of the tail an inch and three-twelfths; the aperture of the eye two-twelfths, but this varies according to the impreffion of light. The ceraftes has fixteen fmall immoveable teeth, hollow, crooked, inwards, and of a remarkably fine polifh, white in colour, inclining to blueifh; nearly one-fourth of the bottom are ftrongly fixed in the upper jaw, and folds back like a clafp knife, the point inclining inwards, and the greateft part of the tooth is covered with a green foft membrane, not drawn tight, but, as it were wrinkled, over it, immediately above this, is a flit along the back of the tooth, which ends nearly in the middle of it, where the tooth curves inwardly. From this aperture, Mr. Bruce imagines, and not without reafon, that the ceraftes fheds its poifon, inftead of from the point, where, with the beft glaffes he could never perceive an aperture; fo that the tooth is not a tube, but hollow only half way; the point being calculated for making the incifion, and by its preffure occafioning the venom in the bag at the bottom of the fang to rife in the tooth, and fpill itfelf through the flit into the wound. By this flat pofition of the tooth along the jaw, and its being defended by the membrane, it eats in perfect fafety; for the tooth cannot prefs the bag of poifon at the root, while it lies in this pofition, nor can it rife in the tube to fpill itfelf, nor can the tooth make any wound fo as to receive it; but the animal is fuppofed to eat but feldom or only when it is with young. This viper has only one row of teeth. The poifon is very copious for fo fmall a creature, being fully as much as a drop of laudanum dropped from a phial by a careful hand; it is of a yellow colour, and viewed through a glafs is not perfectly tranfparent or pellucid.

During the day time the ceraftes hides itfelf in the fand, where it lives in dens fimilar to thofe inhabited by the jerboa. Mr. Bruce kept two of the ceraftes in a glafs jar, fuch as is ufed for keeping fweetmeats in, for the fpace of two years, without having given them any food; they did not fleep that he obferved in winter, but caft their fkins the laft days of April. The ceraftes moves with great rapidity, and in all directions, forward, backward, and fideways. When he inclines to furprife any one, who is too far from him, he creeps with his fide towards the perfon, and his head averted, till judging his diftance, he turns round, fprings upon him, and faftens upon the part next to him. Mr. Bruce faw one of them in a houfe at Cairo crawl up the fide of a box in which there were many, and there lie ftill as if hiding himfelf,

felf, till one of the people who brought them to us, came near him, and though in a very difadvantageous pofture, fticking, as it were, perpendicular to the fide of the box, he leaped near the diftance of three feet, and faftened between the man's fore-finger and thumb, fo as to bring the blood. The man fhewed no fign of either pain or fear, and Mr. Bruce and his party kept him with them full four hours without his applying any fort of remedy, or feeming inclined fo to do. To make himfelf affured that the animal was in its perfect ftate, Mr. Bruce make the man hold the ceraftes by the neck, fo as to force him to open his mouth, and lacerate the thigh of a pelican, a bird he had tamed as large as a fwan. The bird died in about thirteen minutes, though it was apparently affected in about fifty feconds, and this even can fcarce be confidered as a fair trial, becaufe a few minutes before it had bit the man, and fo difcharged part of its virus, and it was made to fcratch the pelican by force, without any irritation or action of its own.

It appears not only on the teftimony of the above circumftance, but on the relations of travellers in general of the greateft refpectability, that the natives of the countries infefted by the ceraftes, have a method of charming, or rather ftupefying thefe and other ferpents to prevent their biting, or to render their bite innoxious, however irritated the animal may be. Some pretend to poffefs preternatural powers over thofe reptiles, while others fay, they have certain preparations with which they anoint themfelves to obviate the fatal confequences of their bite, and which is never ineffectually employed. Mr. Bruce fpeaks at fome length on this interefting topic "a long differtation (fays this writer,) would remain on the incantation of ferpents. There is no doubt of its reality, the fcriptures are full of it, all that have been in Egypt have feen as many different inftances as they chofe. Some have doubted that it was a trick, and that the animals fo handled, had been firft trained and then difarmed of their power of hurting; and, fond of their difcovery, they have refted themfelves upon it without experiment, in the face of all antiquity. But I will not hefitate to aver that I have feen at Cairo, (and this may be feen daily without trouble or expence) a man who came from above the catacombs, where the pits of the mummy birds are kept, who has taken a ceraftes with his naked hand, from a tumber of others lying at the bottom of the tub, has put it upon his bare head, covered it with the common red cap he wears, then taken it out, put it in his breaft and tied it about his neck like a necklace; after which it has been applied to a hen and bit it, which has died in a few minutes; and, to complete the experiment the man has taken it by the neck, and beginning at the tail has ate it as one would do a carrot, or ftock of celery, without any feeming repugnance."

"We know from hiftory, that where any country has been remarkably infefted with ferpents, there the people have been fcreened by this fecret. The Pfylli and Marmarides of old, undoubtedly were defended in this manner."

"Ad quorum cantus mites jacuere caraftæ."
Sil. Ital. lib. iii.

"To leave ancient hiftory, I can myfelf avouch, that all the black people in the kingdom of Sennaar, whether Fungee, or Nuba, are perfectly armed againft the bite of either fcorpion or viper. They take the ceraftes in their hands at all times, put them in their bofoms, and throw them at one another, as children do apples or balls, without having irritated them by this ufage fo much as to bite. The Arabs have this fecret naturally, but from their infancy they acquire an exemption from the mortal confequences attending the bite of thefe animals, by chewing a certain root and wafhing themfelves, (it is not anointing) with an infufion of certain plants, in water. One day when I was fitting with the brother of Shekh Adelan, prime-minifter of Sennaar, a flave of his brought in a ceraftes, which he had juft taken out of a hole, and was ufing with every fort of familiarity; I told him my fufpicion that the teeth had been drawn, but he affured me they were not, as did his mafter, Kitton, who took it from him, wound it round his arm, and, at my defire, ordered the fervant to carry it home with me. I took a chicken by the neck and made it flutter before him, his feeming indifference left him, and he bit it with figns of anger, the chicken died almoft immediately;—I fay his feeming indifference, for I conftantly obferved that however lively the viper was before, yet, upon being feized by any of thefe barbarians, he feemed as if taken with ficknefs and feeblenefs, frequently fhut his eyes, and never turned his mouth towards the arm of the perfon who held him. I afked Kitton how they came to be exempted from this mifchief? He faid they were born fo, and fo faid the grave and refpectable men among them. Many of the lighter and lower fort talked of enchantments by words and by writing, but they all knew how to prepare any perfon by medicines, which were decoctions of herbs and roots. I have feen many thus armed for a feafon, do pretty much the fame feats as thofe who poffeffed the exemption naturally; the drugs were given me, and I feveral times armed myfelf, as I thought, refolved to try the experiment; but my heart always failed me when I came to the trial; becaufe, among thofe wretched people, it was a pretence that they might very probably have fheltered themfelves under that I was a Chriftian, and that it had no effect upon me. I have ftill remaining by me a fmall quantity of this root, but never had an opportunity of trying the experiment."

Among the writers of antiquity we find abundant mention of the Pfylli, or ferpent-eaters; men who pretended to poffefs the inherent power of charming ferpents, and of devouring them without danger. Lucan fpeaks of the practice of the Pfylli, or African tribes, and informs us they were employed by Cato to attend his expedition through the Lybian deferts, for the recovery of his foldiers bitten by ferpents. Strabo tells us the Pfylli, or men of Crene, poffeffed a fecret antidote againft the poifon of thofe reptiles. It appears equally certain that there are tribes of men in the Eaft, who, to this day practife the fame arts. Savary relates that when at Rofetta, he was prefent at the feftival of Sidi Ibrahim, in which the rear of a proceffion compofed of the different trades, and cheiks, or priefts of the country, bearing the ftandard of Mahomet, was brought up by a troop of thefe modern Pfylli. Thofe men, fays Savary appeared frantic, with naked arms, their eyes wild, and enormous ferpents in their hands, which twined round their bodies and endeavoured to efcape. They feized the ferpents forcibly by the neck, avoided their bite, and, regardlefs of their hiffes, tore them with their teeth and eat them alive, while the blood ftreamed from their defiled mouths; other Pfylli ftruggled with them to free away their prey, for the contention was who fhould devour a living ferpent!—The aftonifhed populace followed, and cried—a miracle!

The remarks of Sonnini, one of the lateft writers on this fubject, may not prove uninterefting in conclufion. "The Eaft, fays he, was at all times the country of magicians: men boafting to have the power of charming ferpents, of braving their bite, and their venom, of rendering them docile to their voice; they formerly exifted there under the name of Pfylli, and there are ftill to be found, people who

pretend

pretend to have inherited their fecrets. I knew one of thofe verfed in this kind of fafcination; he was certainly the moft ignorant, and moft foolifh of the Greeks: his fecret confifted chiefly in thirteen words, which it was neceffary to pronounce in fight of the ferpents. He told me alfo, that, in order to guard againft the bite of thefe reptiles, it was neceffary to try to take one alive with the precaution of feizing it ftrongly by the neck fo as to prevent it from biting, and not to concern myfelf about the body and tail, the twiftings of which lightly fqueeze the arm. You muft then flip round its neck a running knot made with coarfe thread, and draw it tight by degrees till the animal is ftrangled. When it is on the point of dying, you open it and take out its fat, with which you rub your hands; then faid my modern Pfyllus to me, you have nothing more to fear from the bite of every fpecies of ferpent."

The figure of ceraftes, occurs frequently among the hieroglyphic characters infcribed upon remains of Egyptian antiquity.

Nasicornis. Somewhat oblivaceous yellowifh, variegated with black; flexuous, lateral band pale, and two horns on the fnout. *Coluber nafcornis*, horn-nofe fnake. Shaw Gen. Zool.

This remarkable fnake was firft defcribed by Dr. Shaw in the Naturalift's Mifcellany. The moft ftriking peculiarity of his fpecies are the two large fharp pointed horns, fituated on the top of the nofe, or anterior part of the upper jaw. Thefe horns ftand nearly upright, but incline flightly backwards, and a little outwards on each fide, and are of a fubftance fomewhat flexible; their fhape is rather triangular. The length of thofe horns is about half an inch, and at the bafe of each ftands an upright ftrong fcale, of nearly the fame fhape with the horn itfelf, and thus giving the appearance of a much fmaller pair of horns. The mouth is furnifhed with extremely large and long fangs, or poifonous teeth, two of which appear on each fide of the mouth; the hinder pair being fmaller. The length of this animal is about thirty-five inches. Its colour is yellowifh, olive-brown, very thickly fprinkled all over with minute blackifh fpecks. Along the whole length of the back, extends a feries of yellowifh-brown oblong fpots, or marks, each of which is imbedded in a patch of black; and on each fide of the body from head to tail runs an acutely flexuous, or zig-zag line, or narrow band of an ochre colour, which is bounded beneath by a much deeper or blacker fhade, than on the reft of the body. The belly is a dull ochre colour or cinereous yellow, freckled with blackifh fpots and markings, and befides thefe a number of black fpots of various fizes are fparingly difperfed over the whole animal; the tail is fomewhat thin and fhort in proportion to the body. The fcales are hard, ftiff and ftrongly carinated, the head is covered with fmall fcales, and is marked on the upper-part by a longitudinal patch of brown, running out into pointed proceffes at the fides, and bounded by a fpace of dull lead colour or cinereous. The fhape of the head is broad and flattened, the cheeks varied with black and yellow marks. The horned fnake is fuppofed to be a native of the interior parts of Africa. The fpecimen above defcribed, was obtained from the mafter of a Guinea veffel by the Rev. Edward Charles Jenkins of Charleftown in South Carolina.

Aspis. Nofe terminated by an erect wart; body rufous, with alternate, roundifh, dufky, diftinct, and confluent fpots; beneath fteel blue dotted with yellow. *Coluber afpis*, abdominal fcuta 146, fubcaudal fcales 46. Gmel. 146—34, Strom. Sondm. Col.—*Vipera mofis charas*. Laur. Amph. p. 100. n. 219.

Confidered by fome as a variety of coluber berus: it is a native of Dauphiny, Lyons, and Poitiers. Cepede defcribes a fnake that inhabits the northern parts of France under the name of L'Afpic, but which, according to Latreille, is not the true coluber afpis of Linnæus, as its name may imply. This kind, Cepede informs us, is about three feet in length, of which the tail meafures three inches and eight lines. The head is rather large, and covered with fmall carinated fcales, the body larger, of fimilar ftructure, the colour, pale rufous grey, and along the upper parts are three longitudinal ranges, of roundifh dark rufous fpots, bordered with black, and which unite or become confluent near the tail, and thus exhibits the appearance of a zig-zag band, fimilar to that of the common viper. The underparts of this fnake, are of a dufky colour, marbled with dull yellow; its fangs refemble thofe of the common viper, and it is reputed equally poifonous with that fpecies. We introduce this fnake under the fpecies afpis, conceiving it may be hereafter afcertained to be of the fame individual fpecies, although writers are not agreed on this point at prefent.

Ammodytes. Brown or pale blueifh, with a dentated black dorfal band: nofe terminated by an erect wart. *Coluber ammodytes* abdominal fcuta 142, fubcaudal fcales 32. Linn. Amoen. Ac. Weigel Abh. *Vipera illyrica*, Laur. Amph. *Driinus*, Bell. *Ammodytes*, Aldr.

Inhabits the Eaft, and mountainous parts of Illyria. This fpecies is greatly allied to the viper, from which it is diftinguifhed principally by the erect procefs at the tip of the fnout. The colour is ufually blueifh grey or brown, with a continued black dorfal band, refembling that of the viper. This is confidered as an extremely poifonous fpecies, and according to Matthiolus, proves fatal in the fpace of three hours. The flefh is ufed medicinally for the fame purpofes, as that of the common viper.

Lachesis. Yellowifh-grey, variegated with brown; a black tranfverfe band above the eyes.—*Cobra lachefis*, Laur. Amph. *Serpens ceilonica*, Bitin. *Dicta*, Seba.

Defcribed and figured by Seba, from whom it appears this fpecies is a native of Ceylon, and is known by the name of bitin. Its colour is a rich and fomewhat irregular variation of deep and light brown, difpofed in ftreaks and patches, on a yellowifh grey ground. The fcales, which in many parts are tipped with white, are large, ftrongly carinated, and fixed only at the bafe, while the remainder is loofe or free. This fingular difpofition of the fcales, affords the animal an opportunity of elevating or depreffing them at pleafure, and in moving, is faid to occafion a kind of ruftling noife.

This is a poifonous fpecies, being armed with large fangs, and from its general form, appears to be an animal of confiderable ftrength. The head is indiftinct, or not diftinguifhed from the reft, by any contraction, or appearance at the neck. The male is deeper coloured than the female, and feems to have the body larger, and the tail more flender. The general length of this fnake, feems to be about four or five feet, and the tail fhort in proportion to the body.

Clotho. Greyifh-orange; variegated with numerous waved black bands; keel of the fcales on the chin with a white fpot; tail very flender.—*Cobra clotho*, Laur. Amph. *Vipera*, Bitin. *Ceilonica elegantiffima*.

Inhabits Ceylon and Cuba, and is fuppofed to be a poifonous fpecies. This appears to be from the work of Seba to be a large fnake, meafuring more than fix feet in length,

and being thick in proportion; the head large, covered with minute fcales, and as in the coluber lachefis, fcarce diftinguifhed from the body, by any perceptible contraction at the neck. The colour of the upper parts, is greyifh orange freckled with black fpecks, and marked with tranfverfe undulated, or fomewhat zig-zag bars of black. The under parts are cinereous, variegated with a few black bars, and tranfverfe ftripes.

Atropos. Hoary, with a quadruple feries of large brown ocellar fpots, with white margins. *Coluber atropos*, abdominal fcuta 131, fubcaudal fquamæ 22. Linn. *Cobra atropos*, Laur.

The length of this fpecies is about fixteen inches; the head large, marked with four or five dufky fpots, and covered with fmall fcales: the body rather bulky: the tail is fhort, meafuring about a ninth part of the whole length. It is a native of America, and is confidered as an extremely poifonous animal.

Tisiphone. Body thick, brown, and without variegations, *Coluber tifiphone*, Shaw. Gen. Zool. *Black viper*, Catefby.

This, according to Catefby, is the fize of the black American viper, meafuring about two feet in length, and being large in proportion; he tells us it is a fluggifh reptile, advancing deliberately even to efcape danger, but will yet defend itfelf when attacked with much fiercenefs, and its bite is faid to be very venomous. It is found in Virginia, and Carolina, in the laft of which it is called the truncheon fnake. This fpecies preys on lizards, and other animals.

Megaera. Brown, varied with yellow: head flat and heart-fhaped, and a large orifice between the eyes and noftrils on each fide. *La Vipere Fer de-lance*, Cepede.

This is a large fpecies meafuring five or fix feet in length. It inhabits the ifland of Martinico and fome of the neighbouring iflands, and is confidered one of the moft formidable of the ferpent tribe. A fpecimen of this fnake, preferved in the Britifh Mufeum, is a rich deep brown, with yellow variegations, the back being marked throughout the whole length, by pretty numerous equidiftant, broken, and flightly alternating bars of dull yellow, which, defcending and joining at intervals with the neighbouring ones, form obfcurely annular and fomewhat irregular markings of fimilar colour along the fides, with ftill more obfcure croffings on the part neareft the fcuta, intermixed with fmaller patches and fpots: the abdomen is dull yellow, clouded and fpeckled on the fides with pale brown. The head is large, flat, heart-fhaped, and covered with very fmall carinated fcales; but the terminal fcale of the nofe, and thofe at the fides of the mouth, are very large, and above each eye is alfo a very large fcale. The noftrils are fmall, and between them and the eyes on each fide is a large orifice, which has been regarded as a paffage to the organ of hearing; the fcales on the whole upper parts of the body are moderately large, ovate, and carinated, the back flightly elevated, the fides rather floping, and the abdomen flattifh.

The fangs of this ferpent are of a large fize, about three quarters of an inch in length, and curved. The poifon is faid to refemble that of moft ferpents, being a clear yellowifh fluid, like olive oil. The fymptoms are fuch as follow from that of the viper, but in a much ftronger degree. When preparing to bite, it is faid to throw itfelf into a fpiral form, and to fpring with great rapidity on its prey, but at other times to be rather flow in its motions, and of a torpid nature, concealing itfelf beneath the herbage, or within the hollows of trees. It frequents fugar plantations, for the fake of the rats, which abound in fuch fituations, and alfo preys on birds. The female goes fix months with young, and produces the new brood perfectly formed, and amounting to forty, fifty, or even fixty: they are obferved to vary in colour when young, fome being yellow, others grey, and others intermixed, yellow, grey, and brown.

Cobella. Brown, lineated with white: head broad with a lead coloured ftripe behind each eye. *Coluber cobella*, abdominal fcuta 150, fubcaudel fcales 54. Linn. Amoen. Acad. *Coluber ater*, *lineolis albis*, Boddaert. *Cerastes cobella*, Laur. Amph.

Grows to the length of two feet nine inches, and varies much in the difpofition of its colours, and the number of its abdominal fcuta, and fubcaudel fcales. Gmelin enumerates no lefs than fourteen variations of this kind. It is a very common fnake in America.

Cobra. Entirely brown, compreffed: back carinated, fcales of the ridge largeft; head elongated and rounded. Gmel. Laur. Amph. Allied to the coluber redi.

Coronatus. Deep black, with white unequal fpots and dots. Gmel. *Cerastes coronatus*. Laur. Amph. Inhabits New Spain.

Novæ Hispaniæ. Above black, beneath white; back with oblique ftreaks, pofterior parts with oblique bands. Gmel. *Cerastes mexicanus*, Laur. Amph.

Refembles C. coronatus, and like that fpecies, inhabits New Spain.

Natrix. Brown, with a black and yellow patch on each fide the neck, and a row of black fpots down each fide; abdomen dufky. *Coluber natrix*, abdominal fcuta 170, fubcaudal fcales 60. Linn. Fn. Suec. *Natrix vulgaris*, Laur. Amph. *Natrix torquata*, Raj. *Gemeine fchlange*, Meyer. Thiere. *Common ringed fnake*, Penn.

Inhabits moft parts of Europe, where it frequents woods, moift hedges, and fhady places. Many varieties of this fnake are defcribed by writers, but the colour is in general either a blueifh grey, or pale olive above, the fides variegated with black, and the under parts a mixture of black and white. The head is rather fmall comparatively, and is covered with large fcaly plates; the tail is of moderate length, and gradually tapers to the extremity.

This fnake preys on frogs, mice, and fmall birds, infects, and worms, and occafionally frequents the water in fearch of the firft; it is capable of fwimming, but not well. It depofits its eggs in any warm and moift fituation in the form of a continued chain or necklace of ova, to the number of twelve, fourteen, fixteen, or even twenty, of the fize of thofe of a blackbird, and of a whitifh colour, and it appears are hatched in the fpring following. During the winter the fnake conceals itfelf and becomes nearly torpid, and re-appears in the fpring, at which feafon it is faid to caft its fkin; we fufpect that it cafts its fkin twice every year. This is not a poifonous fpecies.

Atrovirens. Black green fpeckled with yellow; abdomen yellow, with a row of black fpecks down each fide. *Anguis æfculapii niger*, Aldr. Serp. *La couleuvre verte et jaune*, La Cepede.

A fpecies oftentimes confounded with the preceding: it is defcribed with accuracy by La Cepede, who informs us it is frequent in fome provinces in France. Its haunts are woods, and moift fhady places; in fize and general appearance it refembles the ringed fnake, coluber natrix, but differs in colour, being of an extremely dark or blackifh green, appearing at the firft view entirely black: the fides are marked with numerous rays of yellow fpecks, of different forms, fome oblong, and fome fquare; the eyes and edges of the mouth are bordered with yellow fcales; the abdomen is alfo yellow, every plate being marked on each fide with

a black

a black fpeck. This fnake is perfectly harmlefs. La Cepede relates from M. Bromare an anecdote relative to a fnake, which he fuppofes to have been of this fpecies, and which had been fo completely tamed by a lady as to come to her whenever fhe called it; follow her in her walks, wreath itfelf round her arms, and fleep in her bofom. One day, when this lady went in a boat to fome diftance up a large river, fhe threw the fmake into the water; imagi ing that it would readily recover the boat by fwimming; but the current proving unnfually ftrong at that juncture owing to the advance of the tide, the poor animal in fpite of all his efforts to reach the veffel was unfortunately drowned.

Gronovianus. Blueifh-afh, beneath blackifh; a white arched fpot each fide the hind head, and one black: backwaved with black. Gmel. Laur. Amph.

Bears a near affinity to the preceding, and is perhaps a variety only of the former, coluber natrix. Number of plates and fcales not afcertained.

Humanus. Black fpotted with white; tail alternately ftriped with black and white. *Coluber humanus*, Gmel. *Natrix humana*, Laur. Amph.

A fnake very commonly domefticated in New Spain; and alfo faid to inhabit Amboyna.

Punctulatus. Fufcous, with very minute fpots of white. Gmel. *Natrix punctata*, Laur. Amph. Native country unknown.

Tyrolensis. Abdominal fcuta 178, fubcaudal fcales 60. Gmel.

Defcribed after Scopoli, who informs us it inhabits the Tyrolefe country, and depofits its eggs among ftones, thefe are white and leathery, with a lateral yolk and turbid watery white, and are found fticking together in clufters of about fourteen in number.

Bipes. Abdominal fcuta 116, fubcaudal fcales 58. Gmel. Scop. ann. hift.

Mentioned by Scopoli as an inhabitant of the Tyrolefe waters. This kind preys on fifh and frogs; and is faid to be furnifhed with two fhort proceffes or feet; the eyes are red or tawny, lower jaw whitifh, dorfal fcales elliptic and marginate; fides fpotted with white: plates of the belly whitifh, with a brown fpot in the middle.

Austriacus. Blueifh-grey, with a double dorfal row of rufous fpots, and reddifh fides and abdomen. *Coronella auftriaca*, Laurenti. *La Liffe*, Cepede.

This bears a general refemblance to the common fnake, coluber natrix, and feems to have been firft defcribed by Laurenti, who fpeaks of its being common round Vienna: it occurs alfo in France, and feveral other parts of Europe. The principal diftinction between this fpecies and the coluber natrix confifts in the perfect fmoothnefs of its fcales, thofe of the natrix being fomewhat carinated. This animal inhabits moift meadows, hedges, and fwampy places, and bites with much eagernefs, but is incapable of doing any injury, as nature has not provided it with poifonous fangs. It is faid to be eafily tamed, in which ftate it fhows a confiderable degree of attachment.

Æsculapii. Whitifh, with double black tranfverfe zones; abdomen whitifh, variegated with black. *Coluber æfculapii*, abdominal fcuta 180, fubcaudal fcales 43. Linn. *Natrix æfculapii*, Laur. *Coluber albus annulis nigris*, Boddaert.

Length from eighteen inches to two feet; the colour pale whitifh with a more obfcure caft on the back, and is marked throughout with nearly equidiftant black bands, each furrounding the body, and divided half way up from the abdomen by a line or narrow ftripe of the ground colour; thus giving a bifid appearance to the lower part of each band. The head is covered with large fcales, and marked on the fore part by a tranfverfe black bar running acrofs the eyes. This is a native of South America, and is faid alfo to inhabit fome parts of Afia.

Naja. Yellowifh brown; on the back of the neck a large fpectacle fhaped fpot. *Coluber naja*, plates of the belly 193; fcales of the tail 10. Linn. *Naja lutefcens*, Laur. Amph. p. 91. *Serpens Malabarica cobra de capello dicta*. Seb. *Spectacle fnake, nagoo*, Ruffell. Ind. Serp. Shaw Gen. Zool.

The coluber naja is a native of India and the Ternaet iflands, where it appears to be one of the moft common, as well as moft noxious, of the ferpent tribe; very frequently proving fatal in the fpace of a few minutes to thofe who unfortunately experience its bite. The form of this fpecies is very remarkable: its general length feems to be three or four feet, and the diameter of the body about an inch and a quarter. The head is comparatively rather fmall, and is covered on the fore part with large fmooth fcales, as in the greater number of innoxious ferpents; the fcales on the back part and fides of the head, and alfo on the neck are fmaller and ovate: thofe on the remainder of the animal, on the upper part oblong oval, not ill refembling the general form of a grain of rice. At a fmall diftance beyond the head is a lateral fwelling or dilation of the fkin, which is continued to the diftance of about four inches downwards, where the outline gradually finks into the cylindrical form of the reft of the body. This part is extenfile at the pleafure of the animal; and when viewed from above, while in its moft extended ftate, is of a fomewhat cordated form, or wider at the upper than the lower part, and is marked with a fingular fpectacle-formed fpot of black and white, the mark itfelf being white, and the edges black, and the middle of each of the rounded parts black. This mark is more or lefs diftinct in different individuals, and alfo varies occafionally in fize and form, or in fome inftances is altogether wanting. The ufual colour of the animal is a pale ferruginous brown above; the under parts blueifh-white, fometimes flightly tinged with pale brown, or yellow; the tail, which is of a moderate length, tapers gradually and terminates in a flender, fharp pointed extremity. The title of *cobra de capello*, or hooded fnake, has been given to this formidable reptile by the Portuguefe, from the appearance which it prefents when viewed in front in an irritated ftate, or when preparing to bite, at which time it bends the head rather downwards, and feems hooded, as it were, in fome degree by the expanded fkin of the neck.

Laurenti enumerates four varieties of this hooded fnake, *Naja lutefcens*, the common kind; β *Naja fafciata fafciis per totum corpus ex fufco rubris*, having fufcous red bands over the whole body γ *Naja fiamenfis, ex cinereo grifea, fummo dorfo rufo*. Cinereous, with the back rufous; and δ *Naja maculata, ex luteo rufa, fquamis fingulis alba macula notatis*; of a tawny yellow colour, and having every fcale marked with a fingle white fpot. But it appears from the work of Dr. Ruffell "On the Serpents of India," that there are many other varieties of this extraordinary fnake. He defcribes no lefs than ten different kinds that are found in India alone, and feems to intimate that thofe are not the whole of the Nagoo tribe which infeft that part of the world. It is poffible, on further inveftigation, fome of thofe defcribed by Dr. Ruffell as varieties may prove to be fpecifically diftinct: according to the character laid down by Linnæus, taken from the number of the abdominal plates and fcales on the belly, they are clearly fo; but it is not on this criterion, the fallacy of which is too apparent, that we hazard an opinion; we allude to the different conformation of the fpectacle-like mark

mark on the back of the neck, and ftill more to the diffimilarity obfervable in the figure of the fcutæ and laminæ; the variations in colour are but fecondary particulars in confideration. Dr. Ruffell enumerates the varieties above-mentioned in the following order.

1. *Arege nagoo.* With a pale central fpot in the middle of each of the black fpots of the fpectacle-fhaped mark. Abdominal fcuta 189, fubcaudal fcales 60.

2. *Coodum nagoo.* This variety is darker than the other; and the fkin is of a yellower caft; but the principal diftinction is in the fpectacle-mark, which confifts of an oblong curved frame without the ufual black eyes or centre-fpots of the others. Abdominal fcuta 187, fubcaudal fcales 57.

3. *Sankoo nagoo.* The chief diftinction of this is a plain hood, without any mark. This variety is fuppofed by Seba to be the female of the fpecies; but Dr. Ruffell informs us that one which he brought home from India, and prefented to Mr. John Hunter was a male, and that the ufual fpectacle-fhaped mark is found indifferently both on the males and females. This variety is more rare than the reft. Abdominal fcuta 183, fubcaudal fcales 56.

4. *Mogla nagoo.* The cervical fcuta in this variety are fpotted here and there with faint greyifh fpots, and four of the middle ones are entirely of a blueifh-grey. Abdominal fcuta 192, fubcaudal fcales 65.

5. *Malle nagoo.* The colour of this variety is of a lighter brown than the reft, and the fcuta whiter; and lefs fpotted, but feven of the pectoral ones are completely dark. Abdominal fcuta 191, fubcaudal fcales 62.

6. *Cumbo nagoo.* In this fome deviations were obfervable in the laminæ: all the cervical fcuta were dufky, and the trunk had a ftrong blueifh caft. Abdominal fcuta 186, fubcaudal fquamæ 60.

7. *Jonna nagoo.* The fkin of the hood in this is tinged with orange colour; the fcuta of the neck fpotted with grey, and fix of the lower ones wholly of a blue grey. Abdominal fcuta 189, fubcaudal fquamæ 57.

8. *Nella tas pam.* With the black on the hood unufually deep, and all the jugular fcuta remarkably dufky. Abdominal fcuta 186, fubcaudal fquamæ 62.

9. *Kiftna nagoo.* The middle lamina of the three between the eyes remarkably broad, and the pofterior part fubovate inftead of femi-cordate; five of the jugular fcuta dufky, and fix of the pectoral almoft black. Abdominal fcuta 186, fubcaudal fquamæ 63.

10. *Korie nagoo.* The three laminæ between the eyes remarkably narrow; the large pofterior pair oval; colour of the trunk, and ftill more of the fcuta unufually blueifh. Abdominal fcuta 184, fubcaudal fquamæ 57.

The cobra de capello, it is obferved, is every where exhibited publicly as a fhow in India; and is of courfe more univerfally known in that country than almoft any other race of reptiles. It is carried about in a covered bafket, and fo managed by its proprietors as to affume, when exhibited, a kind of dancing motion; raifing itfelf upon its lower part, and alternately moving its head and body from fide to fide for fome minutes, to the found of fome mufical inftrument which is played during the time. The Indian jugglers, who thus exhibit the animal, firft deprive it of its fangs, which renders it incapable of inflicting a poifonous wound by means of its bite.

Dr. Ruffell, in his account of various experiments made in India with this ferpent, affures us that as a general ftandard for a comparifon of the effects of its bite with that of other poifonous ferpents, he never knew it prove mortal to a dog in lefs than 27 minutes, and to a chicken in lefs than half a minute. Thus fatal as it is, its poifon feems not fo fpeedy in operation as that of the rattle-fnake, which has been known to kill a dog in the fpace of two minutes. The following interefting experiments are related by Dr. Ruffell to confirm the accuracy of this obfervation.

In the month of June 1787, a dog bitten by a Cobra de capello on the infide of the thigh, howled at firft, as if in fevere pain; after two or three minutes he lay down, continuing to howl and moan; after twenty minutes he rofe, but with much difficulty, being unable to walk; and his whole frame appeared greatly diforddered. He foon lay down again, and in a few minutes was feized with convulfions, in which he expired twenty-feven minutes after. This is the only inftance mentioned in which the poifonous bite of the Cobra de capello proved fatal to dogs in much lefs than the fpace of an hour.—A large and very ftout dog was bitten by another Cobra de capello on the infide of the thigh, which in a minute or two was drawn up, the firft fymptom in general of the poifon having taken effect. He continued, however, nearly half an hour longer walking on the three remaining legs, feeming not otherwife difordered; but after this time, he laid himfelf along in great inquietude, his head and throat being convulfed in an uncommon degree; he made feveral vain efforts to rife, his legs became both paralytic, and after continuing in this ftate for an hour, he expired.—A large dog was bitten by a Cobra de capello which had been captive only two days. He complained a good deal at the inftant of the bite, and the leg was foon drawn up. In twenty-five minutes he was feized with convulfions, fucceeded by ftupor, in which ftate he lay for ten minutes; the convulfions, however, returned, and he expired in a quarter of an hour, being fifty-fix minutes after the bite. This experiment was tried on the 11th of November.

Auguft 9th, a Cobra de capello, which had loft two of his longeft fangs, but retained two of the fecond order, was made to bite a very large ftout dog. At firft the dog complained loudly, though without drawing up the thigh, or fhewing any other fymptom of poifon; but happening at this time to break loofe, he was purfued, and brought back, after a chace of an hour and a half, much fatigued and heated. After refting a quarter of an hour, water was offered to him, which he refufed, though he eat fome morfels of bread thrown into it. About a quarter of an hour afterwards he became much difturbed, grew entirely outrageous, howling violently, fnapping at and gnawing the ftake to which he was tied with incredible ferocity. This continued about three hours, when growing faint, his howlings grew weaker, his convulfions increafed, and he expired about four hours after the bite.—A pig bitten by a fnake of this kind, which had been fed only once in feven days with milk, became greatly difordered in twenty minutes, and expired in lefs than an hour.—A chicken has been fometimes known to furvive two hours after being bitten by a Cobra de capello. Chickens and pigeons bitten by a Cobra de capello, whofe fangs had been eradicated, fuffered no fymptoms of poifon; but when poifon taken from the fame fnake was inferted into their bodies, either by incifion or puncture, they fuffered the ufual fymptoms, and very often died.

It was endeavoured alfo to afcertain the effects of the bite of the Cobra de capello upon reptiles of the fame fpecies, the refult of which appears doubtful. In fome inftances, the bitten animal experienced no kind of injury, while to others the bite proved fatal. An attempt was made, on the 17th of Auguft 1788, to make a Cobra de capello bite another (of the variety called *Nooni paragoodo*) in the tail, but that part being found too fmall, the belly was bitten, a little above the vent. The bitten fnake foon loft its former

I activity,

activity, and when put under a glafs coiled itfelf up. In this ftate it was left, and after an hour and a quarter was found dead. On opening the belly, the parts immediately beneath the bite appeared much inflamed, though it could not be difcovered whether any fangs had penetrated into the cavity.

A Cobra de capello, received by Dr. Ruffell from Ganjam, under the name of *Saltanag*, was made to bite another remarkably large Cobra brought from the fame place, under the name of *Coultiah*. The poifon was fhed on the place, but no marks of fangs could be perceived, and the Coultiah remained as well as before: this experiment was repeated with the fame refult, though a little blood as well as poifon was found on the part bitten. Some days after this, a Cobra de capello (of the variety called *Coodum nagoo*) was made to bite the Coultiah on the belly; both fangs vifibly acted; blood appeared on the wound, but no other confequence followed. A *Tar tutta* fnake, bitten immediately after, in the fame manner, died within two hours.

Rufus. Rufous, with diftant reddifh-fufcous bands; fpectacle-fpot fomewhat heart-fhaped, and marked with four black fpots. Seba. *Naja brafilienfis*, Laurenti. La Cepede, &c.

Defcribed by Seba and others after him as a native of Brafil. This is perhaps a variety of the preceding.

Bucephalus. Brown, with tranfverfe whitifh bars; head large, cordated, and depreffed; body compreffed; tail very flender. *Serpens lufitanis cobra de capello dicta*, Seba. *Coluber bucephalus, bull-headed fnake*, Shaw Gen. Zool.

According to Seba, this fpecies is a native of Ceylon; he confiders it as a kind of Cobra de capello, or hooded fnake, in which refpect he is miftaken. The length of this fnake is between four and five feet; the head is extremely large, depreffed, cordated behind, fomewhat compreffed at the fides of the mouth, and covered above by very large fcaly plates. At fome diftance from the eyes are two remarkable, oblong, brown fpots. The neck is thin, and, together with the whole body, extremely compreffed on the fides; tail long, round, and tapering to a fine point. From the head, along the back, runs a row of large, broad, hexagonal fcales, thofe on the other parts are ovate; the abdominal plates are very narrow. The general colour of the animal is rufous-brown, with moderately diftant, broadifh, tranfverfe, pale bands, each of which, at its juncture with the fcuta, is marked with a white fpot.

Russelli. Brownifh-yellow, with acutely-ovate, blackifh, dorfal fpots, edged with white; lateral fpots fmaller and ovate. *Ratuka rekula poda*, Ruff. Ind Serp. *Ruffelian fnake*, Shaw Gen. Zool.

The abdominal plates, according to Dr. Ruffell, amount, in this fpecies, to 168, and the fcales under the tail to 59. The length of this fnake is about four feet. Its colour an elegant pale yellowifh-brown, marked throughout the whole length of the back with a continued feries of large ovate fpots of a deep brown colour, paleft in the centre, and furrounded by a narrow line of white. In fome parts thofe fpots are nearly confluent; on each fide of the body is a row of brown oval fpots, fmaller than thofe on the back; and befides thefe, a few ftill fmaller tranfverfe marks are fparingly fcattered on the fides; the under part of the body is white, with a few dufky fpots; the head is rather large, the fnout obtufe, the mouth wide, the fangs large, and, as in feveral other poifonous ferpents, double, a fmaller fang being fituated clofe to the larger one on each fide.

Dr. Ruffell informs us, this fpecies is fcarce lefs common in India than the Cobra de capello; but from its not being carried about, like that and fome other fnakes, as a public fhow, is not fo univerfally known either among the natives or Europeans.

Several experiments were made by Dr. Ruffell to determine the effects of its bite, from which it appears to be one of the moft poifonous of its tribe. A chicken bitten in the pinion by one of thefe fnakes, which had been caught two or three days before, and feemed in high fpirits, was inftantly infected, feized with convulfions, and expired in thirty-eight feconds. Immediately after the chicken, a ftout dog was bitten in the thigh; within lefs than five minutes he appeared ftupefied; the thigh was drawn up, and he frequently moved as if in pain. He remained, however, ftanding, and eat fome bread that was offered to him. In about ten minutes the thigh became paralytic; in fifteen minutes he entirely loft the ufe of the wounded thigh, and lay down, howling in a difmal manner, frequently licking the wound, and making, at intervals, ineffectual attempts to rife. In nineteen minutes, after a fhort ceffation, he again began to howl, moaned often, his breathing became laborious, and the jaws were completely fhut. The few fucceeding minutes were paffed alternately in agony and ftupor, and in twenty-fix minutes after the bite he expired. A fecond dog, of much fmaller fize, was next bitten, and expired in the fpace of fix hours. After this, a rabbit was expofed to the bite of the fnake, and died in lefs than an hour; and, laftly, a chicken bitten in the pinion expired in lefs than fix minutes. The whole of the above experiments were made with the fame fnake in the courfe of the fame morning.

Gramineus. Green, beneath yellowifh, with the edges of the abdomen fpotted with green. *Boodro pam*, Ruffell Ind. Serp. *Grafs-green fnake*, Shaw Gen. Zool.

The length of this kind is about thirty inches. The head is rather large in proportion, and obtufely tapering, but not pointed, and is covered entirely with very fmall fcales; the colour is as above defcribed. This is a native of India, and was firft defcribed by Dr. Ruffell; it is of the poifonous kinds, and has the fangs remarkably long and flender. From the experiments of the laft-mentioned writer it appears, that a chicken died, after having fuffered ftrong convulfions, and afterwards ftupor, in about eight minutes from the bite; pigs and dogs were feized with a ftupor, convulfions, &c. but in a few hours recovered from the effect of the poifon.

Crotalinus. Cinereous, marked above with large alternate blackifh fpots; beneath yellow, freckled with brown. *Coluber crotalinus*, abdominal fcuta 154, fubcaudal fcales 43. Linn.

A large fpecies, with the habit of the rattle-fnake; the head is heart-fhaped, the eye-lids protuberant, fcales carinated. Native country unknown.

Severus. Cinereous, with oblique linear whitifh bands, edged with brown. *Coluber feverus*, abdominal fcuta 170, fubcaudal fcales 42. Linn.

Length about feventeen inches; thicknefs moderate; head broad, obtufe, livid, with cinereous band between the eyes, and behind the nofe; eyes large; neck thick; the colour of the upper parts as before defcribed; the abdomen dufky; fides fpeckled with white; tail fhort. The figure in Seba, quoted by Linnæus, is of a pale rufous colour, with yellowifh bands, fomewhat refembling Hebrew characters in form, and edged with brown; the abdomen pale yellow, with a row of blackifh fpots on each fide.

Porphyriacus. Violet-black, with the abdomen and fides crimfon, the fcuta margined with black. Zool. New Holl. p. 27. pl. 10. Abdominal fcuta 188, anal fcuta 7, fubcaudal fquamæ 45.

Firft defcribed by Dr. Shaw, who fpeaks of it as a moderately large and beautiful fpecies; the general proportions nearly

nearly the fame with thofe of Coluber natrix, the common Englifh fnake. The head is rather fmall, and covered in front with large fcales; the colour of the head and whole under-parts very fine deep violet; fides and abdomen crimfon, deepeft on the fore-part, the large fcales near the fcuta being carmine-coloured, with black tips; the abdomen rofe-coloured, with a tinge of yellow, each fcutum deeply edged with black, thus forming a beautiful feries of tranfverfe black bars down the abdomen. The tail meafures about a fixth part of the whole length, and is furnifhed beneath, exclufive of the divided fubcaudal fcales, with about feven fcuta, or undivided laminæ, commencing immediately beyond the vent, which is edged with fimilar fmaller fquamæ; the colour of the under parts of the tail is a blueifh-afh, the rofe-colour of the abdomen ceafing at the commencement of the tail. In the Zoology of New Holland, Dr. Shaw defcribes this fpecies as deftitute of fangs, and confequently innoxious; an error arifing from the mutilated ftate of the fpecimen he examined. The fnake has been fince obferved to be furnifhed with thofe organs; and, as Dr. Shaw remarks, in his General Zoology, to be highly dreaded by the natives of Auftralafia, as a poifonous fpecies.

HÆMACHATES. Red, clouded with white; abdomen yellowifh-white. *Serpens afiatica hæmachates dicta*, Seba. *L'hæmachate*, Cepede.

Seba defcribes this fnake as a native of the Eaft Indies, having received it from Perfia and Japan. Its general length is about two feet or more; its colour red, varying to deeper or paler in different individuals, and fometimes inclining to brown; the variegations white or whitifh. The head is moderately large, and covered in front with large fcales; tail extremely fhort and tapering to a point. La Cepede confiders it a poifonous fnake.

AQUATICUS. Brown, with the abdomen banded with black and yellow. *Water viper*, Catefby.

We are acquainted with this fpecies only from the account given of it by Catefby. "This ferpent (fays that writer) is called in Carolina the water rattle-fnake; not that it hath a rattle, but is a large fnake, and coloured not much unlike the rattle-fnake, and the bite faid to be as mortal. This fnake frequents the water, and is never feen at any great diftance from it. The back and head are brown, the belly tranfverfely marked with black and yellow alternately, as are the fides of the neck; the neck is fmall; the head large, and armed with the like deftructive weapons as the rattle-fnake; it is very nimble, and particularly dextrous in catching fifh. In fummer great numbers are feen lying on the branches of trees hanging over rivers, from which, at the approach of a boat, they drop down into the water, and often into the boat on the men's heads. They lie in this manner to furprife either birds or fifh, after which laft they plunge, and purfue them with great fwiftnefs, and catch fome of a large fize, which they carry on fhore and fwallow whole. One of thefe I furprifed fwimming afhore with a large cat-fifh in his mouth. The tail is fmall towards the end, and terminates in a blunt horny point, about half an inch in length, and which, though harmlefs, is confidered as of dreadful efficacy, by the credulous vulgar, who believe that the animal is able, with this weapon, not only to kill men and other animals, but even to deftroy a tree by wounding it with it, the tree withering, turning black, and dying."

LACTEUS. Milky-white, the back marked by double black fpots; head black, with a longitudinal white line. *Coluber lacteus*, abdominal fcuta 203, fubcaudal fcales 32. Linn.

Length eighteen inches. A native of India and South America, and is reputed poifonous.

NIVEUS. Snowy-white, without variegations. *Coluber niveus*, abdominal fcuta 209, fubcaudal fcales 62. Linn. Inhabits Africa.

MELANIS. Deep black; fides clouded with blueifh, the eyes brown, with the edge of the pupil filvery. *Coluber melanis*, abdominal fcuta 148, fubcaudal fcales 27. Gmel. Pallas It.

Obferved by Dr. Pallas on the borders of the Volga and Samara rivers in Siberia. It has the general appearance of the viper, but differs in colour, being of a deep black on the back, and of a fteely luftre beneath, marked with patches of a deeper caft, while the fides are clouded, and fpotted at intervals with blueifh. The eyes are of a bright white, with perpendicular pupils, and ferruginous irides; tail fhort, and gradually tapering to the tip.

BUCCATUS. Whitifh, with large double brown dorfal fpots; head fomewhat depreffed, cheeks timid. *Coluber buccatus*, abdominal fcuta 107, fubcaudal fcales 72. Linn.

A poifonous fpecies; it inhabits South America and India. Length twelve inches.

ATROX. Grey brown, with tranfverfe linear whitifh ftripes; abdomen dufky with white tranfverfe variegations. *Coluber atrox*, abdominal fcuta 196, fubcaudal fcales 69. Linn.

Length about eighteen inches; it is a poifonous fnake, and is a native of the ifland of Ceylon.

CORALLINUS. Glaucous, with fcales fomewhat heart-fhaped, and three brown lines down the back. *Coluber corallinus*, abdominal fcuta 193, fubcaudal fcales 82. Linn.

Linnæus defcribes this as a poifonous fpecies: it is a native of the eaftern regions; it preys on lizards.

LEBERIS. Pale; head white; body marked above with linear black bands. *Coluber leberes*, abdominal fcuta 110, fubcaudal fcales 50. Linn.

Defcribed by Kalm, who informs us that it is a native of Canada, and that the upper parts are traverfed by linear black bands; the head white with two rufous fpots on the top, and a triangular fpot over the nofe. Linnæus mentions it as a poifonous fpecies, a particular confidered doubtful by Dr. Gray.

AULICUS. Grey brown, with tranfverfe white bands bifurcating over the fides. *Coluber aulicus*, abdominal fcuta 184, fubcaudal fcales 60. Linn.

The length of this fpecies is fix inches; it inhabits America, and is one of the poifonous kind of fnakes.

ELEGANTISSIMUS. White; head variegated with black; body marked above by a quintuple feries of ocellated red fpots. *Coluber elegantiffimus*, Gmel. Laur. Amph. *Serpens lemnifcata venutiffima Americana*, Seba.

This is a beautiful fpecies, meafuring in length about two feet; the colour is white, marked down the upper part with a quintuple feries of black fpots with red centres; the middle row is compofed of very fmall fpots, the next on each fide with larger ocellated ones, and the loweft on each fide, next the fcuta, refembling that on the middle of the back, and confifting of fmall fpecks; the head is marked by a crofs-fhaped fpot on the top, and by a few blackifh ones acrofs the fnout; the tail is fhort, meafuring two inches and a half in length, and tapering to a point.

RHOMBEATUS. Glaucous, with blackifh lozenge-fhaped fpots, blue in the middle. *Coluber rhombeatus*, abdominal fcuta 157, fubcaudal fcales 70. Linn.

Length from two to three feet; colour, in general, grey, fometimes brownifh, with three alternating rows of ovate dufky fpots, with large blue centres; the abdomen is pale or whitifh, and often clouded with blueifh grey. This is a native of India and South America.

JAVANICUS.

Javanicus. Grey; head ftriped with blue; body marked with tranfverfe blue ftripes edged with golden.

Defcribed by Mr. Wurmb in the "Memoirs of the Batavian Society," for the year 1787. This is a large and moft beautiful fpecies, and is feen principally in the rice fields, whence it obtains the name of *Oular-Sawa*, or Rice-field Snake. Thofe which are found in the higher and more wooded fituations arrive at a far fuperior fize. The head of this fnake is large and flat, and is covered, as in the major part of the coluber genus, with large fcaly plates; the mouth is furnifhed with double rows of fharp teeth, but is deftitute of fangs, the animal not being of a poifonous nature; the iris is yellow; upper part of the head grey, mixed with blue; from behind the eyes pafs two blue ftripes to the upper part of the neck, where they unite into an arch about an inch beyond the head; a third ftripe of the fame colour proceeds from the fnout to the occiput, where it divides into two, and furrounds a yellow fpot marked with a few blue fpecks; the upper part of the body is divided into a kind of lattice-work, formed by ftripes of bright blue with gold-coloured edges; the middle parts of the fquare being of a grey colour, with changeable reflections of yellow, blue, and green; towards the fides the grey colour is of a lighter or paler caft, as well as on the tail, where the fquares are fmaller than on the back; each fide of the body is alfo marked by a row of white fpots, fituated at the croffings of the blue ftripes. This fnake preys on birds, rats, and various other fmall animals.

Boæformis. Whitifh, with brown variegations; white beneath, with very fhort fcuta. *Pedda poda*, Ruffell Ind. Serp. *Boaform fnake*, Shaw Gen. Zool.

A new fpecies defcribed by Dr. Ruffell. The length of the fpecimen, examined by that writer, was about two feet and a half; but it is fuppofed to attain to a much larger fize. It was fhort and thick with moderately large oblong-ovate head, covered with large fcales; and the tail fhort and fharp pointed. The colour of the upper parts very pale or whitifh brown, variegated on the back and fides, with large and fmall irregularly formed, deep-brown patches, and fpots, thofe on the fides being moftly ocellated. The body is covered with very fmall fcales, the three rows next the abdomen being much larger than the reft; abdomen white, the fcuta being remarkably narrow or fhort, and reddifh at the margins. The under part of the tail is variegated with black and white.

This is a native of India, and is reprefented as an animal of great ftrength, wreathing round the arm, if held for a fhort time, fo clofely as to numb the hand; it is not poifonous, its bite producing no other effect than that of temporary pain.

The ferpent mentioned by Dr. Ruffell, under the name of *Bora*, is confidered as a variety of coluber boæformis, and fo alfo is the *Pedda poda*, t. 23, 24. The firft is much larger than the ferpent above defcribed; the difpofition of the fcales and colours are the fame, but the ground colour is white, and the tail is furnifhed beneath with feveral undivided lamellæ towards the tip, or after thofe immediately fucceeding the vent, while the tip itfelf is again terminated by a few divided fcales. This fnake is found at Calcutta, where it is pretended the bite is very foon followed by eruptions on different parts of the body, though it does not prove fatal in lefs than ten or twelve days, but the whole of this is regarded as a mere popular error. The other fuppofed variety, the pedda poda, grows to a very large fize, having been feen nine or ten feet in length. In its general appearance it refembles that firft defcribed, but the fcales are larger in proportion.

Melanurus. Yellowifh brown, with black head, and two black fpots on the tail. Ruffell. Ind. Serp.

A fmall fpecies about ten or eleven inches in length, fcarcely of the thicknefs of a goofe quill, and nearly of equal diameter from the head to the tip of the tail. The colour is a light yellowifh brown, with a dotted black line running from head to tail along the middle of the back, and a few fainter fillets on the fides; the head is fmall, ovate, black, and covered with large fcales; the tail fhort, fcarcely meafuring more than an inch in length, and is marked at its origin on the upper part, by a large rhomboidal black fpot edged with white; and having a white fpeck in the middle; the tip of the tail is alfo marked by a fimilar black fpot; the abdomen is of a pale orange colour, and the under part of the tail white, fpeckled, and variegated with black. The bite of this fpecies is faid to be painful but not poifonous. It is a native of India, and is defcribed among the ferpents of that country by Dr. Ruffell.

Jara. Black, with double linear white fpecks, and yellowifh collar and abdomen. *Jara potoo*, Ruffell, Ind. Serp.

This is one of the new fpecies of ferpents defcribed by Dr. Ruffell. It inhabits India. The length is fifteen inches; tail very fhort and tapering fuddenly to a point. The abdominal fcuta are 175 in number, and the fubcaudal fcales 56.

Arnensis. Yellowifh-brown with narrow blackifh tranfverfe bands edged with white, and pale abdomen. *Arnee fnake*, Ruff. Ind. Serp.

Inhabits the country of Arnee in the Eaft Indies. The length is about eighteen inches; the colour above yellowifh, with moderately diftant blackifh, or very deep brown, tranfverfe bands which are whitifh at the margins; the head is fmall; tail rather fhort and tapering to a fharp-pointed tip. Abdominal fcuta 169, fubcaudal fcales 50.

Sagittatus. Brown, with whitifh fagittated dorfal fpots edged with black. *Tar tutta*, Ruff. Ind. Serp.

The length of this fnake is two feet; the head is rather large in proportion, round, obtufe, and covered with large fcales; neck and body flender, the colour on the upper parts yellowifh brown variegated, with a chain or feries of fomewhat triangular, or fagittated fpots: the abdomen is yellowifh white, and the fcuta is marked by a dufky fpot on each fide. This is a native of India.

Striatus. Greenifh black, with fpotted white bands, and blueifh-white abdomen. *Gajoo tutta*, Ruff. Ind. Serp.

This is much fmaller than the laft, meafuring only fourteen inches: the colour above is greenifh black, marked with about twenty tranfverfe bands, each compofed of a number of longitudinal abrupt white or yellowifh white ftreaks, and along the fides of the body are interrupted rows of fimilar ftreaks; the head is obtufe, and covered with large fcales, the abdomen blueifh-white. Abdominal fcuta 174, fubcaudal fcales 40.

Fasciolatus. Cinereous, with whitifh tranfverfe bands and glaucous abdomen. *Nooni paragoodoo*, Ruffell. Ind. Serp.

Agilis. Banded alternately with white and fufcous, and varied with black dots: head fmall; tail fhort.—*Coluber agilis*, abdominal fcuta 184, fubcaudal fcales 50. Linn. *Ceraftes Agilis*, Laur.

A native of Ceylon. The head is fmall, covered with large fcales; body flender and fmooth, about a fpan in length, and covered with fmall fcales; tail fhort, taper, and terminating rather obtufely.

Simus. Blackifh, with white tranfverfe bands; nofe turned up. *Coluber*.

Simus. Abdominal fcuta 124, fubcaudal fcales 46. Linn. D. Garden.

Length eighteen inches; head rather large, and roundifh, with the nofe flat in front, and turned up into a flightly pointed tip: between the eyes is a black curved band, and on the top of the head a white cruciform mark, with a black central fpot; abdomen dufky. A native of Carolina, and other parts of North America.

Pelias. Brownifh, with double tranfverfe black bands, beneath green with a yellow lateral band.—*Coluber pelias*, abdominal fcuta 187, fubcaudal fcales 130. Linn.

A native of South America and India. Defcribed by Linnæus from the Mufeum of Degeer.

Mucosus. Blueifh, beneath pale, with angular head: lips ftriped tranfverfely with black. *Coluber mufcofus*, abdominal fcuta 200, fubcaudal fcales 140. Linn. *Natrix mucofa*, Laur. Amph.

Defcribed by Linnæus from a fpecimen in the Muf. Ad. Fr. It is a fmall fpecies, meafuring about eighteen inches in length; the native country is South America.

Cinereus. Cinereous; abdomen white; tail recticulated above with brown, and lineated tranfverfely beneath. *Coluber cinereus*, abdominal fcuta 200, fubcaudal fcales 137.

Indies, according to Linnæus South America and India: it refembles the common fnake, and is about two feet in length.

Dipsas. Green with two white ftripes. Abdominal fcuta 152, fubcaudal fcales 135. Linn. *Serpens furinamenfis cærulæ*, Seba. Inhabits Surinam and other parts of South America.

Caspius. Body fafciated alternately above with yellow and fufcous, beneath yellow. *Coluber cafpius*, Gmel. Lepech. It.

Firft defcribed by Lepechin as an inhabitant of the fhores of the Cafpian fea, where it haunts the low grounds and bufhy places. It is reported of this fpecies, that when difturbed it firft endeavours to efcape, but if purfued or irritated, fprings forwards on its affailant with great fury, though incapable of doing any injury by its bite. The ufual length is about five feet.

Peruvianus. Black and white; abdomen rofe-coloured. *Serpens Peruviana elegantiffima et rara*, Seba.

A native of Peru; defcribed by Seba, who informs us it is rare in European collections. This is an innoxious fpecies. Linnæus does not notice this fnake, as the number of its abdominal fcuta, and fubcaudal plates could not be afcertained.

Hygeiæ. White, with fomewhat undulated black zones, and head fafciated longitudinally with black. *Serpens fiamenfis tænoiolis*, &c. Seba.

A fmall fpecies of a white colour, barred with numerous irregular black bands, nearly furrounding the body; head fmall, covered with large fcales, and marked by two broad longitudinal ftreaks uniting at the top of the fnout: tail rather fhort and fharp pointed. Inhabits Siam.

Pethola. Lead colour, with teftaceous bands. *Coluber pethola*, abdominal fcuta 209, fubcaudal fcales 90. Linn. 207—103. Gronovius. 207—85. Boddaert.

This fnake inhabits Africa. In the middle of the head, between the eyes is a large fhining fhield, compofed of many plates; the fides of the head and hind-head is covered with imbricated fcales each fide; and the fnout is fharp.

No lefs than nine varieties of this fnake are defcribed by Gmelin after Laurenti. Thefe we fhall enumerate in the Gmelinian order, obferving only that on further inveftigation it is not unlikely fome, at leaft of thofe fuppofed varieties may prove to be fpecifically diftinct. Thofe are not noticed by Dr. Shaw, but that writer thinks the C. Petalarius of the Mufeum Adolphi Friderici, can hardly be confidered as a fpecies diftinct from Pethola.

β. *Coronella Africana*, &c. White, with fpots on the back; thofe on the anterior part rounded, and gradually becoming rhomboidal, with the edges reddifh. Laur. Amph.

γ. *Coronella ocellata*, &c. Blueifh, with a quadruple feries of black ocellated fpots, which are blue in the middle, and are difpofed longitudinally. Laur. Amph.

δ. *Coronella fafciata*, &c. Blueifh white with black brown bands, and two longitudinal divided lines. Laur. Amph.

ε. *Coronella latiroftra*, &c. Brownifh, with a few pale bands, fnout depreffed. Laur. Amph.

ζ. *Coronella latiroftra, fafciis*, &c. With yellowifh confluent bands near the belly. Laur. Amph.

η. *Coronella cerafloides*, &c. Brownifh white, with very pale brown fpots; occipital fpots two, and longitudinal; dorfal ones eliptic, and difpofed in a fingle ftripe. Laur. Amph.

ϑ. *Coronella tæniata*, &c. Middle of the back marked with a brown ftripe; belly and fides whitifh brown. Laur. Amph.

ϛ. *Coronella anguiformis*, &c. With entire circular brown bands, beneath obliquely concurrent.

Petularius. Brown, with white bands, beneath pale. Abdominal fcuta 212, fubcaudal fcales 102. Linn. Weigel abh. der. hall. Length from twelve to thirty inches; inhabits South America.

Lemniscatus. Yellowifh white, marked at equal diftances with triple dark brown bands. *Coluber lemnifcatus*, abdominal fcuta 250, fubcaudal fcales 35. Linn. Amoen. Ac. *Natrix lemnifcata*, Laur. *Serpens annulatus*, Seba.

A native of Afia. The length of this fnake is about three feet, of a flender form, and white or yellowifh marked throughout the whole length, at equal diftances, with triple zones of black or deep brown, which entirely furround the body. The head is rather fmall, covered with large fcales, and marked acrofs the fnont by a double zone, of which the fmalleft divifion paffes acrofs the noftrils, and the largeft acrofs the eyes. The whole animal is of a fmooth and fhining furface.

Lubricus. Flagelliform; white with equidiftant black bands; body gloffy. *Coluber lubricus*, Gmel.

Allied to the laft fpecies; the body is white, marked with fingle black bands; the head is marked acrofs the fnout by a black band, and at the top by two oblique ftripes nearly meeting at an angle in front; the fkin is remarkably fmooth and gloffy. The length of this fnake is eighteen inches. According to Gmelin it is a native of Surinam; the fnake defcribed by Seba, as *Natrix lubrica, fafciis rubris*, and which is confidered as a variety of the fame fpecies, is a native of Surinam.

Doliatus, milk-white, marked above by large, approximated, fuboval black rings. *Coluber doliatus*, abdominal fcuta 164, fubcaudal fcales 43. Linn.

A fmall fpecies meafuring from eighteen inches to two feet in length; general colour milk white, marked throughout by large oval jet-black rings, the ends of which approaching each other on the top of the back, give the appearance of double bars, correfponding with the defcription given of this fnake by Boddaert, *Colluber albidus, annulis nigris per paria digeftis*. Inhabits Carolina.

Gemmatus. Blue, with a black middle-ftripe fpotted with white, and two lateral white ftripes. *Le Chapelet*,

La

La Cepede. Abdominal fcuta 166, fubcaudal fcales 103.

The length of this beautiful fnake is about fifteen or fixteen inches; the colour on the upper parts blue, with three narrow equidiftant ftripes from head to tail; the two lateral ftripes being white, the middle one black, marked by a row of fmall white fpecks alternately oblong and round, refembling a fmall ftring of beads aud bugles: the head is covered with large fcales, and marked on each fide with three or four fpots, forming a band acrofs the eyes, the top fpotted with pale blue marks bordered with black; the abdomen white. The fcuta are each marked at the edge with a fmall black fpeck, forming two rows down the abdomen. The native country of this kind is unknown, the fpecies was defcribed by La Cepede from a fpecimen in the royal cabinet.

Bilineatus. Rufous, with two golden yellow ftripes. *La double raie,* La Cepede.

This fnake meafures twenty-five inches in length, of which the tail exceeds fix inches. The general colour is rufous; every fcale is bordered with yellow, and down the back from the head to the tail run two bright yellow ftripes of a golden hue. The fcales on the head are large, thofe on the body fmooth. The native country is unknown.

Trilineatus. Rufous, with three black lines. *La trois raie,* La Cepede.

The length is about eighteen inches; the head is covered with large fcales; tail about two inches and three quarters long. This is a native of Africa.

Trifasciatus. Body marked with three broad black ftripes, the middle one divided by a white line, and three fpotted lines down the abdomen. Shaw Gen. Zool.

A fmall fpecies, meafuring a foot in length, and being rather thick in proportion; head rather large, blackifh, with the futures pale. Defcribed from a fpecimen in the collection of Dr. William Hunter.

Dione. Pale blue, fpotted with brown, and three whitifh lines. Pallas It.

This fpecies is a native of the falt deferts towards the Cafpian fea, and of the hilly regions near the river Irtin; and was firft defcribed by Dr. Pallas. It is of a flender form, about two feet in length; the head fmall, tetragonal and commonly reticulated with blackifh futures. The two intermediate fpaces between the three lines on the back are marked with a row of dufky alternate fpots; and the tail is about one fixth of the whole length.

Mycterizans. Head angular, with fharp pointed fnout, and a yellow line on each fide of the abdomen. *Coluber mycterizans,* abdominal fcuta 192, fubcaudal fcales 167. Linn. *Coluber fubcæruleus lateribus lineatis,* Boddaert. *Natrix micterizans,* Laur.

This fnake is in general of a grafs-green colour, and is diftinguifhed in particular by the yellow line which extends the whole length of the body on each fide of the abdomen. It is of a flender form, meafuring about three feet and a half in length, and about half an inch in diameter. The head is moderately large, long, and fharp fnouted, the upper jaw extending far beyond the lower. Linnæus was erroneoufly led to confider this as a poifonous fpecies, from the fang like appearance of the large and long teeth in the upper jaw. It is a native of many parts of North America, where it is principally feen on trees, moving with great velocity in purfuit of infects, on which it feeds.

Gmelin defcribes the natrix flagelli formis of Laurenti, and alfo the anguis viridis of Catefby, as two varieties of the coluber mycterizans. The *Boila Pafferiki* of Dr. Ruffell may be perhaps admitted likewife as a variety. This differs in the colour of the under parts, inftead of green being of a cinereous pink colour, elegantly freckled with very numerous minute black and yellowifh dots; the margin of the fcuta being edged with dull yellow; the fkin of the neck alfo, when the animal is irritated, exhibits by the dilatation of the fkin on that part, a beautiful variegation of black and white recticular marks, which do not appear at other times. This creature is reprefented as of a ferocious nature, hiffing violently, and fnapping at any thing oppofed to it, but producing no other effect by its bite than that of temporary pain in confequence of mere puncture.

Coluber Nasutus. *Serpens viridis, ore acuminato ex Java, afpidio fpecies,* Seba.

Whether this be diftinct from the former is uncertain; the head is fomewhat larger in proportion, and the body lefs flender: in other refpects it very nearly correfponds. The length is about three feet. This fnake according to Seba is a native of Java.

Lineatus. Blue-green, with three or five brown linear ftripes, the middle one broadeft. *Coluber lineatus,* Linn. *Serpens ceilonica lineis fubfufcis,* Seba.

This fnake is a native of India, and is commonly about three feet in length. The general colour is pale blueifh green above, with a golden glofs, and is marked throughout the whole length by five longitudinal narrow bands, or ftripes of dufky brown or greenifh. In young fpecimens there are rarely more than three ftripes. The form of this fnake is long and flender, with the head fmall, the abdomen flattifh, and the tail long and thin.

Jaculatrix. Whitifh, with three blackifh ftripes, the middle one broadeft. *Coluber jaculatrix,* Linn. *Serpens Americana xequipiles dicta,* Seba.

Refembles lineatus, but is fmaller; the general colour whitifh tinged with blue, and marked by three longitudinal ftripes of black or deep brown, of which that in the middle is broadeft. This appears to vary in colour, that defcribed by Seba being yellowifh inftead of white. The abdominal fcuta are 163 in number, the fubcaudal fcales 77. This kind inhabits Surinam, and is confidered as a harmlefs animal.

Sibilans. Blueifh, with five dufky lines, and the head fpotted. *Coluber fybilans,* abdominal fcuta 166, fubcaudal fcales 100.

This, like the laft, refembles coluber lineatus, being marked, as in that fpecies, with five dufky ftripes, the middle one of which is the broadeft, and is nearly black, with a whitifh fpeck on each of the fcales. The head is ovate, covered with large fcales, and marked with feveral oblong, blue, fubangulated fpots, with black edges; and the tail is very long and flender. This animal is of confiderable fize, fometimes meafuring four feet in length; it is a native of Afia, and is efteemed harmlefs.

Situla. Grey, with a longitudinal dufky band, bounded on each fide by a black line. *Coluber fitula,* abdominal fcuta 236, fubcaudal fcales 45. Defcribed by Haffelquift as a native of Egypt.

Saurita. Brown, with three blue-green ftripes. *Coluber faurita,* abdominal fcuta 156, fubcaudal fcales 121.

This is the ribbon fnake of Catefby, a fpecies about three feet in length, and very beautiful. The general colour is brown above, with three moderately-broad longitudinal blueifh-green ftripes; the head is rather fmall and fomewhat pointed, the body flender, and the tail thin. Catefby reprefents it as an animal extremely fwift in its motions; it inhabits Carolina and many other parts of North America, frequents trees, and is perfectly innoxious.

Vittatus. Whitifh, with three black ftripes, the middle one very narrow; abdomen white, with the edges of the

fcuta

Simus. Abdominal ſcuta 124, ſubcaudal ſcales 46. Linn. D. Garden.

Length eighteen inches; head rather large, and roundiſh, with the noſe flat in front, and turned up into a ſlightly pointed tip: between the eyes is a black curved band, and on the top of the head a white cruciform mark, with a black central ſpot; abdomen duſky. A native of Carolina, and other parts of North America.

Pelias. Browniſh, with double tranſverſe black bands, beneath green with a yellow lateral band.—*Coluber pelias*, abdominal ſcuta 187, ſubcaudal ſcales 130. Linn.

A native of South America and India. Deſcribed by Linnæus from the Muſeum of Degeer.

Mucosus. Blueiſh, beneath pale, with angular head: lips ſtriped tranſverſely with black. *Coluber muſcoſus*, abdominal ſcuta 200, ſubcaudal ſcales 140. Linn. *Natrix mucoſa*, Laur. Amph.

Deſcribed by Linnæus from a ſpecimen in the Muſ. Ad. Fr. It is a ſmall ſpecies, meaſuring about eighteen inches in length; the native country is South America.

Cinereus. Cinereous; abdomen white; tail reticulated above with brown, and lineated tranſverſely beneath. *Coluber cinereus*, abdominal ſcuta 200, ſubcaudal ſcales 137.

Indies, according to Linnæus South America and India: it reſembles the common ſnake, and is about two feet in length.

Dipsas. Green with two white ſtripes. Abdominal ſcuta 152, ſubcaudal ſcales 135. Linn. *Serpens ſurinamenſis cærulæ*, Seba. Inhabits Surinam and other parts of South America.

Caspius. Body faſciated alternately above with yellow and fuſcous, beneath yellow. *Coluber caſpius*, Gmel. Lepech. It.

Firſt deſcribed by Lepechin as an inhabitant of the ſhores of the Caſpian ſea, where it haunts the low grounds and buſhy places. It is reported of this ſpecies, that when diſturbed it firſt endeavours to eſcape, but if purſued or irritated, ſprings forwards on its aſſailant with great fury, though incapable of doing any injury by its bite. The uſual length is about five feet.

Peruvianus. Black and white; abdomen roſe-coloured. *Serpens Peruviana elegantiſſima et rara*, Seba.

A native of Peru; deſcribed by Seba, who informs us it is rare in European collections. This is an innoxious ſpecies. Linnæus does not notice this ſnake, as the number of its abdominal ſcuta, and ſubcaudal plates could not be aſcertained.

Hygeiæ. White, with ſomewhat undulated black zones, and head faſciated longitudinally with black. *Serpens ſiamenſis tænoiolis*, &c. Seba.

A ſmall ſpecies of a white colour, barred with numerous irregular black bands, nearly ſurrounding the body; head ſmall, covered with large ſcales, and marked by two broad longitudinal ſtreaks uniting at the top of the ſnout: tail rather ſhort and ſharp pointed. Inhabits Siam.

Pethola. Lead colour, with teſtaceous bands. *Coluber pethola*, abdominal ſcuta 209, ſubcaudal ſcales 90. Linn. 207—103. Gronovius. 207—85. Boddaert.

This ſnake inhabits Africa. In the middle of the head, between the eyes is a large ſhining ſhield, compoſed of many plates; the ſides of the head and hind-head is covered with imbricated ſcales each ſide; and the ſnout is ſharp.

No leſs than nine varieties of this ſnake are deſcribed by Gmelin after Laurenti. Theſe we ſhall enumerate in the Gmelinian order, obſerving only that on further inveſtigation it is not unlikely ſome, at leaſt of thoſe ſuppoſed varieties may prove to be ſpecifically diſtinct. Thoſe are not noticed by Dr. Shaw, but that writer thinks the C. Petalarius of the Muſeum Adolphi Friderici, can hardly be conſidered as a ſpecies diſtinct from Pethola.

β. *Coronella Africana*, &c. White, with ſpots on the back; thoſe on the anterior part rounded, and gradually becoming rhomboidal, with the edges reddiſh. Laur. Amph.

γ. *Coronella ocellata*, &c. Blueiſh, with a quadruple ſeries of black ocellated ſpots, which are blue in the middle, and are diſpoſed longitudinally. Laur. Amph.

δ. *Coronella faſciata*, &c. Blueiſh white with black brown bands, and two longitudinal divided lines. Laur. Amph.

ε. *Coronella latiroſtra*, &c. Browniſh, with a few pale bands, ſnout depreſſed. Laur. Amph.

ζ. *Coronella latiroſtra, faſciis*, &c. With yellowiſh confluent bands near the belly. Laur. Amph.

η. *Coronella ceraſtoides*, &c. Browniſh white, with very pale brown ſpots; occipital ſpots two, and longitudinal; dorſal ones eliptic, and diſpoſed in a ſingle ſtripe. Laur. Amph.

θ. *Coronella tæniata*, &c. Middle of the back marked with a brown ſtripe; belly and ſides whitiſh brown. Laur. Amph.

ϛ. *Coronella anguiformis*, &c. With entire circular brown bands, beneath obliquely concurrent.

Petularius. Brown, with white bands, beneath pale. Abdominal ſcuta 212, ſubcaudal ſcales 102. Linn. Weigel abh. der. hall. Length from twelve to thirty inches; inhabits South America.

Lemniscatus. Yellowiſh white, marked at equal diſtances with triple dark brown bands. *Coluber lemniſcatus*, abdominal ſcuta 250, ſubcaudal ſcales 35. Linn. Amoen. Ac. *Natrix lemniſcata*, Laur. *Serpens annulatus*, Seba.

A native of Aſia. The length of this ſnake is about three feet, of a ſlender form, and white or yellowiſh marked throughout the whole length, at equal diſtances, with triple zones of black or deep brown, which entirely ſurround the body. The head is rather ſmall, covered with large ſcales, and marked acroſs the ſnout by a double zone, of which the ſmalleſt diviſion paſſes acroſs the noſtrils, and the largeſt acroſs the eyes. The whole animal is of a ſmooth and ſhining ſurface.

Lubricus. Flagelliform; white with equidiſtant black bands; body gloſſy. *Coluber lubricus*, Gmel.

Allied to the laſt ſpecies; the body is white, marked with ſingle black bands; the head is marked acroſs the ſnout by a black band, and at the top by two oblique ſtripes nearly meeting at an angle in front; the ſkin is remarkably ſmooth and gloſſy. The length of this ſnake is eighteen inches. According to Gmelin it is a native of Surinam; the ſnake deſcribed by Seba, as *Natrix lubrica, faſciis rubris*, and which is conſidered as a variety of the ſame ſpecies, is a native of Surinam.

Doliatus, milk-white, marked above by large, approximated, ſuboval black rings. *Coluber doliatus*, abdominal ſcuta 164, ſubcaudal ſcales 43. Linn.

A ſmall ſpecies meaſuring from eighteen inches to two feet in length; general colour milk white, marked throughout by large oval jet-black rings, the ends of which approaching each other on the top of the back, give the appearance of double bars, correſponding with the deſcription given of this ſnake by Boddaert, *Colluber albidus, annulis nigris per paria digeſtis*. Inhabits Carolina.

Gemmatus. Blue, with a black middle-ſtripe ſpotted with white, and two lateral white ſtripes. *Le Chapelet*, La

La Cepede. Abdominal fcuta 166, fubcaudal fcales 103.

The length of this beautiful fnake is about fifteen or fixteen inches; the colour on the upper parts blue, with three narrow equidiftant ftripes from head to tail; the two lateral ftripes being white, the middle one black, marked by a row of fmall white fpecks alternately oblong and round, refembling a fmall ftring of beads aud bugles: the head is covered with large fcales, and marked on each fide with three or four fpots, forming a band acrofs the eyes, the top fpotted with pale blue marks bordered with black; the abdomen white. The fcuta are each marked at the edge with a fmall black fpeck, forming two rows down the abdomen. The native country of this kind is unknown, the fpecies was defcribed by La Cepede from a fpecimen in the royal cabinet.

Bilineatus. Rufous, with two golden yellow ftripes. *La double raie*, La Cepede.

This fnake meafures twenty-five inches in length, of which the tail exceeds fix inches. The general colour is rufous; every fcale is bordered with yellow, and down the back from the head to the tail run two bright yellow ftripes of a golden hue. The fcales on the head are large, thofe on the body fmooth. The native country is unknown.

Trilineatus. Rufous, with three black lines. *La trois raie*, La Cepede.

The length is about eighteen inches; the head is covered with large fcales; tail about two inches and three quarters long. This is a native of Africa.

Trifasciatus. Body marked with three broad black ftripes, the middle one divided by a white line, and three fpotted lines down the abdomen. Shaw Gen. Zool.

A fmall fpecies, meafuring a foot in length, and being rather thick in proportion; head rather large, blackifh, with the futures pale. Defcribed from a fpecimen in the collection of Dr. William Hunter.

Dione. Pale blue, fpotted with brown, and three whitifh lines. Pallas It.

This fpecies is a native of the falt deferts towards the Cafpian fea, and of the hilly regions near the river Irtin; and was firft defcribed by Dr. Pallas. It is of a flender form, about two feet in length; the head fmall, tetragonal and commonly reticulated with blackifh futures. The two intermediate fpaces between the three lines on the back are marked with a row of dufky alternate fpots; and the tail is about one fixth of the whole length.

Mycterizans. Head angular, with fharp pointed fnout, and a yellow line on each fide of the abdomen. *Coluber myɔterizans*, abdominal fcuta 192, fubcaudal fcales 167. Linn. *Coluber fubcæruleus lateribus lineatis*, Boddaert. *Natrix micterizans*, Laur.

This fnake is in general of a grafs-green colour, and is diftinguifhed in particular by the yellow line which extends the whole length of the body on each fide of the abdomen. It is of a flender form, meafuring about three feet and a half in length, and about half an inch in diameter. The head is moderately large, long, and fharp fnouted, the upper jaw extending far beyond the lower. Linnæus was erroneoufly led to confider this as a poifonous fpecies, from the fang like appearance of the large and long teeth in the upper jaw. It is a native of many parts of North America, where it is principally feen on trees, moving with great velocity in purfuit of infects, on which it feeds.

Gmelin defcribes the natrix flagelli formis of Laurenti, and alfo the anguis viridis of Catefby, as two varieties of the coluber myɔterizans. The *Boila Pafferiki* of Dr. Ruffell may be perhaps admitted likewife as a variety. This differs in the colour of the under parts, inftead of green being of a cinereous pink colour, elegantly freckled with very numerous minute black and yellowifh dots; the margin of the fcuta being edged with dull yellow; the fkin of the neck alfo, when the animal is irritated, exhibits by the dilatation of the fkin on that part, a beautiful variegation of black and white recticular marks, which do not appear at other times. This creature is reprefented as of a ferocious nature, hiffing violently, and fnapping at any thing oppofed to it, but producing no other effect by its bite than that of temporary pain in confequence of mere puncture.

Coluber Nasutus. *Serpens viridis, ore acuminato ex Java, afpidio fpecies*, Seba.

Whether this be diftinct from the former is uncertain; the head is fomewhat larger in proportion, and the body lefs flender: in other refpects it very nearly correfponds. The length is about three feet. This fnake according to Seba is a native of Java.

Lineatus. Blue-green, with three or five brown linear ftripes, the middle one broadeft. *Coluber lineatus*, Linn. *Serpens ceilonica lineis fubfufcis*, Seba.

This fnake is a native of India, and is commonly about three feet in length. The general colour is pale blueifh green above, with a golden glofs, and is marked throughout the whole length by five longitudinal narrow bands, or ftripes of dufky brown or greenifh. In young fpecimens there are rarely more than three ftripes. The form of this fnake is long and flender, with the head fmall, the abdomen flattifh, and the tail long and thin.

Jaculatrix. Whitifh, with three blackifh ftripes, the middle one broadeft. *Coluber jaculatrix*, Linn. *Serpens Americana xequipiles dicta*, Seba.

Refembles lineatus, but is fmaller; the general colour whitifh tinged with blue, and marked by three longitudinal ftripes of black or deep brown, of which that in the middle is broadeft. This appears to vary in colour, that defcribed by Seba being yellowifh inftead of white. The abdominal fcuta are 163 in number, the fubcaudal fcales 77. This kind inhabits Surinam, and is confidered as a harmlefs animal.

Sibilans. Blueifh, with five dufky lines, and the head fpotted. *Coluber fybilans*, abdominal fcuta 166, fubcaudal fcales 100.

This, like the laft, refembles coluber lineatus, being marked, as in that fpecies, with five dufky ftripes, the middle one of which is the broadeft, and is nearly black, with a whitifh fpeck on each of the fcales. The head is ovate, covered with large fcales, and marked with feveral oblong, blue, fubangulated fpots, with black edges; and the tail is very long and flender. This animal is of confiderable fize, fometimes meafuring four feet in length; it is a native of Afia, and is efteemed harmlefs.

Situla. Grey, with a longitudinal dufky band, bounded on each fide by a black line. *Coluber fitula*, abdominal fcuta 236, fubcaudal fcales 45. Defcribed by Haffelquift as a native of Egypt.

Saurita. Brown, with three blue-green ftripes. *Coluber faurita*, abdominal fcuta 156, fubcaudal fcales 121.

This is the ribbon fnake of Catefby, a fpecies about three feet in length, and very beautiful. The general colour is brown above, with three moderately-broad longitudinal blueifh-green ftripes; the head is rather fmall and fomewhat pointed, the body flender, and the tail thin. Catefby reprefents it as an animal extremely fwift in its motions; it inhabits Carolina and many other parts of North America, frequents trees, and is perfectly innoxious.

Vittatus. Whitifh, with three black ftripes, the middle one very narrow; abdomen white, with the edges of the

fcuta

fcuta brown. *Coluber vittatus*, abdominal fcuta 142, fubcaudal fcales 78. Linn. *Coluber de terragona*, Seba.

The length of this kind feldom exceeds thirty inches; the colour is whitifh, tinged with blue, and marked along the whole length of the back by three black or dark brown ftripes, the middle one of which is the narroweft; between this and the principal longitudinal ftripe on each fide is a pair of extremely narrow or linear ftripes, which are gradually loft after paffing fome diftance down the back. The head is rather fmall; of an elongated form, covered with large fcales, and marked with black variegations; the tail is of moderate length, flender, and gradually tapering to a point. This fnake is a native of South America, and is not of the poifonous tribe of ferpents.

Monilis. Whitifh, with broad brown bands, and three fpots on the neck. *Coluber monilis*, abdominal fcuta 164, fubcaudal fcales 82. Linn.

A native of South America. This is a fmall fpecies meafuring about a foot and half in length; the colour whitifh, banded throughout the whole length with very broad tranfverfe brown bars; the head is of moderate fize, whitifh, and bordered with brown.

Scaber. Grey, fpotted with brown, and the fcales carinated by a rifing point. *Coluber fcaber*, abdominal fcuta 228, fubcaudal fcales 44. Linn. *Rauhe natter*, Merrem.

Length about eighteen inches, the form rather flender; head fmall, and marked at the back of the neck with a few tranfverfe ftreaks; the fpots on the back are fomewhat rhomboidal, of a brown colour, lighteft in the centre, and difpofed in a triple feries. This fnake is a native of India.

Maurus. Brown, with two black dorfal lines, fides tranfverfely banded with black, and the abdomen black. *Coluber maurus*, abdominal fcuta 152, fubcaudal fcales 66. Linn. Syft. Nat. A native of Algiers.

Jugularis. Black, throat fanguineous. Haffequift. Defcribed as a native of Egypt; the abdominal fcuta are 195, and the fubcaudal fcales 102.

Coccineus. Black, with the back yellow, fpotted with red, and the abdomen pale. *Coluber coccineus*, abdominal fcuta 175, fubcaudal fcales 35. Gmel.

Length about two or three feet, form rather flender, with the head fmall, the ground colour black, with about twenty-three fubovate fpots of bright red, with the fpaces between yellow. This is a native of South America.

Candidus. White, with large ovate brown dorfal fpots. *Coluber candidus*, abdominal fcuta 220, fubcaudal fcales 50. Linn. *Serpens æfculapii brafilienfis*, Seba.

General colour milk-white, marked throughout with a row of deep brown ovate patches; the head is brown, and covered with large fcales; tail of moderate length, gradually tapering to the extremity. This is a native of South America.

Nebulatus. Clouded with fufcous and cinereous, beneath varied with white and brown. *Coluber nebulatus*, Linn. Weigel. Abh. Hall. *Ceraftes nebulatus*, Laurenti.

A native of America. This is of a moderate fize, meafuring about two feet in length; the head is rather large in proportion, and covered with fcales of confiderable fize; body rather flender, and the tail tapering rather fuddenly from the body. The colour is yellowifh brown, clouded with irregular deep-brown, or blackifh variegations difpofed fomewhat in the form of bands, and nearly furrounding the body.

Padera. White, with blackifh dorfal fpots, connected by a line and lateral fpots. *Coluber padera*, abdominal fcuta 198, fubcaudal fcales 56. Linn. A native of India.

Australasiæ. Blackifh brown, fpeckled with yellow; fcuta very narrow, and the abdomen clouded with brown and yellow. *Auftralafian fnake*, Shaw Gen. Zool. White's Journ. New South Wales.

This is a large fnake, meafuring nine or ten feet in length, and being rather flender in proportion; the colour above deep or blackifh brown, variegated with numerous yellow fpecks, arifing from the circumftance of the middle of every fcale being marked with an ovate yellow fpot. On the fides of the body many of the fcales are yellow on one half and black on the other, and by degrees appear more tinged with yellow as they approach the abdomen, which is clouded with a mixture of brown and yellow; the head is fmall, and covered in front with moderately large fcales; the teeth rather large, and unaccompanied, fo far as can be afcertained from the dried fpecimens hitherto examined, by any poifonous fangs.

Schockari. Cinereous brown, with a double white longitudinal band each fide; abdomen whitifh; throat yellowifh, and fpeckled with brown. *Coluber fchockari*, abdominal fcuta 180, fubcaudal fcales 114.

Defcribed by Linnæus after Forfkal, as being about a cubit and a half in length, and the thicknefs of a finger; the colours as above defcribed, except that, as the fnake advances in age, a narrow ftripe, compofed of fmall whitifh fpots, is obfervable down the middle of the back. The head is ovate, obtufe, and covered with large fcales, and the tail about a third of the whole length. A native of the woody parts of Arabia.

Hoellier. Entirely red. Forfk. Forfkal defcribes this as a native of Arabia. It is about a foot in length; the bite of this fnake is faid to caufe an inflamed tumour, and its breath to excite an itching in the fkin.

Reginæ. Violaceous brown; beneath white, with a femi-orbicular brown fpot on each alternate fcuta. *Coluber reginæ*, abdominal fcuta 137, fubcaudal fcales 70. Linn. Weigel. Abh. Der. Hall. &c.

Length twelve inches; the tail is of a moderate length, and rather flender, and the fcales beneath are plain. A native of India, and confidered, by fome writers, as an inhabitant likewife of America.

Cyaneus. Deep blue, beneath cinereous. *Coluber cyaneus*, abdominal fcuta 119, fubcaudal fcales 110. Linn. *Anguiculus furinamenfis cyaneus*, Seba.

This is a fmall fpecies; the head is of a moderate fize, rather long, and covered with fcales of a large fize; tail long, and tapering gradually to a point. Inhabits South America.

Exoletus. Blueifh-grey; head oblong and flattifh; lips and throat white. *Coluber exoletus*, abdominal fcuta 147, fubcaudal fcales 132. *Natrix exoletus*, Laur. Amph. p. 78.

Inhabits South America and India. The length is three feet: the fcales on the body are obtufe, and arranged in eleven rows; the head oblong and flattifh; tail flender, a foot in length, and pale beneath.

Dhara. Coppery-grey, with the edges of the fcales whitifh; beneath white. *Coluber dhara*, abdominal fcuta 235, fubcaudal fcales 48.

The length of this fnake exceeds a cubit; the thicknefs lefs than a finger. The head is ovate, obtufe, and covered with large fcales, of which thofe in the middle between the eyes are larger than the reft. A native of Arabia. Forfk.

Tyria. Whitifh, with a triple feries of rhomboidal fpots. *Coluber tyria*, Linn. Defcribed by Haffelquift as a native of Egypt.

Fulvius. Fulvous, fpotted with brown, the body annulated with black bands, and the tail very fhort. *Coluber fulvius*, abdominal fcuta 218, fubcaudal fcales 31. Linn.

Length

Length about eighteen inches; the head brown above, and covered with large ſcales. A native of North America.

CONSTRICTOR. Shining black, with the body very long and ſlender. *Coluber conſtrictor*, abdominal ſcuta 186, ſubcaudal ſcales 92. Linn. *Black ſnake*, Cateſby. Carol.

According to Cateſby, this is a large and very long ſnake, ſome attaining to the length of ſix feet; they are entirely of a ſhining black colour, and are very nimble and beneficial in killing rats, which they purſue with wonderful agility to the roofs and all parts of houſes and barns, where rats are able to run, and for this ſervice are preſerved by moſt of the inhabitants; they are bold and furious, leaping at and biting thoſe that attack them, though no harm enſues, their bite not being venomous; it is commonly ſaid, in Carolina, they will attack the rattle ſnakes, and ſwallow them. "It is certain," ſays Cateſby, "moſt or all ſnakes will devour one another, not only of their own but of all other kinds, which I have often ſeen; one, after a long ſtruggle, ſwallowing another, but little leſs than itſelf."

SIRTALIS. Brown, with three blueiſh-green bands. *Coluber ſirtalis*, abdominal ſcuta 150, ſubcaudal ſcales 114. Linn. Deſcribed by Kalm as a Canadian ſpecies.

DECORUS. Blueiſh-green, with a double lateral band of black, and black ſpots on each ſide the neck.

A ſpecies deſcribed by Dr. Shaw, from a ſpecimen in the Britiſh Muſeum. Its habit is ſlender and flagelliform; length about two feet and a half; the colour pale, blueiſh, gilded green, with irideſcent variegations; beneath paler, or more inclining to white; on each ſide the body, near the abdomen, a double black ſtripe; head longiſh, covered with large ſcales, immaculate, and marked each ſide, through the eyes, by a broadiſh black ſtripe broken into ſpots, and which, paſſing to ſome little diſtance along the neck, becomes divided, and forms the double lateral ſtripe before mentioned. The eyes are large: tail very long and ſlender.

DOMICELLA. White, with numerous deep black tranſverſe bands meeting beneath, and a blackiſh abdominal line. *Coluber Domicella*, abdominal ſcuta 118, ſubcaudal ſcales 60. Linn. *Anguis bioclor elegantiſſimus malabaricus*, Seba.

Length about two feet and a half, diameter half an inch; the head is ſmall, covered with large ſcales; tail rather ſhort and tapering to a point. This is a native of India; it is ſaid the ladies in India ſometimes carry this ſnake in their boſoms, and hence Linnæus named it domicella.

VIRIDISSIMUS. Bright green; abdomen whitiſh, with the ſcuta dilated towards the middle. *Coluber viridiſſimus*, abdominal ſcuta 217, ſubcaudal ſcales 122.

This beautiful ſnake is a native of Surinam. The length is about three feet; head ſlightly obtuſe, of moderate ſize, covered with very large ſcaly plates; the remainder of the upper parts with ovate ſcales; the tail is of moderate length and ſlender. The green on the back inclines more or leſs to blue or purple in different individuals, and the abdomen in ſome than in others. It is eſteemed a harmleſs ſpecies.

CURSOR. Greeniſh, with two dorſal ſtripes of linear white ſpots, and whitiſh ſides and abdomen.—*La Coureſſe*, Cepede. Abdominal ſcuta 185, ſubcaudal ſcales 105.

A ſpecies deſcribed by La Cepede, from a ſpecimen in the Royal Cabinet at Paris. The length is near three feet; the head is covered with large ſcales, the tail of moderate length and gradually tapering to the tip. It is ſaid to be a timid animal, and remarkable for the ſwiftneſs of its motions. This inhabits the iſland of Martinico.

HICKANELLA. White, ſpeckled above with blue, and variegated with blue on the abdomen. *Serpens hikkanella Americanus*, Seba.

A native of South America, where it frequents houſes, and is very uſeful in deſtroying rats, mice, and other vermin. It is about two feet and a half in length, the thickneſs moderate, head oblong, and covered with large ſcales, tail rather ſhort, and gradually tapering.

PERLATUS. Pearl-coloured; head and tail ſea-green; the former marked by a red ſpot. *Serpens ex novo Hiſpania*, a Fabro Lynceo.

This ſnake is about two feet and a half in length, and rather thick, except towards the tail, where it gradually tapers to a ſlender point; the top of the head is covered with ſmall ſcales except about the noſe and between the eyes. It is a native of New Spain.

PLATURINUS. White, ſpotted with brown, and annulated with broad brown zones. Shaw Gen. Zool.

Deſcribed from a ſpecimen in the muſeum of Dr. William Hunter. It reſembles the common ſnake C. natrix, but the tail is rather more ſlender in proportion; the head is rather large, and covered with large ſcales of a black brown colour, elegantly marked with intervening ſpaces of white; the whole animal is about three feet and a half in length.

ARGUS. Cheſnut-brow, banded with tranſverſe rows of ocellated red ſpots; beneath yellow. *Coluber argus*, Linn. *Serpens arabica braſſilienſibus iboboboca*, and *Boiguacu dicta; alias argus*, Seba.

The argus ſnake is a large and elegant ſpecies, meaſuring, according to Seba, above five feet in length, and being of a moderate thickneſs in proportion. The head is large, flattiſh, covered in front with ſmall ſcales, and ſo very protuberant on each ſide at the hind part, ſo as to appear heart-ſhaped. The ground colour is brown, very beautifully marked from head to tail by numerous tranſverſe rows of round ocellated red ſpots, ſurrounded by a white iris, and an exterior red one; the abdomen beneath is pale yellow; tail moderately ſlender and tapering to a point. It is a native of Arabia, and ſeems to be conſidered as a poiſonous ſpecies.

OCELLATUS. Cheſnut-brown, with ocellated brown ſpots, and yellow abdomen. *Serpens guineenſis rariſſima argus dicta*, Seba.

In ſize reſembles the viper; the head is covered with ſmall ſcales; tail tapers to a moderately ſlender tip. This, according to Seba, is a native of Guinea, and is a rare ſpecies.

CHIAMETLA. Blue, the ſcales marked with a white ſpot, body beneath yellow. *Serpens americana chiametla dicta*, Seba.

A beautiful ſpecies about four feet and a half in length, found in the Weſt Indian iſlands.

ZEYLONICUS. Abdominal ſcuta 180, ſubcaudal ſcales 80. Gmel. Gronov. *Coluber maculis majoribus brunneis*, Boddaert. *Serpens maculata ceylonica*, Seba. *Serpens americanus*, Scheuchz.

CATUS. White; the ſcales diſpoſed in fours, black, and thickly crowded into patches. *Coluber catus*, Gmel. *Coronella catus*, Laur. Amph.

A native of America; it is obſerved of this ſnake that it lies in wait, and ſprings upon mice like the cat, whence its name.

CERVINUS. White, dotted in the middle with black, and branched with black at each end. Gmel. *Coronella virginica*, Laur. Amph. Inhabits America.

TESSELLATUS. Above alternately teſſellated with black and brown; beneath black with white unequal ſpots each ſide; head long and ſhielded. Gmel. *Coronella teſſellata*, Laur. Amph.

Rufus. Bright red with the fpots alternately uniting; beneath white. Gmel. A doubtful fpecies.

Molurus. Abdominal plate 248, fubcaudal fcales 59. Gmel.

This kind inhabits South America, and refembles the Boa tribe, but is diftinguifhed by the plates, and large fcales on the head, as in the coluber genus.

Minervæ. Glaucous, with a brown dorfal ftripe, and three on the head; abdominal fcuta 238, fubcaudal fcales 90. Linn.

Length about eighteen inches; thicknefs exceeding that of a fwan quill; the colour glaucous, with a broad, longitudinal, brown band down the back, and three longitudinal bands on the heads, two of which pafs through the eyes. The head is oblong, ovate, convex, and fmooth; the eyes large; tail flender, and meafuring about a third of the whole length. Defcribed by Linnæus from a fpecimen in the mufeum Adolphi Friderici brought from the Eaft Indies.

Scutatus. Black; fcuta extremely broad; tail fubtriangular. *Coluber fcutatus*, abdominal fcuta 190, fubcaudal fcales 50. Pallas.

Refembles the common fnake, *coluber natrix;* the length is about four feet; colour entirely black, except that the abdomen is marked alternately on each fide with a row of fmallifh fquare yellowifh-white fpots. The principal character confifts in the fcuta being remarkably wide, extending on each fide in fuch a manner as to embrace two-thirds of the body. This fpecies was obferved by Dr. Pallas about the borders of the river Ural; it is found occafionally both in the water and on land.

Hippocrepis. Livid, fpotted with brown, with a reverfed lunulated or horfe-fhoe mark on the back part of the head. *Coluber hippocrepis*, abdominal fcuta 232, fubcaudal fcales 94. Linn. Muf. Ad. Fr.. *Natrix hippocrepis*, Laur.

Length about twelve inches; head of moderate fize, marked by a tranfverfe arched brown band between the eyes, and a larger horfe-fhoe-fhaped mark on the back of the head; abdomen pale; tail tapering gradually from the tip. A native of America.

Domesticus. Grey, fpotted with brown; a bipartite black fpot between the eyes. *Coluber domefticus*, abdominal fcuta 245, fubcaudal fcales 94. Linn.

This is a native of Barbary, where it appears to be in fome degree domefticated, being very common in the houfes of the inhabitants, where it is kept to deftroy the fmaller kind of noxious animals. In its general appearance this fnake is allied to the laft-mentioned fpecies, and like that is perfectly harmlefs.

Dubius. Abdominal fcuta 141, fubcaudal fcales 24. Linn. Gron. Muf. Seba.

Exalbidus. Whitifh with tranfverfe broad fpots mixed with black and white.

Coluber Exalbidus, abdominal fcuta 135, fubcaudal fcales 42. Gmel. *Coluber exalbidus maculis tranfverfis latiffimis ex et albo mixtis.*

Cahirinus. Grey, with large oval brown fpots on the back, and fmall quadrangular notched fpots on the fides; beneath filky white. *Coluber caharinus*, abdominal fcuta 230, fubcaudal fcales 82. Forfk. Fn. Arab.

Inhabits Cahira. Length four feet and a half, and the thicknefs that of a finger; the head is flattifh, fub-cordated, with two pale oblong fcales on the crown.

Calamarius. Livid, with tranfverfe brown bands and linear points; beneath teffelated with brown and white. *Coluber calamarius*, abdominal fcuta 140, fubcaudal fcales 22. Linn.

This is a fmall fnake, meafuring about a fpan in length, the thicknefs that of a goofe-quill; colour above livid, fprinkled with linear dufky fpots, and marked by feveral dark narrow tranfverfe bars; the head is very fmall, convex, and ovate; the tail fhort and terminating obtufely. This fpecies inhabits America.

Carinatus. Lead-coloured, with large ovate, porous fcales; back carinated; abdomen whitifh. *Coluber carinatus*, abdominal fcuta 157, fubcaudal fcales 115. Linn. Muf. Ad. Fr.

A large fpecies, growing to the length of five or fix feet, and of a moderate thicknefs; tail tapering gradually to a point; tail much carinated, rifing into a ridge on the top; colour deep blueifh brown, or cinereous, inclining to lead-colour, paler or whitifh underneath; fcales very large and marked with numerous impreffed points as if pierced with pin-holes. This is reprefented as a harmlefs fpecies; it inhabits North America, and varies in colour.

Getulus. Blueifh-black, with linear yellow lines on the fides and bifid bands on the belly. *Coluber getulus*, abdominal fcuta 215, fubcaudal fcales 44. Linn. D. Garden.

Inhabits Carolina, where it frequents moift woods and fhady places, and preys on lizards. Length about three feet. An elegant fpecies.

Plicatilis. Livid, with a ftripe of dufky brown confluent fpots on each fide, the anterior ones ocellated with a white pupil. *Coluber plicatilis*, abdominal fcuta 131, fubcaudal fcales 46. Linn. Amoen. Acad. *Cerofles plicatilis*, Laur. Amph. *Serpens balifalan-boeket*, Seba.

Length from two to three feet; the colour brownifh-yellow or livid, with a dufky and lateral ftripe of confluent fpots immediately above the centre, the anterior ones of which have a white dot in the centre. The abdomen is pale, and marked with three or fometimes four rows of fmall dufky fpots. The head is covered in front with large fcales, fnout obtufe; tail thick and rather blunt. The fpecimen defcribed by Linnæus meafured, as above-mentioned, lefs than three feet, that defcribed by La Cepede, a fpecimen in the Mufeum of the king of France, was more than fix feet long, from which it appears this fnake is of a large fize when full grown.

Bataen. Spotted with black and white. Forfk. Fn. Arab.

Defcribed by Forfkal as a native of Arabia; it is a foot in length and two inches in thicknefs, and is highly poifonous; the body fwelling to a great fize after being bitten by this fnake.

Hannasch. Entirely black. Gmel. Inhabits Arabia, a cubit in length, and as thick as a finger.

Purpurascens. Abdominal fcuta 189, fubcaudal fcales 122. Gmel.

Pictus. Abdominal fcuta 172, fubcaudal fcales 142. Gmel. Boddaert.

Haje. Black, with oblique bands, and fcales half white. *Coluber haje*, abdominal fcuta 207, fubcaudal fcales 109. Linn.

Firft defcribed by Forfkal. This fnake inhabits Lower Egypt, is of a very large fize, when irritated lifts up, and ftretches out its head to bite.

Pullatus. Bands of the body black with white dots; temples fnowy with black fpots; beneath white with black fpots. *Coluber pullatus*, abdominal fcuta 217, fubcaudal fcales 108. Gmel. A native of Afia.

Caracaras. Blue, with the fcales on the fore-part of the

the body elongated; thofe behind rhomboidal, and the neck tranfverfely ftriated with black, *Coluber caracaras*, abdominal fcuta 190, fubcaudal fcales 125. Linn. *Serpens caracaras brafilienfis fingularis*, Seba

A fpecies of moderate fize, length two feet and a half; the head rather large and oblong; fnout obtufe; from behind each eye a black ftreak; colour pale blue, the pofterior part of the body tinged with rofe colour; the fcales on the fore parts of the animal are of a narrow lengthened form, and on the hind parts rhomboid; neck and anterior parts elegantly marked by numerous tranfverfe black lines; tail rather long, and gradually tapering to the tip. This fpecies inhabits Brafil.

Stolatus. Glaucous, with two whitifh ftripes, and quadrangular tranfverfe brown fpots between. *Coluber ftolatus*, abdominal fcuta 143, fubcaudal fcales 76. Linn. Laurenti. Seba.

Defcribed from a fpecimen in the Mufeum Adolphi Friderici as a poifonous fnake, but it appears erroneoufly fo. This fpecies inhabits India. It is of the middle fize, meafuring from a foot and a half to two feet or more in length. The colour is blueifh above, with two rather remote white lines down the back, and a continued feries of brown, tranfverfe, equidiftant zones. The abdomen is pale or white, each fcutum being marked on each fide by two fmall fpecks; the head is covered with large fcales, pale or blueifh above, and of moderate fize; tail rather fhort and tapering to a point.

Aurora. Orange coloured, with the dorfal band and abdomen yellow. *Coluber aurora*, abdominal fcuta 179, fubcaudal fcales 37. Linn. Muf. Ad. Fr. *Cerafles aurora*, Laur Amph. *Serpens acontias, &c.* Seba.

Length two feet and a half, and of moderate thicknefs in proportion; general colour dull orange, with a broad dorfal line of pale yellow; head rather large and covered with very large fcales; tail rather fhort and tapering to an obtufe point. Inhabits South America.

Pallidus. Grey, fpeckled with brown, and marked with a double, interrupted black line on each fide. *Coluber pallidus*, abdominal fcuta 156, fubcaudal fcales 96. Linn. Amoen. Acad.

Linnæus defcribes this as being a foot and a half in length, and the thicknefs of a fwan-quill, with the back flightly angulated each fide. The head is roundifh, much thicker than the neck and covered with large fcales; the ground colour pale variegated with fcattered grey fpots and points. Inhabits India.

Orientalis. Abdominal fcuta 202, fubcaudal fcales 96. Gmel. Boddaert. *Vipera vera orientalis*, Seba. Inhabits Eaftern countries.

Ovivorus. Abdominal fcuta 203, fubcaudal fcales 73. Gmel. *Guinpuajura*, Pif. Brafil.

We only know of this fpecies that the plates and fcales are as above defcribed, and that the fpecies inhabits America.

Cenchoa. Head globofe; body whitifh, with tranfverfe rhomboidal brown bands. *Coluber cenchoa*, abdominal fcuta 210, fubcaudal fcales 124. Linn. *Anguis de cencoatl americanus*, Seba.

A long and very flender fpecies growing fometimes to the length of three or four feet, and yet fcarcely exceeding the thicknefs of a fwan-quill. The head is very large and nearly globular, the neck extremely thin; and the tail remarkably long, meafuring nearly a third part of the whole animal, and gradually tapering to the extremity. The colour is white or yellowifh, marked throughout the whole upper part from the head to the end of the tail, with numerous tranfverfe rhomboidal bars, or patches of brown, the points of which defcend on each fide.

Flagellum. Extremely long, flender, and brown; abdomen pale. *Coach-whip fnake*, Catefby.

This fpecies meafures from four to five feet; or even fix feet in length, and is remarkably flender. Catefby, who defcribes this fnake, fpeaks of it as an active nimble creature, running very fwiftly and being perfectly harmlefs, "yet, fays he, the Indians report, not without gaining many profelytes to their filly belief, that it will by a jerk of its tail, feparate a man in two parts." This fnake is a native of Carolina and Virginia.

Ahaetulla. Bright blue-green and iridefcent; abdomen pale, with a black ftreak acrofs the eyes. *Coluber ahaetulla*, abdominal fcuta 163, fubcaudal fcales 150. Linn. Amoen Acad. *Natrix ahaetulla*. Laur. Amph. *Serpens ornatiffima amboinenfis bouguatrora*. Seba. *Long green Borneo fnake*, Petiver.

The general colour is a bright blue green with a golden glofs, and highly iridefcent. The length is from three to four feet, and the diameter about three-fourths of an inch; the head is covered above with large fcales, and the fnout is flightly elongated, though not pointed; the tail is fomewhat angular, and of confiderable length. It is an innoxious fpecies, is found in feveral parts of India, and is efteemed one of the moft beautiful of the ferpent race.

Aestivus. Blue green, flender; fnout obtufe; abdomen pale green. *Coluber aeftivus*, abdominal fcuta 155, fubcaudal fcales 144. Gmel. *Green fnake*, Catefby.

Long and flender, the general length about three feet; the head is obtufe; colour of the upper parts blue green, flightly tinged with purple; tail very long and flender. This kind inhabits many parts of North America, where it frequents trees and preys on flies and other infects. Catefby, to whom we are indebted for the above particulars, adds, that it is eafily reclaimed from its natural wildnefs, becoming tame and familiar, and affirms that fome people carry it in their bofoms.

Filiformis. Very flender, black; beneath white. *Coluber filiformis*, abdominal fcuta 165, fubcaudal fcales 158. Linn. Muf. Ad. Fr. *Natrix filiformis*, Laur.

Length about twelve inches, and thicknefs that of a goofe-quill; the colour above black, appearing like a broad dorfal ftripe, beneath white; the head is ovate, twice the diameter of the body, above black and beneath white; tail about one-third the whole length, very flender, and fharp-pointed. A native of India.

Torquatus. Black above, beneath red, with a white collar round the neck. Shaw Gen. Zool. *Little black and red fnake*, Edwards.

A fmall fpecies, lefs than an earth-worm; head and upper parts jet black, and gloffy; the head rather large, and covered with large fcales; eyes flame-coloured. This is a native of Pennfylvania where it inhabits crevices of rocks, old walls, &c. and feeds on infects.

Sipedon. Entirely black or deep brown. *Coluber fipedon*, abdominal fcuta 144, fubcaudal fcales 73. Linn. A native of North America; defcribed by Kalm.

Daboya Snake, *Le daboie*, La Cepede.

Defcribed by La Cepede who confiders it as the fpecies which in the kingdom of Juda, and fome other parts of Africa, is regarded as a deity, and kept in temples confecrated to its worfhip. This fuperftition is faid by the traveller, De Marchais, to have arifen from the following circumftance; the army of Juda being on the point of yielding to that of Ardra, it happened that a large ferpent of this fpecies made its appearance, which the chief prieft probably

probably knowing it to be innoxious lifted it up in his arms and difplayed as a kind of miracle, or at leaft as a propitious omen, perfuaded the army again to rally, by which means a fignal victory was obtained, and the animal was in confequence exalted into a divinity. It is faid to arrive at a very confiderable fize, and is of a whitifh colour, ornamented on the upper part throughout the whole length by a triple row of large oval rufous patches bordered with black, the head is rather large, and is covered with oval carinated fcales fimilar to thofe on the reft of the animal. The individual defcribed by La Cepede was preferved in the Royal Cabinet, and meafured three feet five inches in length.

Brasilian Snake, *La brafiliene*, La Cepede.

Length three feet; head and body covered with oval carinated fcales, fnout terminated by a large and almoft perpencular fcale rounded at the top, but emarginate at the bottom for the paffage of the tongue; upper parts of the animal marked with large oval rufous patches bordered with black, and in the intervals between the large patches are feveral much fmaller ones of a dufky colour; fangs very large. This is a native of Brafil, and La Cepede believes may be about fix feet in length when it has attained its full fize.

Triangular-headed Snake, *La tête triangulaire*, La Cepede.

Refembles the common viper in general appearance. The colour is greenifh, with fpots of different fhapes on the head and body, uniting fo as to form a regular band down the back; abdomen dufky, edged with white. The head is of a more triangular fhape than ufual, and covered with fmooth fcales, as are likewife the body. Its total length is two feet. This kind inhabits the ifland of Euftatia.

Panther Snake, *La tigrée*, La Cepede.

Allied to the laft; length about eighteen inches; head as in the common viper. Colour of the upper parts whitifh, rufous, with dufky fpots bordered with black like thofe on the fkin of the panther or leopard. The native country unknown.

The *coluber hydrus*, and *coluber laticaudatus* of Linnæus, are excluded from the above, and will be defcribed under the article Hydrus, the new genus to which they are referred by Mr. Schneider, and which we think it right to adopt. They are generally diftinguifhed from the colubrine tribe by having the body flender in front, becoming gradually thicker, fcaled, and the tail compreffed. See Hyrdus.

COLUBRARIA *Infula*, in *Ancient Geography*, an ifland of the Mediterranean fea, near the Baleares. Pliny fays that the foil engendered ferpents. It is thought to be the prefent ifle of Formentera, and the fame with that which the Greeks called Opdiufa, from οφις, *ophis*, *a ferpent*. It lies S. of Yicca, and was inhabited.

COLUBRINUM *Lignum*. See Lignum Colubrinum.

COLVEND *Copper-Mine*, in *Mineralogy*, Galway county, in Ireland; the fpecimens of ore found in this mine are very beautiful and deferving the attention of mineralogifts and collectors. See Williams's Mineral Kingdom.

COLVILLE, Cape, in *Geography*, a cape on the eaft coaft of New Zealand; lying in S. lat. 36° 26′. E. long. 194° 27′. This cape rifes directly from the fea, to a confiderable height, and is remarkable for a lofty rock, which may be diftinguifhed at a very great diftance. From the S. point of this cape the river Thames runs in a direct line S. by E., and is no where lefs than three leagues broad for the diftance of fourteen leagues above the cape, and there it is contracted into a narrow ftream, but continues the fame courfe through a flat country, or broad valley, which lies parallel with the fea-coaft. On the eaft fide of the broad part of this river the land is tolerably high and hilly; on the weft fide it is rather low, but the whole is covered with verdure and wood, and has the appearance of great fertility, though there were in Cook's voyage, Nov. 1769, but a few fmall fpots which had been cultivated. Six leagues within cape Colville, under the eaftern fhore, are feveral fmall iflands, which, together with the main, feem to form good harbours; and oppofite to thefe, under the weftern fhore, lie other iflands of which, probably, good harbours may be formed. The river affords good anchorage, and is defended from the fea by a chain of iflands, lying acrofs the mouth of it, and on this account called by Cook "Barrier Iflands;" thefe ftretch N.W. and S.E. 10 leagues. The S. end of the chain lies N.E. between two and three leagues from cape Colville; and the N. end lies N.E. 4½ leagues from Point Rodney. "Point Rodney" lies W.N.W. nine leagues from cape Colville, in S. lat. 36° 15′. W. long. 184° 33′. The natives, refiding near the river, are not numerous; but they are a ftrong, well-made, and active people, and all of them paint their bodies with red ochre and oil from head to foot. Their canoes were large and well-built, and adorned with carving.

COLUMB, St. Major, a market town of England, in Cornwall, in the hundred of Pider; 19 miles N.E. of Truro, and 245 W. of London. This town had for fome years a communication with the fea-coaft by means of the Columb canal, but which is now filled up and difufed. The Mawgan canal was alfo another abortive attempt at conducting a permanent navigation into this elevated neighbourhood for the conveyance of its China-ftore and potters' clay to the place of fhipping.

Columb, *St. Minor*, a village of Cornwall, in the hundred of Pider: the fituation of its church fteeple was determined in the Government Trigonometrical Survey in 1796, by obfervations from St. Agne's ftation, diftant 58,448 feet, and bearing 44° 7′ 57″ S.W. from the parallel to the meridian of St. Agnes; and from Henfbarrow ftation diftant 53,942 feet; whence is deduced its latitude 50° 25′ 21″.0 N. and its longitude 5° 1′ 29.3″ or 20ᵐ 5.ˢ9 W. of Greenwich.

COLUMBA, in *Ornithology*, the genus pigeon. Thofe have the bill ftraight, and defcending towards the tip; the noftrils oblong, and half covered with a foft tumid membrane.

The pigeon tribe is divided into two families, the firft having the tail even at the end, and of moderate length; the other cuneated and long.

* *Section*. Tail of moderate length, and even at the end.

Oenas. Blueifh; neck above gloffy-green; double band on the wings and tip of the tail blackifh. Linn. Fn. Suec. *Oenas*, or *Vinago*, Aldr. Will. *Stock dove*, Arct. Zool. *Holtztaube*, Frifch.

The ftock dove inhabits Europe and Siberia, frequenting rocky places and ruins in retired fituations.

Domestica. Cinereous; rump white; band on the wings, and tip of the tail blackifh. Linn. Fn. Suec. Scopoli. *Columba domeftica*, Briff. *Common pigeon*, Ray, Albin, &c. *White rumped pigeon*, Lath.

The common, or domeftic pigeon admits of an infinite number of varieties, many of which are remarkable for the beauty and elegance of their plumage; the principal varieties of thefe birds have been minutely regarded by Buffon and fome other writers, and are enumerated in the following order in the Gmelinian Syftema Naturæ.

Livia.

LIVIA. Stock dove. Wings with a double blackiſh band, called by Buffon *biſet*, and by Albin the *ſtock dove*.

SAXATILIS. Rock pigeon. Quill-feathers fuſcous. *Columba rupicola* of Ray.

HISPANICA. Roman pigeon. Cere whitiſh and ſcurfy. *Columba romana* of Briſſon. *Columba domeſtica major*, Ray. *Pigeon romain*, Buff. *Greater tame pigeon*, Willughby.

DASYPUS. Rough-legged pigeon. Legs rough with feathers. *Rough footed dove*, Willughby. *Rauchfüſige taube*, Friſch.

CRISTATA. Creſted pigeon. Head creſted; legs hirſute and cinerous. *Pigeon huppé*, Buff.

NORWEGICA. Norway pigeon. Head creſted; legs hirſute and ſnowy. Briſſ.

BARBARICA. Barbary pigeon. Area of the eyes naked and papillous; a double black ſpot on each wing. *Pigeon de barbarie*, Buff. *Barbary pigeon*, Ray.

CUCULLATA. Jacobine. Feathers of the hind head erect, reflected. *Columba anglica*, or *ruſſica*, Geſn. *Pigeon nonain*, Buff. *Jacobine*, Ray. *Zahme ſchlagtaube*, Friſch.

HISPIDA. Laced pigeon. Down ſmall, erect, and diſperſed over the back and wings. *Columba criſpa*, Aldr. *Pigeon friſé*, Buff.

TURBITA. Turbit pigeon. Feathers on the breaſt recurvate. *Pigeon à cravate*, Buff. *Turbit*, Ray.

LATICAUDA. Shaker pigeon. Tail erect, many-feathered, and broad. *Pigeon paon*, Buff. *Broad-tailed ſhaker*, Ray. *Pfauentaube*, Friſch.

GYRATRIX. Tumbler pigeon. Throws itſelf over and over in flight. *Pigeon culbutant*, Buff. *Tumbler*, Ray. *Tummeltaube*, Friſch.

GALEATA. Helmet pigeon. Head and quill feathers of one colour, and different from that of the body. *Pigeon cuiraſſé*, Buff. *Helmet pigeon*, Ray.

TURCICA. Turkiſh pigeon. Cere papillous and red. *Türkiſche taube*, Friſch. *Turkiſh* or *Perſian pigeon*, Willughby.

TABELLARIA. Carrier pigeon. Cere broad, carunculated and whitiſh; eye-lids naked. *Carrier pigeon*, Ray, Willughby.

GUTTUROSA. Cropper pigeon. Breaſt inflated. *Pigeon groſſe gorge*, Buff. *Cropper pigeon*, Ray. *Kropftaube*, Friſch.

EQUES. Light-horſeman pigeon. Breaſt inflated; cere carunculated. *Light horſeman pigeon*, Ray.

PERCUSSOR. Smiter pigeon. Strikes its wings violently in flight. *Smiter pigeon*, Ray, Willughby.

JUBATA. Turner pigeon. Creſt hanging down from the crown like a mane. *Turner pigeon*, Will.

MACULATA. Spot pigeon. White tail and frontal ſpot of one colour. *Spot pigeon*, Willughby.

MONTANA. Orbits naked and red; body rufous, beneath yellow. Linn. *Columba rufa cayennenſis*, Briſſ. *Perdix montana*, Ray. *Mountain partridge*, Sloane; Brown, &c. *Partridge pigeon*, Latham.

This bird, is eight inches and a half in length. The bill is red, with a black tip; the irides red, and ſurrounded with a warty ſkin of the ſame colour; the upper parts of the body are rufous, with a purpliſh hue; the under part of the neck, with the breaſt fleſh colour; belly, ſides, and vent, ſomewhat rufous; under wing-coverts, quills, and tail rufous; legs red, with the claws black. Thoſe birds inhabit Cayenne; they build in trees which have the boughs hanging low, and line their neſts with hair and cotton. They feed on the berries of the myrtle. Dr. Latham ſuſpects, that this ſpecies is found in St. Helena, as a bird is mentioned in Mr. Anderſon's catalogue, under the name of *columba perdix*, and which is ſaid to be very common in that iſland. A kind of pigeon, conceived to be a variety of the above, is deſcribed by Edwards; the forehead is of a clay colour; the head and neck, reddiſh purple; back, wings, and tail, red brown, with a gloſs of copper-colour; the fore part of the neck is reddiſh clay colour; breaſt, belly, thighs, and under tail-coverts, light clay colour; a white mark on each ſide under the eye, and another at the ſide of the throat, and juſt at the joint of each wing.

TETRAOIDES. Head, and neck black, with white margin. Scop. *Tetraoid pigeon*, Lath.

The only account we have of this bird, is from the work of Scopoli. Ann. I. p. 125. He informs us it equals the red-legged partridge in ſize, and that the head and neck are black, and encompaſſed with a white margin, as in that bird. The deſcription was taken from a bird living in a menagerie.

LEUCOCEPHALA. Blueiſh; orbits and crown white. *Columba leucocephala*, Linn. *Columba minor, capite albo*, Ray. *Columba ſaxatilis jamaicenſis, le pigeon de roche de la Jamaique*, Briſſ. *Bald-pate pigeon*, Sloane. *White crowned pigeon*, Arct. Zool.

Breeds in vaſt numbers among the rocks on the coaſts of Jamaica, St. Domingo, and the Bahama iſlands; and ſubſiſts on the berries of the ſweet wood. The length is ten inches and a half; the bill red with a white tip; the eyes ſurrounded with a white ſkin, the irides yellow; crown of the head white, beneath changeable; neck green and blue, varied with a gloſs of copper; the quill, feathers, and tail are brown; the legs red, with grey claws.

LEUCOPTERA. Orbits naked, and blue; tail feather cinereous, with the tips white, the middle ones fuſcous. Linn. *Columba indica*, Briſſ. *Brown Indian dove*, Edwards. *White winged dove*, Brown. Jam.

This bird is the ſame ſize as the common turtle, and meaſures in length eight or nine inches. The bill is duſky black. A fine blue ſkin ſurrounds the eyes, and according to the figure in the plates of Edwards, goes on to the baſe of the upper mandible. The irides are crimſon; the forehead, cheeks, and front of the neck and breaſt, pale rufous brown; hind part of the head and neck dull brown. The upper part of the body is dark brown, with a mixture of blue; greater wing-coverts the ſame, but the outer margins, and tips are white. The two middle tail feathers, are the ſame colour as the back, the reſt dull aſh, with white tips; legs red, with black claws. The white winged dove, inhabits the Eaſt Indies, and is obſerved to flirt up its tail at intervals, like the common wagtail.

FUSCA. Fuſcous; eyes black; neck and breaſt white, undulated with black. Jacq. Beytr.

This is the ſize of the turtle, and inhabits Carthagena, in America. Latham conſiders it as a variety of the laſt.

MARTINICA. Somewhat violaceous; abdomen reddiſh; quill feathers rufous on the inner webs. *Columba martinica*, Linn. *Columba violacea martinica*, Briſſ. *Pigeon violet de la martinique*, Buff. *Martinico pigeon*, Lath.

About the ſize of a turtle; the length nine inches and a quarter; the bill is red, and the eyes are ſurrounded with crimſon tubercles; the head, neck, and upper parts of the body, are cheſnut gloſſed with violet; the under parts of the body, more or leſs rufous; the quills the ſame as the upper, but on the outer edges only, the inner rufous; the tail feathers, the ſame on both margins; legs reddiſh with browniſh claws. Inhabits Martinico. *Le pigeon de la Martinique* of Briſſon, and which Buffon calls *Le pigeon roux de Cayenne*, is conſidered as a variety or rather the female

male of the above mentioned bird; it is of a reddiſh brown colour, with a collar of golden violet; the wings are ſpotted with black; lateral tail feather black at the end, with the tip white. Inhabits alſo Martinico.

Jamaicensis. Purpliſh brown, beneath white; tail feathers blue, terminated by a white line. *Columba jamaicenſis*, Linn. *Pigeon de la Jamaique*, Buff. *Columba minor ventre candido*, Raii. *White bellied pigeon*, Lath. *White bellied dove*, Sloane.

The length of this ſpecies is nine inches. The noſtrils are much elevated, and form two tubercles at the baſe; the top of the head, with the under parts of the neck and body are white; hind part of the neck varied with blue and purple; back, rump, and upper tail-coverts, purpliſh brown, with a light reddiſh tinge. This bird is found in the ſavannas of Jamaica, in the month of January. It feeds on berries, frequents trees, and has a mournful note, which is ſometimes very loud and diſagreeable.

Coronata. Blueiſh, above cinereous; orbits black; creſt erect; ſhoulders ferruginous. Gmel. *Columba mugiens*, Scop. Ann. *Phaſianus criſtatus indicus*, Briſſ. *Faiſan couronné des Indes*, Buff. *Goura de la nouvelle Guinée*, Sonnerat. *Great crowned Indian pigeon*, Edwards.

The crowned pigeon is nearly the ſize of a turkey, in which particular, it far exceeds any other ſpecies of the ſame tribe. Briſſon has placed it with the pheaſants, and his example is followed in the *planches enluminées*, but the bird poſſeſſes in every reſpect, the manners of the pigeon tribe; its note is cooing and plaintive like thoſe birds, only louder in proportion. We are told, the mournful notes of theſe birds, alarmed the crew of Bougainville very much, when they touched in their voyage at one of the iſlands they inhabit, as they miſtook it at firſt for the cries of the human ſpecies. The crowned pigeon, we are aſſured by Scopoli, has been known to build its neſt and lay eggs in Europe, though the young were not hatched; they made a neſt on trees in the menagerie, where they were kept, compoſed of hay and ſtalks. The female it is obſerved never ſat, but ſtood upon the eggs, and it is ſuppoſed by Scopoli, that it muſt be from this cauſe alone, theſe eggs proved abortive. In the Eaſt Indies, they are occaſionally kept in court yards like other domeſtic poultry.

Cristata. Reddiſh brown, creſted; under ſide, head, and neck, black; back and tail green; front with ſix very long, erect feathers. *Columba criſtata*, Gmel. *Le zouloul de Malacca*, Sonnerat. *Uncommon bird from Malacca*, Phil. Tranſ. *Leſſer crowned pigeon*, Lath.

The bill of this ſpecies is conical and rather bent; the colour black, except the under mandible, which is yellow at the baſe. On the fore part of the head, are ſix very long black briſtly hairs, which ſtand upright, and may be depreſſed or elevated by the bird at pleaſure; on the back part of the head, is a creſt of a gilded red colour, compoſed of hard and ſtill feathers, The ſpace between the two creſts is white, forming a band acroſs the head. The eyes are encircled with ſtiff white feathers. The legs are yellow; the toes are ſeparated at their origin, and the hind claw is deſtitute of a claw. Size of the common pigeon. A variety of this bird, formerly in the Leverian Muſeum, meaſured ten inches in length: the bill was yellowiſh, with the tip black; the back part of the head, creſted as in the former; the forehead white, paſſing backwards on each ſide beneath the creſt; the eyes were ſurrounded with feathers of a reddiſh colour, which paſſed backwards in a point; the head and neck were dark reddiſh brown; breaſt, belly, and vent, violet black; wings fine reddiſh brown; back, rump, and tail, dull browniſh green; tail-coverts long and falling over the tail; legs reddiſh yellow, with black claws. The hiſtory of this laſt bird is unknown, but it is conſidered as a variety, or perhaps a ſexual difference.

Pompadora. Green; wings purpliſh, quills black; chin and throat yellow. Gmel. *Pompadour pigeon*, Lath. Gen. Syn. Brown. Illuſtr. *Yellow-faced pigeon*, Brown (fem).

The pompadour pigeon is a native of India, and appears to be moſt common in the iſland of Ceylon. It is conſtantly ſeen on trees, and for the moſt part on thoſe known by the name of *Waringin grothebria*, on the berries of which it delights to feed. They are ſhot by Europeans, who eſteem them excellent eating; the natives take them with bird-lime. The ſize is leſs than that of the common turtle; the back, breaſt, and belly, are pale green; the wing-coverts of a fine pompadour colour; tail green; and legs red. The female is paler, and has the wing-coverts the colour of the body. Thoſe birds are common in the country about Bengal, where they are called *coucla*; it is ſaid to have a whiſtling note, reſembling that of the thruſh.

Erythroptera. Black; eye-brows, and front white; neck above, ſhoulders and wing-coverts garnet colour; tail from the baſe to the middle cinereous; legs brown.

Length nine inches and a half; tail two inches and a half long and even at the tip; legs brown.

This inhabits the iſland of Eimeo. Another bird much reſembling this, and ſuppoſed to be the female, was met with at Otaheite; the forehead, throat, front of the neck and breaſt, were white, the hind part of the neck duſky; over the eye a ferruginous ſtreak, paſſing a little downwards on each ſide of the neck; the back duſky black; belly duſky; quills and tail blackiſh. Another analogous kind, found in the South Sea iſlands, is of a reddiſh black colour, with the breaſt, and eye-brows white, and the legs red.

Albicapilla. Green; crown hoary; ſides of the neck cheſnut with a golden gloſs; greater quill feathers and tail black. *Columba albicapilla*, Gmel. *Le pigeon vert à tête griſe d'Antique*, Sonnerat. *Grey headed pigeon*, Lath.

A native of the iſle of Panay. Its ſize is equal to that of the common pigeon: the bill dull red with the irides yellow; the leſſer quill feathers are green, with a metallic luſtre, and on the arm-pits is a ſemi-circular ſpot, half grey, and half green; the legs are dull red.

Indica. Body purple; ſhoulders green; cap blueiſh. *Columba indica*, Linn. *Palumbus amboinenſis*. *Le pigeon ramier d'amboine*, Briſſ. *Green winged pigeon*, Lath.

Size of the turtle; the bill ſcarlet and ten inches in length; noſtrils blueiſh; forehead white, with a ſtreak of the ſame through the eye. The ſides of the head, neck, and breaſt is reddiſh, the hind part deepeſt; upper part of the back and wing-coverts green gold, gloſſed with coppery; ridge of the wing ſpotted with white; lower part of the back, rump, and upper tail-coverts reddiſh brown; quills browniſh, and rufous next the baſe; tail three inches long; two middle tail feathers black; the reſt cinereous, with the tips black; legs red, with black claws. A native of Amboina. Jacquin deſcribes a variety of this bird, having the quills and tail feathers green; wing-coverts violet; and the rump and vent blue.

Purpurata. Green; cap ſcarlet; vent fulvous; head, neck, and collar white. *Columba purpurata*, Gmel. *Purple-crowned pigeon*, Lath.

A general inhabitant of the iſlands in the Pacific ocean, and ſubject to conſiderable variations in the colour of its plumage. The natives of Tongo Taboo call it *kurukuru*, thoſe of Otaheite Oopa, and Oopara. It lives on the banana, and is eaſily tamed.

Jambos. Green; front red; breaſt white. *Columba jambu*, Gmel. *Pooni jamboo*, Marſd. *Jamboo pigeon*, Lath.

Rather ſmaller than the common dove; the bill is yellow, the fore part of the head of a deep pink, reſembling the colour of the bloſſoms of the jamboo, whence its name of jamboo pigeon; the back, wings, and tail are green, with the breaſt and crop white; the eyes are yellow, and from the orbits to the breaſt extends a white ſtreak, edged on one ſide with green, and on the other with pink. This is a native of Java, and feeds chiefly on berries.

Rubricapilla. Violet-black; cap and orbits of the eye naked and red; neck, upper part of the back, and breaſt greyiſh. *Columba atricapilla*, Gmel. *Le pigeon violet à tête rouge d'Antique*, Sonn. *Red crowned pigeon*, Lath.

Found in the iſle of Panay by M. Sonnerat. This bird is the ſize of the jacobin pigeon. The bill is grey. At the baſe of the upper mandible is a fleſhy membrane of a bright red colour entirely encircling the eye; legs grey.

Purpurea. Green; head and neck purpliſh; breaſt fulvous; vent ſcarlet. *Columba purpurea*, Gmel. *Purple pigeon*, Brown, Lath.

Size of the common wood-pigeon. The front is pale green; breaſt orange; back, ſcapulers, and belly light green; quills duſky. A native of Java where it is called *jooan*.

Eimensis. Greeniſh brown; front, collar, and beneath vinaceous; crown and neck above brown; double band on the breaſt purple and white. *Columba eimenſis*, Gmel. *Purple breaſted pigeon*, Lath. Inhabits the iſland of Eimeo. Length fourteen inches.

Vernans. Green, beneath yellow, outer margin of the wing pale yellow. *Columba vernans*, Linn. Gmel. *Le pigeon vert de Philippines*, Buff. *Columba madera ſpatana*, Raii Syn. *Le pigeon vert male de l'iſle de Luçon*, Sonnerat. *Parrot pigeon*, Lath.

Inhabits the iſlands of Manilla and Panay. The female is of a greeniſh-grey, and greeniſh yellow beneath. The ſpecies is rather larger than the turtle.

Aromatica. Green-olive; back bay-colour; double bar on the wings yellowiſh and black; quill feathers black, with yellow edges. *Columba aromatica*, Gmel. *Columba viridis amboinenſis*, Briſſ. *Pigeon vert d'Amboine*, Buff. *Aromatic pigeon*, Lath.

Size of the common turtle; length ten inches and a half. The bill is greeniſh; crown grey; tail beneath black at the baſe, and at the tip whitiſh; legs grey or red. A native of Amboina.

St. Thomae. Green; vent yellow; bill curved, blue, and red at the baſe. *Columba viridis S. Thomæ*, Briſſ. *A wild pigeon from St. Thomas's iſland*, Will. Ray. *St. Thomas's pigeon*, Lath.

The ſize of the common pigeon; the eyes are black, ſurrounded by blue orbits, with the wings and tip of the tail brown. Inhabits the iſland of St. Thomas.

Curvirostra. Green; beneath yellowiſh; vent white; back and ſhoulders bay; wings with two yellow bars; middle tail feathers green; lateral ones cinereous with a black band. *Columba curviroſtra*, Gmel. *Hook billed pigeon*, Lath.

Inhabits the iſle of Tanna in the South Seas; the bird, ſuppoſed to be the female of this ſpecies, differs from the male in having the back and ſhoulders green, and the under tail-coverts, together with the vent white.

Tannensis. Green; wing-coverts ſpotted with white; ſecondary quill feathers edged with yellow at the tip. Lath.

Deſcribed from a drawing in the poſſeſſion of ſir Joſeph Banks. The bird is eleven inches in length, and inhabits the iſle of Tanna. This is, perhaps, only a variety of the laſt.

Cyanocephala. Vinaceous-brown; head and throat blue, with a white band between the eyes. *Columba cyanocephala*, Linn. *Turtur jamaicenſis*, Briſſ. *Tourtelle de la Jamaique*, Buff. *Turtle dove from Jamaica*, Albin. *Blue-headed turtle*, Lath.

A native of the iſland of Jamaica, Cuba, and other warm parts of America. Size of the common pigeon.

Pacifica. Back greeniſh brown; head, neck, breaſt, and abdomen cinereous white; tail blackiſh. *Columba pacifica*, Gmel. *Ferruginous vented pigeon*, Lath.

The length of this ſpecies is thirteen inches and a half; the noſtrils are gibbous, the throat whitiſh; breaſt vinaceous, and the legs either red or brown. It is a native of the Friendly Iſlands. A variety of this ſpecies has the head, neck, breaſt, and belly whitiſh; back, wing-coverts, and tail greeniſh, and the bill gibbous at the baſe. This inhabits Otaheite and Tongataboo.

Mexicana. Fuſcous, orbits ſcarlet; breaſt and tip of the wings white. *Columba mexicana*, Briſſ. *Pigeon du Mexique*, Buff. *Cehoilolt*, Ray. *Mexican pigeon*, Lath.

A native of Mexico; the irides are black; the legs red.

Naevia. Above fuſcous, ſpotted with black; beneath pale fulvous; under tail-coverts, and beneath the wings, cinereous. *Columba naevia*, Gmel. *Oenas mexicana*, Briſſ. *Hoilotl*, Ray. *Black ſpotted pigeon*, Lath.

Inhabits the ſame country as the laſt, and frequents woods; ſize of the common pigeon.

Hoilotl. Rufous purple; leſſer wing-coverts white; bill and legs ſcarlet. *Columba hoilotl*, Gmel. *Columba montana Mexicana*, Briſſ. *Hoilotl*, Ray. *White-ſhouldered pigeon*, Lath. Inhabits the mountainous parts of Mexico.

Caerulea. Blue; beneath, bill, legs, and wing-coverts red. *Columba caerulea*, Gmel. *Columba caerulea mexicana*, Briſſ. *Flacahoilotl*, Ray. *Blue pigeon*, Lath.

Size of the domeſtic pigeon; and an inhabitant of Mexico.

Palumbus. Cinereous: tail feathers black on the poſterior part; primary quill feathers whitiſh on the outer edge; neck on each ſide white. *Columba palumbus*, Linn. *Le pigeon ramier*, Buff. *Colombo ſaſſaiuolo*, Cetti. *Ringel tauben*, Gunth. *Ring pigeon*, Lath.

Inhabits the woods of Europe and Siberia, and builds its neſts on trees.

Ænea. Legs feathered halfway down; beak and legs greeniſh; body braſſy. *Columba ænea*, Linn. *Palumbus moluccenſis*, Briſſ. *Pigeon ramier des moluques*, Buff. *Nutmeg pigeon*, Lath.

Inhabits the Molucca iſlands, and feeds on the nutmeg; its ſize is equal to that of the ring-pigeon. A variety of this ſpecies is deſcribed by Sonnerat, under the title of *Pigeon cuivre mangeur de muſcade*, and which appears to have been found in New Zealand; another variety has been met with at Amſterdam iſland, where it is called *Oorooba ya*.

Alba. Body white; primary quill-feathers and tip of the tail black. *Columba alba*, Gmel. *Le pigeon blanc mangeur de muſcade*, Sonner. Voy. *White nutmeg-pigeon*, Lath.

This bird inhabits New Guinea, and is deſcribed by Sonnerat, who mentions its feeding on nutmegs, obſerving, that it is probably only the outer ſkin which ſerves them for nouriſhment, as the nut itſelf is voided whole, and ſo little altered, that, after paſſing through the organs of digeſtion, it is not rendered leſs fit for vegetation; and hence it happens, that thoſe birds flying from one iſland to another, diſ-

perfe, and fow the feeds of thofe valuable plants in every part they frequent. A variety of this fpecies having the tail white inftead of black.

Guinea. Orbits naked and rufous; wings fpotted with triangular fpots of white; tail-feathers black at the tip. *Columba guinea*, Linn. Gmel. *Pigeon de guinée*, Buff. *Le tourterelle du cap de bon efpérance*, Sonner. *Triangular fpotted pigeon*, Edwards, Lath.

Inhabits the rocky parts of Africa, and is in particular common about the Cape of Good Hope. The fize is that of the wood-pigeon; its bill is brown, irides yellow; head and neck cinereous, upper parts gloffed with violet and purple; rump and belly white.

Caribæa. Blueifh; abdomen white; head, lower part of the neck, and breaft purplifh; tail fafciated tranfverfely with black. *Columba caribæa*, Gmel. *Columba cauda fafcia notata*, Ray. *Ring-tail pigeon*, Lath.

A bird the fize of the ring-pigeon, and which is found in all the woods of the Caribbee iflands. It is in great efteem for food, each bird felling for the table at the price of a dollar. In Jamaica it is frequently called the mountain pigeon. A fuppofed variety of this bird is defcribed by Jacquin, which has the tail cuneated, the orbits bare of feathers, and yellowifh, and the body blueifh; the tail of the laft-mentioned bird is as long as the body, and is deftitute of the black band fo confpicuous in the ring-tail pigeon. We conceive this ought fcarcely to be confidered as a mere variety.

Zealandica. Red; abdomen white; rump blue; tail black. *Columba novæ feelandiæ*, Gmel. *New Zealand pigeon*, Lath.

A native of New Zealand, obferved by the Englifh circumnavigators, in Dufky bay, where the inhabitants call it *Hagarreroo*. The length of this bird is eighteen inches. The bill and irides are red; quill-feathers dufky; vent blueifh.

Brunnea. Cap, neck above, back, and wing-coverts brown; breaft, neck beneath, and the rump fhining green. Lath. Inhabits New Zealand; the bill and legs are fanguineous.

Chalcoptera. Brown-cinereous, edged with rufous; front and chin white; a bifid copper-gold band acrofs the wing, and a black one near the tip of the tail. *Columba chalcoptera*, Lath. Ind. Orn. *Bronze-winged pigeon*, Phil. Bot. Bay.

This beautiful bird is a fpecies recently difcovered, and was firft defcribed by governor Phillips, in his account of Botany bay. It is the fize of the common wild pigeon, and appears to be found chiefly in Norfolk ifland. The moft remarkable character of the bird is the rich band of coppery-gold acrofs the wings; a few fpots of the fame colour occurs alfo on the leffer wing-coverts. Its bill and legs are red; quill-feathers brown, beneath rufous; the two middle tail-feathers brown, the reft pale lead colour.

Madagascariensis. Legs feathered; tail violaceous; body blue-black. *Columba madagafcarienfis*, Linn. *Le founingo*. Buff. *Pigeon ramier bleu de madagafcar*, Pl. Enl. *Madagafcar pigeon*, Lath.

The length of this fpecies is ten inches and a half; its fize that of the common pigeon. The bill and legs are red; the eyes placed in a bare reddifh fkin; the feathers on the neck are narrower than the others, and have a mixture of afh.

Australis. Green; abdomen, vent, and thighs fpotted; fhoulders violet. *Columba auftralis*, Linn. *Palumbus viridis madagafcarenfis*, Briff. *Pigeon ramier verd de madagafcar*, Buff. *Madagafcar pigeon*, Lath.

A native of Madagafcar. Length twelve inches; bill lead colour; eyes and legs fanguineous; pofterior part of the abdomen and thighs fpotted with black. Perhaps a variety of the laft.

Franciæ. Blue; orbits naked; rump and tail red; feathers of the neck long, narrow, and pointed at the end. *Columba franciæ*, Gmel. *Le pigeon hollandois*, Sonnerat. *Hackled pigeon*, Lath.

This bird confiderably exceeds the ring pigeon in point of fize. The bill and irides are crimfon; the feathers of the head, neck, and breaft are long, narrow, pointed, of compact texture, and with a highly polifhed furface. It inhabits the ifle of France, and is never eaten, the flefh being reputed poifonous.

Maculata. Deep green; body above fpotted with whitifh; belly blackifh; tail black, with the tip ferruginous. *Columba maculata*, Gmel. *Spotted green pigeon*, Lath.

Defcribed by Dr. Latham from two fpecimens, one in the collection of general Davies, the other in that of fir Jofeph Banks. The length is twelve inches. The bill black, with the tip yellow; the general colour is dark green, with a gloffy furface; the head and neck darker than the reft. The feathers of the neck are long and narrow; every feather of the wings and fcapulars are marked with a pale cinereous-white, and fub-triangular fpot; the quill-feathers are black, with the tip cinereous; the legs are brown, and are covered half way down with downy feathers. The native place of this fpecies is unknown.

Nicobarica. Tail white; body black; wings blue; back fhining green; feathers of the neck long. *Columba nicobarica*, Linn. Gmel. *Pigeon de nincombar*, Buff. *Nicobar pigeon*, Albin.

This is one of the moft fplendid of the pigeon tribe. Its fize is that of the common pigeon; the bill is dufky; the irides hazel; head, neck, breaft, belly, and thighs, and under tail-coverts dark blueifh-purple; the feathers on the neck are long and pointed, and with the upper parts of the wings are of the fineft green colour, gloffed with the moft vivid hues of red, blue, copper, or golden. The tail and upper coverts are white; legs reddifh. The female is diftinguifhed by the plumage being lefs brilliant and gloffy, and in having the pointed feathers of the neck fhorter than in the male. Thofe birds inhabit the ifle of Nicobar.

Speciosa. Ferruginous; tail blackifh; neck and breaft varied with rufous, white, and purple undulations. *Columba fpeciofa*, Gmel. *Le pigeon ramier de Cayenne*, Buff. *Le ramiret*, Ib. *Scallop-necked pigeon*, Lath.

Rather larger than the common turtle. The bill is red, covered with a white cere; the head ferruginous; neck and breaft varied with rufous white and purple, each feather being rufous, with a white mark, and the margin blue, gives the whole plumage in this part a beautiful undulated appearance; the back and wings are ferruginous; quills darker than the reft; tail dufky black, and rounded; the legs red. The female is marked in the fame manner as the male, but is much duller in colour. A native of Cayenne.

Turtur. Tail-feathers white at the tip; black grey breaft flefh-colour; on each fide of the neck a patch of black feathers, white at the tip. *Columba turtur*, Linn. *Turtur auritus*, Ray. *Palumbus turtur*, Klein. *Tourterelle*, Buff. *Tortora*, Zinnan. *Common turtle*, Penn.

The turtle is a general inhabitant of Europe, China, and India, and appears to be moft frequent in Turkey and the fouthern parts of Ruffia, and in the rocky country beyond the lake Baikal. In England thofe birds are not uncommon during the fummer, but it is only in this feafon that they

they are obferved with us, for they arrive late in the fpring, and depart in autumn. They build on the higheft trees in thick and deep forefts, and lay two eggs like the other kinds of pigeons.

It is related by baron de Tott, that this bird is highly favoured in the Turkifh dominions, where it is extremely plentiful, government allowing a certain rate per cent. on the duty impofed on corn that thofe birds may be allowed to feed unmolefted. A crowd of them conftantly alight on the veffels which crofs the port of Conftantinople, and carry the corn uncovered either to the mills or magazine, and the boat-men never oppofe them. This permiffion to feaft on the grain brings them in great numbers, and familiarizes them to fuch a degree, that they are feen ftanding on the fhoulders of the rowers watching for a vacant place where they might fill their crops in turn. The fame cuftom is mentioned by Sonnini.

"In the Leverian Mufeum (fays Dr. Latham) is a bird fhot in Buckinghamfhire, which differs from the common turtle in having almoft the whole fide of the neck black, inftead of a patch only, and inftead of each feather being tipped with white, there is a round fpot of white on each very near the end, giving the fides of the neck a moft beautiful appearance." There were three of thofe elegant birds in the Leverian Mufeum, including the male, female, and young, all which are now preferved in the London Mufeum. Thofe we are perfuaded ought rather to be confidered as a diftinct fpecies than a variety of the turtle. Two others, confidered as varieties of this bird, are the Portugal dove of Albin, and *La tourterelle grife de l'ifle de luçon* of Sonnerat, the firft inhabits Portugal, as its name implies, and is of a brown colour, with the fpot on the fide of the neck varied with black and white, and the lateral tail feather on the outer fide tipped with white; the other is diftinguifhed principally by having the two middle tail-feathers black, and the lateral ones white. This inhabits Manilla. Befides the above Dr. Latham defcribes *La tourterelle brune de la Chine* of Sonnerat as a further variety of this bird in his "Synopfis," but in the "Index Ornithologicus," it is enumerated as a fpecies under the name of *orientalis*.

Orientalis. Grifeous brown; feathers on the fides of the neck black, with pale cinereous tips; band on the wings yellow. *Chinefe turtle*, Lath.

A native of China, and of the fize of the common turtle; the bill and irides are red; head, neck, breaft, and back dirty brownifh grey, paleft on the breaft; wings brown; rump and tail deep cinereous grey; belly and thighs vinous grey; legs red.

Ægyptiaca. Teftaceous-flefh colour; chin fpotted; the feathers black, and two-lobed, truncated and ferruginous at the tip. Forfk. Fn. Arab.

This bird is defcribed by Forfkal, who informs us it frequents houfes in Egypt; the bill is black; head violet and flefh-colour; orbits naked and bluifh; back cinereous; breaft violaceous flefh-colour; belly and thighs whitifh; wings brown; the two outermoft tail feathers cinereous at the bafe, black in the middle, and the remainder white; the two next on each fide cinereous at the bafe, black in the middle, cinereous beneath, and whitifh at the tips, the fifth on each fide brown, in the middle pale black, the two middle ones wholly brown; legs flefh-colour.

Surinamensis. Cinereous, beneath white; chin varied with black and green; bill blue. *Columba furinamenfis*, Gmel. *La tourterelle*, Sonnerat. *Surinam turtle*, Lath.

Length ten inches; the bill long and flender, of a fine deep blue without, and red within; and the legs red. The fpecies is thus defcribed by Fermin, who informs us it is a common bird in Surinam. It lays eggs twice in a year, making its neft in woods on the higheft trees; the flefh is juicy and delicious.

Risoria. Above yellowifh, beneath white, with a black crefcent on the back of the neck. *Columba riforia*, Linn. *Turtur torquatus*, Briff. *Turtur indicus*, Aldr. *La tourterelle à collier*, Buff. *Indian turtle*, Albin. *Collared turtle*, Lath.

Exceeds ten inches in length; the female differs from the male in having the colours lefs vivid, and inclining to grey. Inhabits India, and the fouthern parts of Europe.

La tourterelle grife de la Chine of Sonnerat is confidered as a variety of this bird; it is of a brown colour, beneath vinaceous grey; crown grey; black crefcent on the neck, above fpotted with white; lateral tail-feathers black, fpotted with white. This kind inhabits China and Madras.

La tourterelle mulet, turtur hybridus of Briff. is alfo of this fpecies; or, at leaft, a mixed breed between the common and collared turtles. The head, neck, and breaft are vinaceous; the back dull reddifh afh-colour; belly, beneath the wings, and tip of the tail as in the laft mentioned bird; the quills are brown; legs fanguineous.

Sinica. Fufcous, fafciated with black; abdomen fomewhat fanguineous; wings and bill black. *Columba finica*, Linn. *Turtur finenfis ftriatus*, Briff. *Tourterelle rayée de la Chine*, Buff. *Dove* from China, Albin. *Striated turtle*, Lath.

This is a native of China, and is the fize of the laft. The bill is bluifh afh-colour; the irides white; crown of the head afh colour; tail palifh brown; legs red, and claws white.

Striata. Orbits and lores white; body cinereous, fafciated with black; beneath rufous. *Columba ftriata*, Linn. *Turtur indicus ftriatus*, Briff. *Tourterelle rayée des Indes*, Buff. *Barred turtle*, Lath.

Length nine inches and a half; the bill three quarters of an inch long, and of a pale horn colour; the noftrils pale blue; irides blue grey. The eyes are placed in a bare white fkin, which paffes to the noftrils; forehead, cheeks, and throat pale blue; top of the head and hind head incline to rufous; upper part of the neck, the back, and wing-coverts are brownifh afh marked with tranfverfe arcuated black bands; fides of the neck and body blueifh, croffed with blue, black, tranfverfe flender lines; fore part of the neck, breaft, belly, and thighs tinged with rofe-colour; under tail-coverts white; legs pale red; claws brown.

This bird is frequent at Malacca and the ifland of St. Helena; and is alfo found, according to Jacquin, in South America.

Suratensis. Grifeous; neck above black; hind head white; nape banded with rufous; quill-feathers black; back, rump, and tail obfcure grey. *Columba furatenfis*, Gmel. *La tourterelle de Surate*, Sonner.

About ten inches in length. The bill is black; the irides and legs red. It is a native of Surat in the Eaft Indies.

Cambayensis. Grey, beneath white; head fomewhat vinaceous; collar beneath black, varied with rufous; lateral tail-feathers half black and half grey. *Columba cambayenfis*, Gmel. *La tourterelle grife de Surate*, Sonner. *Cambayan turtle*, Lath.

Defcribed after Sonnerat as a native of Surat, and other provinces of Cambaya. Its fize is that of the collared turtle.

Viridis. Braffy, fore part of the neck purple-violet. *Columba viridis*, Linn. *Turtur viridis amboinenfis*, Briff.

Le

Le turvert, Buff. *La tourterelle à gorge pourprée d'amboine,* Pl. Enl. *Green turtle,* Lath.

The length of this bird is feven inches and three quarters. The bill is red ; fore part of the head and throat afh-colour ; the hind head and back part of the neck, back, rump, upper tail and wing-coverts, breaft, belly, fides, and thighs green gold, gloffed with copper ; the greater wing-coverts have the outer edges of the feathers at the tip fulphur-coloured ; under wing-coverts afh, quills blackifh ; tail blue-green, gloffed with copper ; the legs are red, and covered half their length with feathers ; the claws grey-brown. This bird inhabits Amboina.

Malabarica. Cinereous, beneath white ; middle wing-coverts with oval fpots ; lateral tail-feather black two-thirds their length from the bafe, the remaining part white. *Columba malabarica,* Gmel. *Tourterelle de la cote de malabar,* Sonner. *Malabar turtle,* Lath.

A fpecies the fize of the laft, and alfo defcribed by Sonnerat. It inhabits the coaft of Malabar. The bill and irides are red ; the head, back, and wings are of a pale cinereous-grey ; the neck and breaft grey, tinged with vinaceous ; the two middle tail-feathers grey ; the belly white ; and legs red.

Melanocephala. Green ; head fomewhat cinereous ; head blueifh-afh ; hind head black ; chin and throat yellow ; vent orange ; fix middle-tail-feathers green ; the outer ones on each fide fine crimfon. *Columba melanocephala,* Zool. Ind. *Turvert,* Buff. *Tourterelle de Batavia,* Pl. Enl. *Black-capped pigeon,* Ind. Zool.

Found in the ifland of Java. The length is nine inches and a half ; the bill black, fhort, and yellow at the tip ; the tail is of a fomewhat cuneated form ; and the legs are black.

Javanica. Green ; head and neck vinaceous red ; abdomen dufky ; primary quill-feathers fufcous. *Columba javanica,* Gmel. *Le turvert,* Buff. *La tourterelle de java,* Buff. Pl. Enl. *Javan turtle,* Lath.

Length nine inches ; the bill pale red ; covered with a white cere ; tail dufky beneath ; legs red. Inhabits Java.

Cæruleocephala. Green, beneath red ; crown blue ; wings and tail black-blue. *Columba cæruleocephala,* Lath. *Columba cyanocephala,* Gmel. *Blue-crowned turtle,* Lath. Syn.

Size of the laft ; it is an inhabitant of China, where it is called by the natives *Taupaun.* Common alfo in the ifland of Cuba, where it is caught in traps, and brought to the markets in great numbers as an article of provifion.

Afra. Grifeous brown, beneath whitifh ; exterior tail-feathers, at the outer bafe, and the fpot at the tip white ; wing-coverts with violet-azure fpots. *Columba afra,* Linn. Gmel. *La tourterelle du fenegal,* Briff.

The length of this bird is eight inches. The bill is reddifh ; top of the head afh-coloured ; hind part of the neck, back, wing-coverts, and rump grey-brown ; throat whitifh ; fore part of the neck and breaft pale vinaceous ; the belly, fides, thighs, and under tail-coverts dirty white ; the upper tail-coverts are grey-brown, with the tips blackifh ; quills brown, with the inner webs rufous ; on the wings are fome fpots of green gold-colour, gloffed with violet ; the tail is two inches and three quarters in length ; the two middle tail-feathers blackifh-brown, the reft grey-brown, with the ends blackifh ; the legs are red, with brown claws. This is a native of Senegal, and is the *Columba fenegalenfis* of Briffon, but not of Linnæus ; the latter writer defcribes the next fpecies under that name.

Senegalensis. Reddifh-brown, beneath white ; neck beneath fpotted with black ; three outer tail-feathers white on the lower half. *Columba fenegalenfis,* Linn. *Turtur gutture maculato fenegalenfis,* Briff. *Tourterelle à gorge tachetée du fenegal,* Buff. *Senegal turtle,* Lath.

The length of this fpecies is nearly ten inches ; the bill is blackifh, the head, neck, and breaft vinaceous ; upper part of the back brown, lower cinereous ; the fix middle feathers cinereous-brown ; the three others on each fide dark-afh from the bafe to the middle, and from thence to the ends white ; beneath the colours are half afh, and half black in the fix middle feathers, and white in the three outer ones ; the legs are red, the claws brown. This bird is found chiefly near the river Senegal.

Vinacea. Grey-brown, beneath white ; on the upper part of the neck a black collar ; wings fufcous, with the outer margin of the feathers whitifh. *Columba vinacea,* Gmel. *Turtur torquatus fenegalenfis,* Briff. *Tourterelle à collier du fenegal,* Buff. *Collared fenegal turtle,* Lath.

Size of the laft, and inhabits the fame country. The bill is blackifh ; head, neck, and breaft claret-colour ; upper part of the back brown, lower cinereous ; belly white ; fix middle tail-feathers afh-coloured-brown ; beneath from the bafe to the middle black, the reft cinereous.

Cruenta. Grey ; neck beneath white ; nape violet ; three greyifh bands acrofs the wings ; on the breaft a fanguineous fpot. *Columba cruenta,* Gmel. *La tourterelle grife enfanglantée,* Sonner. *Red-breafted turtle,* Lath.

Firft defcribed by Sonnerat ; it inhabits Manilla. The length of this bird is eight inches ; the bill is black ; the irides ferruginous ; collar on the neck violet, gloffed with green ; the blood-coloured fpot on the breaft darkeft in the middle ; wings with three grey and two black tranfverfe bands ; quill-feathers black ; tail grey at the bafe, and black at the end ; legs blackifh, and fomewhat violet.

Sanguinea. Body entirely white ; fpot on the breaft, the bill and legs fanguineous. *Columba fanguinea,* Gmel. *Tourterelle blanche enfanglantée,* Sonner. *Sanguine turtle,* Lath.

This bird inhabits Manilla, and was firft defcribed by Sonnerat. It is a fpecies of great fingularity, the whole of the plumage being white, except the fpot on the breaft, which is of a deep fanguineous colour ; the bill and legs are red, the irides purplifh.

Passerina. Wings and tail dufky ; body purplifh ; bill and legs yellow. *Columba pafferina,* Linn. Gmel. *Turtur parvus americanus,* Briff. *Columbus minimus,* Klein. *Turtur indicus,* or *Cocotzin,* Ray. *Cocotzin,* Buff. *Les petites tourterelles,* Pl. Enl. *Ground dove,* Catefby.

The ground dove is a native of the warmer parts of America, and the contiguous iflands ; and is obferved as far north as Carolina, but more rarely. Willughby fays it is very common in Mexico, where it inhabits mountainous places. Bancroft obferves, that it is the only kind of dove met with at Guiana. In the Caribbee iflands it is very abundant, and is commonly eaten, being in much efteem for food ; its haunts are ftony places under bufhes. It is alfo common in Jamaica, where, as Sloane mentions, "they feed on the ground like partridges, and fpring as they do, rifing and flying for a fhort flight, and then light again on the ground." They fubfift chiefly on grain and feeds of vegetables ; and are taken in traps baited with the feeds of the *Ricinus,* or wild caffada.

This is a fmall and elegant fpecies, the length about fix inches. The bill is pale red, with the tip blackifh ; the irides orange ; upper part of the head and neck afh-colour ; back, rump, and upper tail-coverts the fame, but deeper ; front vinaceous ; throat and breaft fpotted with brown ; two middle tail-feathers are deep afh-colour ; the others blackifh ;

legs

legs red, the claws blackiſh. The female differs in the general colour of the plumage being paler.

There are ſeveral varieties of this ſpecies, one of which, found at Carthagena in South America, is diſtinguiſhed by having fewer brown ſpots than uſual; another has the body more inclining to reddiſh, and the eyes cheſnut; and a third with the feathers of the neck and breaſt of many colours.

MINUTA. Brown; wings with from five to ſeven ſteel-blue ſpots; outermoſt tail-feathers white at the tip. *Columba minuta*, Linn. *Turtur parvus fuſcus americanus*, Briſſ. *Cocotzin aliud genus, tlapalcocotli*, Will. *Paſſerine turtle*, Lath.

It admits of ſome doubt whether this pigeon is diſtinct from the laſt, C. paſſerina. This kind inhabits America, and is five inches and a half in length. The upper parts of the body are brown, the under more or leſs rufous-white; wing-coverts rufous; two middle tail-feathers brown, the others aſh-coloured at the baſe, black in the middle, and brown at the tip; the bill and legs are black.

MALACCENSIS. Undulated with black lines; above cinereous-grey; beneath cinereous; ſides of the neck white; tail-feathers fuſcous, ſides near the tips white. *Columba malaccenſis*, Gmel. *La petite tourterelle de queda*, Sonner. *Malacca turtle*, Lath.

This is a beautiful ſpecies, ſcarcely exceeding the ſize of the common houſe-ſparrow; the bill is yellow, and in the middle black; the forehead and throat are light cinereous-grey; breaſt and belly vinaceous-grey; middle tail-feathers brown for two-thirds of their length, and from thence to the end white; thighs and under tail-coverts white; legs yellow. This ſpecies inhabits Malacca, and is eſteemed a delicacy for the table.

VERNANS. Green; beneath yellowiſh; outer edges of the wings pale yellow. *Columba viridis philippinenſis*, Briſ. *Pigeon vert des philippines*, Buff. *Columba vernans*, Gmel.

A native of the Philippine iſlands; the bill and legs are red, the breaſt azure.

Section * * *Tail long and cuneated, or wedge-form.*

MIGRATORIA. Orbits naked and ſanguineous; body cinereous; breaſt rufous. *Columba migratoria*, Linn. Borowſk. *Ænas Americana*, Briſ. *Palumbus carolinienſis*, Klein. *Pigeon de paſſage*, Buff. *Paſſenger or migratory pigeon*, Phil. Tranſ. Kalm, &c.

Thoſe birds inhabit North America, paſſing the ſummer in the higher latitudes, and retiring to the more ſouthern provinces at the approach of winter. They build in trees, and lay two eggs. It is ſaid thoſe pigeons are ſo abundant in America, that at the period of their migration they are ſeen paſſing from one place to another in flocks of two or three miles in length, and a quarter of a mile in breadth, and which literally darken the air as they proceed. Frequently at ſuch times we are told they alight on trees, and ſometimes in ſuch immenſe numbers as to break down pretty ſtrong branches. They are eſteemed excellent eating, and, during the time of migration, furniſh the common people of America with abundance of food. About Philadelphia they ſhoot theſe birds from the tops of their houſes, or knock them down in the evening from their rooſting places. In Louiſiana they adopt another mode of capture: a party of five or ſix go in the evening into the wood; and taking with them ſeveral diſhes, or other flat veſſels, they ſet brimſtone on fire in theſe under ſuch trees as the birds commonly prefer to rooſt upon, the ſmoke and vapour of which aſcending ſo ſtupefy the birds that they drop down from their reſting places, and are picked up and ſecured in ſacks previouſly provided for that purpoſe. It is ſaid ſuch parties are often accompanied in thoſe nocturnal rambles by the ladies; this mode of taking pigeons being eſteemed a delightful evening's amuſement. The chief food of theſe birds are acorns, rice, corn, and other grain.

The paſſenger, or migratory pigeon of America, is about the ſize of the common domeſtic pigeon of this country. The bill is black, the ſpace round the eyes crimſon; irides orange; head, throat, and hind part of the neck, back, rump, and upper tail-coverts cinereous; wing-coverts the ſame, marked with duſky or black ſpots; the ſides of the neck are gloſſy, variable purple; fore part of the neck vinaceous; belly, ſides, and thighs, with the under tail-coverts, the ſame colour; paler, quills black-brown, edged with white; the tail rather long, with the two middle feathers blackiſh brown, the reſt hoary; legs red, with black claws.

A variety of this ſpecies is deſcribed by Gmelin. The colour is browniſh above, beneath whitiſh-rufous; neck on the forepart ſomewhat vinaceous; lateral tail feathers with a round black ſpot in the middle on the under ſurface.

CAROLINENSIS. Body rufo-cinereous, beneath reddiſh; orbits blue. *Columba carolinenſis*, Linn. *Turtur carolinenſis*, Briſ. *Picacuroba*, Will. *Tourterelle de la Caroline*, Buff. Pl. Enl. *Caroliua pigeon*, Arct. Zool. Lath.

Rather larger than the common turtle. The bill is blackiſh; irides black; front, throat, and breaſt rufous, with a green-gold and violet gloſs. The hind part of the head and neck are browniſh aſh; the back, rump, upper tail, and wing-coverts aſh-brown; on the wings, near the tip of the greater coverts, are a few black ſpots; quills blackiſh aſh with whitiſh edges; tail-feathers unequal, the two middle ones four inches and an half in length; the outer ones very ſhort; the two middle ones entirely aſh-coloured brown; the next two on each ſide aſh-coloured, marked with black in the middle, the others light aſh-colour, whitiſh at the end, with a black ſpot between the two colours; the legs are red, the claws black. The female is deſtitute of the gloſſy violet colour on the breaſt. Thoſe birds inhabit Carolina, Braſil, and St. Domingo.

CANADENSIS. Body grey-brown, beneath whitiſh; primary quill feathers yellowiſh at the tip; tail feathers white at the apex. *Columba canadenſis*, Linn. *Tourterelle de Canada*, Buff. *Canada turtle*, Arct. Zool.

Length thirteen inches; the bill blackiſh; upper part of the head, neck, back, and wings grey-brown; the lower part of the back, rump, and upper tail-coverts aſh-coloured; throat and fore part of the neck grey-brown tinged with yellowiſh; wing-coverts marked with blackiſh brown ſpots; tail aſh-coloured, the feathers tipped with white, except the two middle ones; legs red; claws black. In the female moſt of the feathers are tipped with dirty white, which gives the plumage a ſtriated appearance. The native place is Canada.

MARGINATA. Body above fuſcous; beneath brown-grey; breaſt red; tail feathers black at the tip, the edges white. *Columba marginata*, Linn. *Turtur Americanus*, Briſ. *Tourterelle d'Amerique*, Buff. *Long tailed dove*, Edw. *Marginated pigeon*, Lath.

Inhabits America. Length ten inches; the bill is horny; irides rufous; lores white; front and chin reddiſh brown; hind head blueiſh aſh; under the ears a black ſpot; upper part of the body brown; ſhoulders ſpotted with black; throat roſy; two middle tail feathers blackiſh, the reſt cinereous.

AMBOINENSIS. Body rufous; neck waved with black. *Columba amboinenſis*, Linn. *La tourterelle d'Amboine*, Buff. *Amboina turtle*, Lath.

Length fourteen inches; bill black; feathers of the crown

crown, neck, and breast with a blackish transverse bar near the tip; feathers of the upper part of the back, and wing-coverts brawn tipped with rufous; wings brown; tail reddish-brown. A native of Amboina.

Capensis. Body grey-brown, beneath white; primary quill feathers rufous on the inside. *Columba capensis*, Linn. *La tourterelle*, Buff. *Cape pigeon*, Lath.

Inhabits the southern parts of Africa. The length of this bird is nine inches and a half; the bill is red; body grey-brown; belly whitish; spot on the wing steely; secondary quill feathers brown, with the exterior edge grey; tail black beneath; lateral feathers at the base grey-brown, with the tips blackish; legs red, with the claws black. The female differs in having the throat and fore-part of the neck of the same colour as the rest of the head, and the greater wing-coverts not tipped with black. There are several varieties of the cape pigeon.

Macroura. Body cinnamon coloured, beneath whitish; tail whitish at the tip. *Columba macroura*, Gmel. *Le tourocco*, Buff. *La tourterelle à large queue*, Pl. Enl. *Great tailed pigeon*, Lath.

The length of this bird is twelve inches, the bill red, with a white cere; tail as long as the body; legs red. A native of Senegal.

Bantamensis. Orbits naked and fleshy coloured; neck, breast, and flanks waved with black and white. *Columba bantamensis*, Muf. Curf. f. 3. t. 67.

Common in the island of Java. The species is small, being about the size of the wry neck; the bill is black; body above hoary ash; beneath whitish; back, wings, and breast with lunate black spots; tail same length as the body, and consisting of fourteen feathers, the six middle of which are black, the rest white towards the tip; legs red.

Melanoptera. Body livid or blueish; wings black. Molin. Gmel. Described as a native of Chili. Vide Molin Hist. Chili.

Dominicensis. Body grey; sides of the head and collar beneath the nape white; spot on the crown; band under the eyes, and collar on the neck black. *Tourterelle de St. Domingue*, Pl. Enl. *Columba dominicensis*, Lath. Ind. Orn.

A native of St. Domingo; the length of this bird is eleven inches; the bill black; wings with a few blackish spots; breast vinaceous; front, chin, and vent white; tail grey; the outermost feathers white; legs red.

Columba *groenlandica*, a name given by authors, as Ray, Willughby, and Albin, to the black guillemot. See Colymbus *grylle*.

Columba is also the name of a military order instituted by John I. of Castile, about the year 1739.

Columba *Noachi*, a small constellation in the southern hemisphere, consisting of ten stars. The longitudes, latitudes, &c. of which are given in Sharp's Catalogue.

COLUMBAC denotes that part of the agallochum, which is between the heart, and that part next to the bark.

COLUMBARIA, in *Ancient Geography*, an island of the Mediterranean on the coast of Etruria, according to Pliny. —Also, another island of the Mediterranean, near Drapanum in Sicily, called by the Greeks "Pelias."

COLUMBARIUM, a promontory of the isle of Sardinia, N. of Portu Olbianus, on the E. coast: the same with *Colymbarium*.

COLUMBATE *of iron*. See Columbium.

COLUMBIA, in *Geography*, a county of America, in New York, bounded N. by Renffelaer, S. by Dutchess, E. by the state of Massachusetts, and W. by Hudson river, which divides it from the county of Albany. It is 32 miles long and 21 broad, and is divided into 8 towns, *viz.* of which Hudson, Claverack, and Kinderkook are the chief. It contained, in 1790, 27,732 inhabitants, and in 1796, 3560 electors.

Columbia, a county of America, in the upper district of Georgia, bounded by the Savannah river on the E. and N.E., which separates it from the state of Carolina, and N.W. of Richmond county.

Columbia, a township of Washington county, in the district of Maine, on Pleasant river, adjoining Machios on the N.E., was incorporated in 1796.

Columbia, a post-town of America, the capital of Kershaw county, and the seat of government of S. Carolina. It is situated in Camden district, on the E. side of the Congaree river, just below the confluence of Saluda and Broad rivers. The streets are regular, and the town contains upwards of 70 houses. It lies 115 miles N.N.W. of Charlestown, 35 S.W. of Camden, and 678 S.W. of Philadelphia. N. lat. 34° 1′. W. long 81° 5′.

Columbia, a flourishing town of Goochland county in the state of Virginia, on the side of James river, near its junction with the Rivanne, 45 miles from Richmond, and 35 miles from Charlotteville.

Columbia, a town of America, in the county of Lancaster and state of Pennsylvania, seated on the N.E. bank of the Susquehanna river, 10 miles from Lancaster, and 76 W. by N. from Philadelphia.

Columbia, a town of America, in the county of Hamilton and state of Ohio, seated at the confluence of the Little Miami with the Ohio, 6 miles above Cincinnati. The settlement began in 1789. N. lat. 39° 20′.

Columbia *College*. See College.

Columbia, *territory of*. See Washington.

COLUMBIANA, a county of America, in the state of Ohio, bounded N. on the county of Trumbull, S. on Jefferson and Muskingum counties, E. on the state of Pennsylvania, and the Ohio, and W. on Muskingum river, and county.

COLUMBIC Acid, in *Chemistry*. See Columbium.

COLUMBIERS, in *Geography*, a town of France, in the department of the Aveiron, and district of Rhodes; 10 miles W. of it.

COLUMBINA, a name given by Actuarius, and some other medical writers, to the verbena, or common vervain.

Columbina *Marga*. See Marle.

COLUMBINE, in *Botany*. See Aquilegia.

Columbine *feathered*. See Thalictrum *aquilegifolium*.

Columbine, a kind of violet-colour, called also dove-colour. See Dyeing.

COLUMBIUM, in *Chemistry*, a new metal discovered by Mr. Hatchett, in the year 1802, in a mineral which he had from the British Museum. The mineral, it appears, had been sent with some specimens of iron ores from Massachusetts in America, to sir Hans Sloane, in whose catalogue it is described as "a very heavy black stone, with golden streaks." By Mr. Hatchett it is described as of a dark brownish grey externally, and more inclining to an iron grey internally; he found the longitudinal fracture lamellated; and the cross fracture had a fine grain. Its lustre is vitreous, slightly inclining in some parts to metallic, moderately hard, and very brittle. The colour of the powder was dark chocolate brown; but the streaks were yellow mica. The particles were not attracted by the magnet. Its specific gravity, at the temperature of 65°,

was 5.918. A feries of very accurate experiments made by Mr. Hatchett proves that this ore confifts of iron combined with a new metallic acid: of 200 grains of the ore 42 were found to be the oxyd of iron, and 155 of acid. The mode which Mr. H. adopted to analyfe this columbate of iron was this: he took one part of the ore reduced to powder, and mixed it with five times its weight of carbonate of potafh, and fufed them in a filver crucible, An effervefcence took place, which being fubfided, the whole was poured into a proper veffel, and fuffered to cool. Boiling diftilled water was then poured upon it, and the whole was tranfferred upon a filter. The infoluble refiduum was repeatedly wafhed in diftilled water. The filtered fluid was now fuperfaturated with nitric acid. The refult of which was a white flocculent precipitate, which he denominated *columbic* acid. The infoluble refidue was again fufed with carbonate of potafh, and treated as before, but fcarcely any effect was produced, the alkali was therefore wafhed away, and the powder digefted with muriatic acid, in order to get rid of the iron. The acid was then decanted, and the refiduum wafhed in diftilled water. It was again fufed with carbonate of potafh, diffolved, and precipitated with nitric acid. The refiduum was repeatedly treated in a fimilar manner, till the whole was completely decompofed. By thefe means he obtained a precipitate of oxyd of iron which combined with the muriatic acid. The columbic acid is of a pure white colour, but not very heavy, and has fcarcely any perceptible tafte; it is not foluble in boiling water. When fome of the powder is placed upon litmus paper, moiftened with diftilled water, the paper in a few minutes becomes red. When expofed to the blow-pipe, it is not fufible, but only becomes of a lefs brilliant white. Having found that this acid poffeffed properties different from all other acids, and that the bafe was metallic, Mr. H. gave to the metal the name of *columbium*. In the attempts which he made by heat to reduce it to the metallic ftate, the oxyd was found only in a ftate of black powder. From his experiments he found that the metal combines with oxygen in different proportions, and thefe oxyds are diftinguifhed by different colours. It combines with fome of the acids, and forms falts; thus we have the fulphate, muriate, &c. of columbium.

Sulphate of Columbium. Boiling fulphuric acid forms a tranfparent colourlefs folution with columbic acid. When water is added to this folution, it becomes turbid, affuming a milky appearance; and a white precipitate is gradually depofited, which cracks as it becomes dry upon the filter, and from white it changes to a lavender blue colour; and when completely dry, to a brownifh grey. It is then infoluble in water, is femitranfparent, and breaks with a vitreous fracture. This precipitate obtained from the fulphuric folution, by the addition of water, is a fulphate of columbium.

Muriate of Columbium. Columbic acid, when recently feparated from potafh is foluble in boiling muriatic acid. This folution may be confiderably diluted with water, without any change being produced. When evaporated to drynefs, it left a pale yellow fubftance, infoluble in water, and which is diffolved with great difficulty, when it is again digefted with muriatic acid.

Phofphate of Columbium. A few drops of phofphoric acid being added to a part of the folution of columbium in concentrated fulfphuric acid, at the end of 12 hours converted the whole into a white, opaque, ftiff jelly, which was infoluble in water. When a fmall quantity of phofporic acid was added to the muriatic folution of columbium, in a few hours a white flocculent precipitate was formed. Philofoph. Tranf. 1802, part i.

COLUMBO, in *Geography*, the capital of the ifland of Ceylon, and the feat of government, is fituated towards the S.W. part of the ifland, in about 7° N. lat. and 78° E. long. from London. It was captured from the Dutch by the Britifh troops under general Stewart in 1796. Although Trincomater, on account of its fituation and harbour, be of greater confequence to the Britifh nation to retain, yet Columbo is in every refpect greatly fuperior. The number of its inhabitants is much greater; its fort and black town are much larger; the country in which it is fituated much more fertile; and the rich diftrict depending upon it much wider, being not lefs than 20 leagues in length and 10 in breadth. Columbo is commonly fuppofed to have been firft fortified by the Portuguefe; but captain Percival queftions the truth of this ftatement, as Laurence de Almeyda, after his firft treaty with the king of the ifland, found that the Moors and Malabars had a fortrefs here, on which fome guns were planted, which had been procured from fhips wrecked on this coaft. That part of the fort, where thefe ancient works ftood, is now ftrongly fortified, and fhewn as the firft works of the Portuguefe. It is in a manner detached from the main body of the fort, being feparated from it by an entrenchment and wall, with a foffe or ditch, now almoft choaked up. The fort is placed on a peninfula projecting into the fea, and it is thus expofed on all fides to the fea-breezes, by which the air is rendered temperate and healthy, though it lies fo very near the equator. This fort is upwards of a mile in circumference; and is indebted for its ftrength both to nature and art. On the fouth fide the furf runs fo high, and the fhore is fo rocky, that it would be dangerous to approach it. On the weft fide of the bay, where the fea is fmoother, and near the wharf or landing place, which at all feafons of the year is fafe for boats, the only attempt could be made; but thefe quarters are fo well defended by the batteries which command the harbour, that there is hardly any probability of its fucceeding. On the weft fide of the fort, and facing the fea, are two very fine batteries, *en barbet*, intended for the fecurity of the harbour. Thefe ftand on a part that projects a confiderable way from the main body of the fort, from which they are feparated by a high wall and ditch flanked with baftions, and have gates that communicate with the interior of the fort. Here the wharf or landing place is found; it confifts of large piles of timber, extending feveral yards into the fea, and affords a very commodious ftation for loading and unloading floops and large boats, which may be brought clofe alongfide. At this end feveral ftore-houfes, and barracks for half a regiment are erected. The ramparts of the fort are very ftrong, having eight principal baftions; and they have alfo a number of leffer ones, with curtains, banquets, and parapets, communicating with each other all round the fort, and fitted for troops to line and defend with mufketry and field-pieces. The whole fort is furrounded by a road and deep oval ditch, over which draw-bridges are thrown at each of the gates. On the outfides are fome fmall magazines, with a powder-mill and a faw-mill attached to the fort. Adjoining to the covert-way, and at the foot of the plain, is a lake extending three or four miles into the country, in a N. E. direction. For near a mile on the outfide of the fort, the neck of land which connects it with the country, is not above five or fix hundred yards broad; and in the middle of this fpace lies the lake, leaving room on each fide only for a narrow caufeway. Near the plain an approach might be entirely cut off, by opening the fluices and cutting the road acrofs, where the lake would be connected with the fea, and the garrifon completely infulated. In the centre of the lake is an ifland, communicating with a fally-

a fally-port on the eaft face, by a narrow caufeway and draw-bridges. This is a pleafant fpot, abounding with cocoa-nut trees, and was called by the Dutch "Slave Ifland," as it was the place whither they fent their fick flaves. A battalion of Malays is ftationed here. This ifland is very convenient, as it lies contiguous to the fort, and opens the neareft way to the cinnamon gardens, which are clofe by it. The fort has three gates; the principal one, where the main-guard is ftationed, which is called the Delph-gate, and leads into the "pettah," or black town. It has two draw-bridges to pafs over the ditch, which here forms an angle. At each of the gates are guard-houfes, with a fubaltern's guard placed over them.

The plan of Columbo is regular. It is nearly divided into four equal quarters, by two principal ftreets, which crofs each other, and extend the whole length of the town. To thefe fmaller ones run parallel, with connecting lanes between them. At the foot of the ramparts, in the infide, is a broad fheet or way, which goes round the whole fort, and communicates with the baftions and foldiers' barracks; and alfo affords, at the different angles, open fpaces for their private parading. The grand parade is by no means fufficient for the garrifon, as it can hardly contain one complete regiment. On one fide of it are ranges of public offices for the civil and military departments, with the town or ftadt-houfe in the centre of them, where the Dutch held their high court of juftice. On the arrival of the Britifh troops they found a rack, wheel, and many other implements of torture, which had been ufed for inflicting punifhment on criminals, particularly flaves, but thefe favage modes of punifhment were immediately abolifhed by the Britifh government. On the other fide of the grand parade ftand the cinnamon ftore-houfes, or "go-downs," as they are here called. At the upper end of the parade the Dutch had begun to erect a church, which has never been finifhed. The Dutch ufually attended divine fervice at a fpacious and handfome church in the black town, about a mile diftant from the fort; and worfhip is ftill performed there for the Englifh, either before or after that of the Dutch inhabitants. The government houfe, which faces the harbour, is a very long and capacious building, but more convenient than elegant: feveral offices are attached to it, where the bufinefs of government is tranfacted. Behind it is an excellent garden, intended for a "tank" or refervoir, in cafe of a fiege; for though every houfe has a well plentifully fupplied with water through the year, yet it is of a brackifh quality, and not fit to drink. The Europeans, therefore, both of the civil and military eftablifhment, are fupplied with water from a fpring, about a mile from the fort, which is brought by means of bullocks, in leathern bags, called here "puckally bags," a certain number of which is attached to every regiment and garrifon in India.

Columbo is built more in the European ftyle than any other garrifon in India. The interior of the fort has alfo more the appearance of a regular town; the Dutch houfes are all regularly built, though few are above one ftory high; and the windows have all glafs-panes, after the European manner. Before each houfe, and connected with it, is a large open fpace, roofed in and fupported on pillars of wood, called a "viranda," affording a fhade from the fun, and expofed to the refrefhing breeze of the fea. The houfes are alfo agreeably fhaded by a double row of thick-fpreading trees, planted on each fide of the feveral ftreets. The walls of the houfes are plaftered over and white-wafhed with a very fine bright lime, made of burnt fhells. This beautifully white colour may contribute to the coolnefs of the houfes, but it throws an infupportable glare on the eyes of the paffengers along the ftreets. The houfes are for the moft part uniformly conftructed, confifting of the hall in the front, with a chamber at each fide, and another room in the back part, equal in length to the other three, and called the "back viranda." Behind this are one or two ranges of fmall buildings, proportioned to the fize of the houfe and defigned for the accommodation of fervants, for cellars, and fometimes for fleeping rooms. The houfes are covered with indented tiles, which afford no fecurity againft rain. In the centre of the principal ftreet is a very handfome and lofty houfe, which belonged to the Dutch governor, and has fince been occupied by the commander of the Britifh forces on the ifland. There is alfo another very handfome and fpacious houfe for the commandant of the garrifon, with fuitable offices and gardens. The hofpital, defigned for foldiers and failors, is a roomy and convenient building. Three or four battalions are ufually ftationed as a garrifon in the fort of Columbo.

The harbour of Columbo, which lies on the weft fide, is an open road, affording good and fafe anchorage to fhips for only four months of the year, from December to April, when the N.W. winds do not prevail to any great degree; but about May, when the monfoon fets in on the Malabar coaft, and extends its ravages to the W. coaft of Ceylon, the roads of Columbo no longer afford any protection. Hence it is, that Columbo is cut off from any intercourfe by fea, with the other parts of the ifland, for two thirds of the year. For fix months of the ftormy feafon, this fide of the ifland is fubject to very heavy falls of rain, accompanied with dreadful thunder and lightning, and violent winds blowing in there. During this feafon the variations of the climate are very great. The heavy rains, predominating moft by night, render the air damp and chill; and the exceffive heat of the fun by day is almoft infupportable. Thefe tranfitions make the climate more unhealthy at this feafon than during the hot weather. During the rainy feafon, the Indians from the continent are very fubject to fluxes, dyfenteries, and fevers. They are alfo fubject to another very extraordinary difeafe, called the "Berry berry," occafioned by low diet and hard water, which fwells the body and legs of the patient to an enormous fize, and generally carries him off in twenty-four hours. The cure is effected by rubbing the difeafed perfon all over with cow-dung, oil, chinam, lime-juice, and other preparations from herbs, and then burying him up to the chin in hot fand. The Britifh foldiers counteract the bad effects of the air and water, by drinking plentifully of arrack and fmoaking tobacco. The "Pittah," or black town, of Columbo deferves particular notice, on account of its extent and fuperior ftructure, compared with other fuch towns attached to the forts of India. It is divided into two parts; that neareft the fort confifts of one very large ftreet, beginning at the efplanade near the walls, and running on till ftopped by an old mud wall, and a gate called the "Kenman's port." In this divifion of the Pittah are moft excellent houfes, where many Dutch gentlemen and merchants refide. Through Kenman's port there is a narrow paffage leading into the other divifion, which confifts of a long ftraggling town, fkirted on one fide by the lake above defcribed. Befides a principal ftreet, there are feveral fmaller ones running parallel to it, in one of which is a large well-conftructed building, called the "Orphan feminary, or fchool," where the Dutch ufed to educate the children of their foldiers and the poorer Europeans, as well as thofe they had by the native women. Here the boys were educated at the public expence, till they were fit for trades; and the females were either fettled in fome comfortable fituation, or married to perfons of their own rank. This laudable inftitution is ftill maintained by the

the Britiſh government. Cloſe by the eſplanade, and adjoining the black town, is the burial ground of the garriſon. The ſhops, bazars, and ſtalls, placed all along the ſtreets, are repleniſhed with various articles of merchandize, peculiarly in uſe among the natives of India; and the town, during the whole day, ſwarms with people of all deſcriptions. The boats or canoes uſed in the fiſheries of Columbo are of a curious ſhape and conſtruction. They are about fifteen feet long, and not more than two in breadth. They move with great ſpeed, eſpecially with the addition of a very large ſquare ſail; and, to prevent their overſetting, a log of wood is extended five or ſix feet from the end of the boat, by way of out-rigger; this log is faſtened to the boat by two long and bent poles, and ſeems to ſerve at once for helm and ballaſt. A paddle, ſomewhat in the form of a ſhovel, is uſed to guide the boat's head. The body of the canoe is a large tree, hollowed out by fire, or ſcooped out by the carpenters. Along its ſides boards are nailed to the height of about two feet, and in the form of a gun-wale, to prevent the water from getting in. When large burdens are to be carried inland by the canals or rivers, two or three of theſe canoes are laſhed together without the out-riggers. Split canoes, bamboes, or betel tree, are then laid acroſs them, ſo as to form a kind of raft; which, though ever ſo much loaded, will draw but very little water. Other flat-bottomed boats of a much greater breadth are alſo uſed by the natives. Theſe are thatched with cocoa-tree leaves, like a houſe, and are large enough to hold couches. Near Columbo may be ſeen two or three hundred of theſe boats in regular rows, moored along the banks of the rivers, with entire families on board, who make them their habitations.

Columbo, for its ſize, is one of the moſt populous places in India; and its population conſiſts of a great variety of nations. Beſides Europeans and Cingleſe, the proper natives of the iſland, you meet, ſcattered over the town, almoſt every race of Aſiatics; Moors of every claſs, Malabars, Travancorians, Malays, Hindoos, Gentoos, Chineſe, Perſians, Arabians, Turks, Maldivians, Javians, and natives of all the Aſiatic iſles; Perſees, or worſhippers of fire, who would rather have their houſes burnt, and themſelves periſh in the flames, than employ any means to extinguiſh it. Here are alſo a number of Africans, Caffrees, Buganeſe, or a mixed race of Africans and Aſiatics; beſides the half-caſts, people of colour, and other races which proceed from a mixture of the original ones. Each of theſe different claſſes of people has its own manners, cuſtoms and language. The language moſt generally ſpoken by both the Europeans and Aſiatics, who reſort to Columbo is the Portuguſe of India, a baſe, corrupt dialect, altogether different from that ſpoken in Portugal.

Columbo, though difficult of acceſs, is ſituated in a rich diſtrict, and furniſhes a great variety of articles to commerce; and, therefore, it is much frequented both by Europeans and the natives of the different coaſts of India. From this diſtrict large quantities of cinnamon and pepper, the ſtaple ſpices of the iſland, are yearly tranſported to Europe in veſſels that touch here on their voyage from Madras and Bengal. A great quantity of arrack is made in the neighbourhood of Columbo and the other diſtricts along the weſt coaſt. A large quantity of Coya-rope, or cordage is alſo manufactured here, for the ſupply of our ſhips on the various ſtations in thoſe ſeas. The inferior articles, exported by the Moors and Malabars, who reſide here for that pupoſe, are betel-leaf and areca-nut, jaggory, or a ſort of coarſe blackiſh ſugar, cocoa-nut, and oil, honey, bees-wax, cardamoms, coral, ivory, fruit, and a variety of other ſmaller articles. In return they import coarſe woollen cloths, and calicoes, pieces of printed or painted cloths for women's apparel, coarſe muſlins, handkerchiefs, palampores, ſtockings, china-ware, tin, copper, and a variety of toys; alſo bomelves, a ſpecies of fiſh peculiar to Bombay, and onions, from the ſame place, where they are remarkably good. Every year, generally towards February, a Portugueſe or Chineſe ſhip arrives from Macao with teas, ſugar, candied ſweetmeats, hams, ſilks, velvets, nankeens, umbrellas, ſtraw-hats, all kinds of china-ware and toys; all which articles find a very ready ſale, and are paid for in hard caſh. The current coin at Columbo, as well as in the other European dominions on the iſland, conſiſted, on the arrival of the Engliſh, of rix-dollars, a nominal coin, like one pound ſterling, valued at a certain quantity of copper money. There were beſides ſeveral ſmall copper coins, called pice or ſtivers, half-pice, and dudies. Four pice or two dudies made a fanam, and ſeven fanams were equal to a rix-dollar. New regulations have been adopted with regard to the coin ſince the iſland has belonged to the Engliſh. There is now current a new coinage of double and ſingle pice and half-pice made by our Eaſt India Company. A pice is about a halfpenny ſterling; four pice are equal to a fanam, and twelve fanams to a rix-dollar, or, as it is uſually called by our people, a copper rupee. This latter coin paſſes for about two ſhillings ſterling; and four of theſe are equivalent to a ſtar pagoda, a Madras gold coin worth eight ſhillings ſterling. the fluctuation in the value of money in Ceylon is very great, and depends upon the plenty and ſcarcity of gold and ſilver there. The expence of coining at Columbo is more conſiderable than on the continent of India. Horſes and ſervants are particularly expenſive, vegetables are extremely ſcarce, and they form a great article of food in thoſe warm climates. Such articles, however, as are the native produce of the iſland, are found in great abundance, and at a moderate price. Beef, fiſh, and fowl, in particular, are both cheap and plentiful. Mutton is exceſſively dear, as no ſheep can be reared in the neighbourhood of Columbo, which ſome attribute to the noxiouſneſs of the climate or paſture of the iſland, but which may be principally owing to their falling an eaſy prey to jackals, ſnakes, and other deſtructive animals, and alſo to certain poiſonous herbs that occur in many places. Pigs and ducks are plentiful and cheap. Geeſe are rare, and turkeys are not to be had, except occaſionally by importation from other parts of India.

The country round Columbo for ſeveral miles is flat and very rich. It is diverſified with fields of rice and paſture, as well as a variety of groves, in which the cocoa-tree is conſpicuous. The ſcene is embelliſhed by a number of ſmall rivers, lakes, and canals. The ſhady roads, which every where interſect the country, afford to the traveller an agreeable ſhelter; while the numerous country ſeats and gardens which ſkirt them preſent his eye with a continual change of gratification. The river Mutwal extends itſelf here into a very broad channel, and by its numerous windings affords a moſt enchanting proſpect from the road, which runs along its banks for many miles. Several temples of the natives are ſituated along the banks of this river and among the adjoining groves. One of the chief beauties in the vicinity of Columbo is the immenſe number of cinnamon trees, which produce the niceties of the iſland. In the woods they grow wild in abundance, and in the gardens they are now regularly cultivated with the greateſt ſucceſs. Percival's Account of the Iſland of Ceylon, 1805.

Columbo, in the *Materia Medica*. This root was firſt brought from the town of Columbo, in the iſland of Ceylon,

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in which country it had long been ufed as a valuable remedy in bilious fevers, and other diforders of the ftomach and bowels. Our practitioners in the Eaft Indies adopted the ufe of this root from them, and it is now defervedly in high reputation in moft parts of Europe. The plant that yields it is not commonly known.

Columbo root comes to us in circular pieces about two inches in diameter, covered with a thick wrinkled bark of a dark brown externally, but a light yellow within. On paring off this bark the root is feen to confift of three diftinct lamina. The whole is ufed indifcriminately in medicine.

Columbo root has an aromatic fmell; the tafte is bitter and naufeous. It gives no effential oil when diftilled with water, and contains fcarcely any volatile aromatic parts. When boiling water is poured on the powdered root a ftrong infufion is produced, which poffeffes all the fenfible qualities and virtues of the plant, but it grows mouldy in a day or two. Spirit of wine alfo extracts the active qualities of this root very readily.

Columbo is employed with nearly equal advantage in fubftance in fpirituous tincture or in watery infufion, and generally with the addition of cinnamon or fome grateful aromatic. This root is of fingular efficacy in ftrengthening the fibres of the ftomach and bowels, either in chronic cafes, or more particularly in cholera morbus, dyfentery, and other violent diforders of the alimentary canal, where, after due evacuations, it may be employed with great fuccefs in checking the inceffant vomiting action of the bowels that bring down the powers of life with fuch rapidity.

An extract and a tincture of Columbo are kept in the fhops, the latter of which is by itfelf a very ufeful ftomachic taken daily in very fmall dofes.

COLUMBUS, Christopher, in *Biography*, a fubject of the republic of Genoa, celebrated in hiftory as the difcoverer of America. Neither the exact time nor place of his birth can be afcertained with any degree of certainty, but it is generally fuppofed that he was born in fome part of the Genoefe dominions about the year 1447. He is faid to have defcended from an honourable family, reduced by various misfortunes to a ftate of indigence. In whatever rank of fociety his parents moved, it is certain that they gave their fon an education adapted to the bent of his genius; at fchool he acquired the elements of the Latin language, and made fome proficiency in geometry and the other fciences which he was enabled in the future part of his life, to apply to the practical parts of navigation. At the age of fourteen he went to fea, and though his firft voyages were confined to the Mediterranean, yet he very foon ventured out on the northern feas, and vifited the coafts of Iceland, to which the Englifh and other nations reforted on account of its fifhery. About the year 1467 he entered into the fervice of a fea captain of his own name and family, and fpent fome years in a predatory warfare againft the Mahometans and Venetians the rivals of his country in trade. In this fituation he continued acquiring both wealth and reputation, till at length in an obftinate engagement with fome Venetian veffels, off the coaft of Portugal, the fhip in which he ferved took fire, and he, with difficulty, preferved his life by throwing himfelf into the fea, and fwimming a diftance of two leagues to the fhore. As foon as he had recovered ftrength for the journey he repaired to Lifbon, where his brother Bartholomew had fettled, and where he found many of his countrymen, who, like himfelf, had embarked in the fea fervice. Here his merit and talents were foon appreciated; and here he married the daughter of Pereftrelle, one of the captains employed by prince Henry in his early navigations, and who, under his protection, had difcovered and planted the iflands of Porto Santo, and Madeira. Columbus got poffeffion of the journals and charts of this experienced navigator, and from them he learned the courfe which the Portuguefe had held in making their difcoveries, as well as the various circumftances which guided and encouraged them in their attempts. While he contemplated the labours of his father-in-law, and read the defcription of the countries which he had feen, his own impatience to vifit them became irrefiftible. To indulge it he made a voyage to Madeira, and for feveral years traded with that ifland, with the Canaries, the Azores, the fettlements in Guinea, and all other places which the Portuguefe had difcovered on the continent of Africa. He now began to think of extending the boundaries of nautical knowledge. He was fatisfied, not only that there muft be lands ftill further to the weft, than thofe already explored, but that a fhorter paffage to the Eaft Indies, then the great object of the Portuguefe navigators, might be found by fteering in that direction, than round the continent of Africa. When he had fettled his plan, he was anxious to fecure the patronage and fupport of fome European power capable of undertaking fo important an enterprife. With this view, he laid his fcheme before the fenate of Genoa, and, making his country, for which he bore a filial and fincere affection, the firft tender of his fervice, offered to fail under the banners of that republic, in queft of new regions, which he expected would render illuftrious his own name, and the nation which fhould enable him to realize his vaft projects. Genoa rejected his offer: and Portugal, to whom he next applied, treated him with fo much duplicity, that he went himfelf to Spain, while at the fame time he fent his brother Bartholomew into England to make the like propofals to both courts. By both, his fchemes were at firft flighted, till, by the interpofition of fome zealous friends at the court of Spain, a change was effected in his favour, and in the fpring of 1472 a treaty was figned with Columbus, by which Ferdinand and Ifabella, the fovereigns of Spain, appointed him their high admiral in all the feas he fhould difcover, and their viceroy in all the iflands and continents. They granted him and his heirs a tenth of all the profits that fhould accrue from the enterprize, with fome other important advantages. As foon as the treaty was figned, Ifabella, by her activity and attention, in forwarding the preparations for the voyage, endeavoured to make fome reparation to Columbus for the time which he had loft in fruitlefs folicitation.

On the third of Auguft 1492, Columbus fet fail with three fmall fhips and ninety men. The expence of which did not amount to more than 4000*l*. He had already, in the moft public manner, implored the guidance and protection of heaven, and on the morning of his departure the fhores were crowded with fpectators, who fent up their fupplications to the Almighty for the profperous iffue of the voyage. Columbus fteered directly for the Canaries, where, on account of the ill condition of the fhips, he was obliged to refit. Having fupplied himfelf with frefh provifions, he failed from Gomera, one of the moft wefterly of the Canary iflands, on the fixth day of September. Here the voyage of difcovery may be faid to begin; for Columbus holding his courfe due weft, left immediately the ufual track of navigation, over a vaft and unknown ocean, with no other guide, than well-founded hopes and rational conjectures. Scarcely had he loft fight of the Canaries, when feveral of his men exhibited figns of confternation bordering on defpair. He comforted them with the vaft wealth which was to be found in thofe regions whither he was conducting them, and in his own perfon he fet fuch an example of patience and induftry

as could not fail of exciting the admiration of thofe about him. Scarcely did he allow himfelf time for neceffary refrefhments: he regulated every thing; he fuperintended the execution of every order, and kept the deck with the founding line or inftrument for obfervation perpetually in his hand, and noting down every unufual appearance with the utmoft accuracy and precifion. Three weeks had they traverfed the ocean, and had proceeded to a diftance which Columbus thought it prudent to conceal, when his men became mutinous, and even threatened to throw their admiral overboard fhould he perfift in an undertaking which they fuppofed muft prove fatal to them all. He fucceeded for the prefent in quieting their apprehenfions, but in a few days they became more violent, declaring that nothing fhould induce them to proceed in fo mad an enterprife; after trying every means of perfuafion in vain, he at length promifed to direct his courfe homewards within three days, fhould not land be difcovered. This propofition did not appear unreafonable to the men, and to the commander it appeared fufficiently fafe, for the prefages of difcovering land by the flight of birds, &c. were now fo numerous and promifing that he deemed them infallible. From a variety of fymptoms Columbus was fo confident of being near land, that on the evening of the 11th of October, after the ufual invocations to heaven for fuccefs, he ordered the fails to be furled, and the fhips to lie to, keeping the ftricteft watch, left they fhould be driven on fhore. During this interval of fufpenfe and expectation, no man fhut his eyes, all kept upon deck, gazing intently towards that quarter where land was expected to be difcovered. At ten o'clock Columbus, ftanding on the forecaftle, obferved a light at a diftance: he pointed it out to another, and he again to a third perfon; all three faw it in motion, and at midnight there was heard from the foremoft veffel the joyful found of *land, land*. Having, however, been frequently deceived by falfe appearances, every man was flow of belief; and waited in all the anguifh of uncertainty and impatience for the return of day. When the morning dawned their doubts were difpelled, and an ifland was feen about two leagues to the north, whofe verdant fields, well ftored with wood, and watered with many rivulets prefented the afpect of a delightful country. Thankfgivings were inftantly offered to heaven: never was gratitude more fincere, never were the expreffions of joy more ardent, than thofe which proceeded from every tongue. Their duty to God was followed by an act of juftice to their commander. They threw themfelves at the feet of Columbus, with feelings of felf-condemnation, mingled with reverence entreating pardon for their paft conduct; and now they regarded as the favourite of heaven the man whom they lately reviled as a vifionary and impoftor. No fooner had the fun tinged with its rays the fhores of the newly difcovered ifland, than their boats were manned and armed. As they approached the coaft with colours, mufic, and martial grandeur, they faw it covered with a multitude of people, whom the novelty of the fpectacle had drawn together, whofe attitudes and geftures expreffed wonder and aftonifhment at the ftrange objects which prefented themfelves to their view. The land proved to be one of the Bahama iflands, named afterwards by Columbus, San Salvador: he was the firft European who fet foot in the New World which he had difcovered, and he took folemn poffeffion of it for the crown of Caftile and Leon, with all the formalities which the Portuguefe were accuftomed to obferve in acts of this kind, in their new difcoveries. The Spaniards, while thus employed, were furrounded by many innocent and unfufpecting natives, who gazed in filent and awful admiration upon actions which they could not comprehend, and of which they could not forefee the direful confequences. Towards the evening Columbus returned to his fhips accompanied with many of the iflanders in their canoes. "Thus," fays Dr. Robertfon, "in the firft interview between the inhabitants of the Old and New Worlds, every thing was conducted amicably, and to their mutual fatisfaction. The former, enlightened and ambitious, formed already vaft ideas with refpect to the advantages which they might derive from the regions that began to open to their view. The latter fimple and undifcerning had no forefight of the calamities and defolation which were approaching their country."

From San Salvador, Columbus proceeded on other difcoveries; he faw feveral iflands, and touched at three of the largeft, on which he beftowed the names of St. Mary of the Conception, Ferdinanda, and Ifabella. He vifited alfo Cuba and Hifpaniola; wherever he went he inquired for gold, and having obtained a certain quantity of the precious metal, and made other arrangements, he took his departure homewards. He encountered a violent tempeft, in which he had nearly loft his fhips. While all on board were overwhelmed with a fenfe of perfonal danger, Columbus was only anxious for the means of preferving a record of his great difcoveries. Retiring to his cabin, he wrote an account of what he had feen and done, which he covered with wax, enclofed in a tight cafk, and committed to the fea with a proper direction, hoping that it might be fortunately landed on fome European fhore. The ftorm, however ceafed, and in a few days he found himfelf approaching the Azores. Here he obtained provifions, and renewed his voyage. When he was almoft within fight of the Spanifh coaft, another ftorm arofe, that forced him to take fhelter in the Tagus, from whence he proceeded to Lifbon; where, in the prefence of the king of Portugal, he narrated every thing that he had done and feen. Columbus remained at Lifbon but five days, and on the fifteenth of March he arrived in the port of Palos, feven months and eleven days from the time when he fet out thence. As foon as his fhip was difcovered, the inhabitants ran eagerly to the fhore, to welcome their relations and fellow-citizens, and to learn the tidings of their voyage. Columbus repaired to the court, then at Barcelona, where he was received with all the refpect and honour due to his great atchievements. Every mark of attention that gratitude or admiration could fuggeft was conferred upon him. All his ftipulated privileges were confirmed, his family was ennobled, and, which was moft fatisfactory to his active mind, another armament was immediately fitted out for him. This confifted of 17 fhips and about 1500 perfons; of whom a large number were men of diftinction, deftined to fettle in the newly difcovered countries.

On the 25th day of September 1493, Columbus failed on his fecond voyage from Cadiz. He firft reached the Caribbee or Leeward iflands, which he vifited, and then proceeded to Hifpaniola, where he had left a fmall garrifon of his own men, but who had been deftroyed, probably from mifconduct on their own parts, by the natives. Inftead of wafting his time in punifhing paft wrongs, Columbus took precautions for preventing any future injury. With this view he built a fmall town, which he named Ifabella, in honour of his royal patronefs. While fome were employed in the neceffary operations of building, he fent others to explore the interior of the country, in the hope of finding gold. The hardfhips to which the Spaniards were obliged to fubmit, rendered them impatient of control, and it was with the utmoft difficuity that Columbus could maintain any fubordination. Signs of mutiny were every where exhibited; and to the commander was imputed the moft unworthy motives, by perfons from whofe

whofe rank in fociety better and more rational conduct might have been expected. Having, however, by prudence and vigour allayed the ferment, he left his brother Diego as governor of the fettlement, and proceeded with a fquadron in queft of new difcoveries. During a tedious voyage of five months, in which he endured every hardfhip, he difcovered only the ifland of Jamaica. But on his return to Hifpaniola, he had the fatisfaction of finding there his brother Bartholomew, whom he had not feen for a long period, and who had brought with him a large fupply of provifions and men. About this period the native Indians perceiving that the yoke impofed upon them by the invaders would prove intolerable, refolved, if poffible, to free themfelves from fo dreadful an evil. Hoftilities were commenced, and much blood was fhed on both fides; but in the event the Indians were completely defeated. The confternation with which the Indians were filled by the noife and havoc made by the firearms, by the impetuous force of the cavalry, and the fierce onfet of twenty large dogs trained for the purpofe, was fo great, that they threw down their weapons, and fled, without attempting farther refiftance. Many were flain, more were taken prifoners, and reduced to a ftate of the moft humiliating fervitude; a rigorous tax was impofed upon them of gold, which was the deareft object of European ambition, and which was now become neceffary to plead the caufe of Columbus in Spain, where numerous accufations had been laid againft his conduct. Willing, however, to meet the charges in perfon, he invefted his brother Bartholomew with full power of government during his abfence, and then fet fail. He arrived in Spain in 1496, and immediately appeared at court, with the modeft but determined confidence of a man, confcious not only of his own integrity, but of having performed many very eminent fervices for the ftate, in whofe employment he had embarked. The dignity of his conduct filenced his enemies; and, with the affiftance of the gold and precious commodities which he had brought with him, he recovered the good opinion of his fovereigns. They refolved to make every exertion to render the new colony a permanent and complete eftablifhment, by fending out fuch reinforcements as Columbus thought neceffary for the purpofe.

It was not, however, till late in the fpring of 1498, that he was enabled to proceed on his third voyage; during which he difcovered Trinidad, at the mouth of the Orinoco. The vaft fize of this river, though only ranking in the third or fourth magnitude of rivers in the New World, convinced him that it muft have its rife in a great continent. He even touched upon various parts of the continent, without fufpecting it, conceiving that they belonged to iflands which he had not leifure to explore. Columbus arrived at Hifpaniola in Auguft, where he found that his brother had removed the colony to St. Domingo, on the oppofite fide of the ifland. During his abfence, a mutiny had been excited, and fome of his people had feceded from the main body. To calm the difcontent, he gave them allotments of land, to which were annexed diftributions of poor natives, that proved to them an intolerable fource of oppreffion. New complaints were fecretly tranfmitted to court againft him and his brothers; and having no opportunity of vindicating his conduct, his powers were at firft greatly abridged by a feparate commiffion of difcovery having been granted to Alphonfo d'Ojeda; who was accompanied in his voyage by Amerigo Vefpucci, after whom the whole New World has fince been named. Columbus was then recalled, and Francis de Bovadilla appointed in his ftead. By his unworthy and infolent fucceffor, Columbus was thrown in chains, and treated with other indignities, which have for ever difgraced the court that granted to him fo much power. The captain of the fhip, to whofe charge Columbus was given, offered, in the moft refpectful manner, to liberate him, but he indignantly refufed to fuffer his irons to be removed, but by the exprefs command of his fovereigns. On his arrival in Spain, he was inftantly fet at liberty, and treated with that civility and kindnefs from the king and queen which he had formerly experienced. Bovadilla was difgraced, but Columbus could not forget the injuries which he had fuftained; he carried with him, wherever he went, the fetters he had worn, and ordered that they fhould be buried in the fame grave with himfelf.

In 1502, he obtained permiffion to make a fourth voyage and on arriving off St. Domingo, he found eighteen fhips richly laden ready to depart for Europe. His own experience led him to perceive an approaching ftorm; he accordingly requefted permiffion to enter the harbour, and at the fame time warned the fleet of the dangers to which it would infallibly be expofed by failing at that juncture. His requeft and his warning were equally difregarded. The hurricane came on, and though, by proper precautions, he faved his own veffels, it fell upon the fleet with fo much violence, that only two or three veffels efcaped; and Bovadilla, with feveral others of his moft inveterate enemies, perifhed with all their ill-gotten wealth. Among the veffels that weathered the ftorm, was that on which the wreck of Columbus's property was embarked. This, which, by fome, was referred to the fuperintendence of providence, was, by others, imputed to certain magical arts exercifed by Columbus himfelf. In purfuing his voyage, he traced the coaft of Darien, in hopes of difcovering a ftrait, which he fondly imagined would open a new tract to the Eaft Indies. Although he was difappointed in his expectations, he was, neverthelefs, fo much delighted with the fertility of the country, and conceived fuch an idea of its wealth, from the fpecimens of gold produced by the natives, that he refolved to leave a fmall colony upon the river Belem, in the province of Veragua, under the command of his brother, and to return to Spain, to procure the means requifite for rendering the eftablifhment permanent. On his voyage, he was driven back by a violent tempeft from the coaft of Cuba, his fhips fell foul of one another, and were fo much fhattered by the fhock, that with the utmoft difficulty they reached Jamaica. Here he endured the greateft calamities, as well from the mutinous difpofitions of his own men, as from the fufpicions of the natives, who refufed to fupply him with provifions, till, by his fkill in aftronomy, he predicted the event of an approaching eclipfe, a circumftance that gave him an irrefiftible authority over their minds. From this time the fuperftitious natives venerated him as a god, and not only furnifhed him profufely with provifions, but cautioufly avoided every thing that could give him offence. Columbus was at length delivered by a fleet fent from Hifpaniola; and, after various difficulties, he arrived at St. Lucar in Spain in December 1504. Here, in addition to his other fufferings, he learned that his patronefs, Ifabella, was dead: from her alone he anticipated the redrefs of his wrongs, which he little expected from the king. To him, however, as the laft refort, he applied, who amufed him with promifes, but, who, inftead of granting his claims, infulted him with the propofal of renouncing them all for a penfion. Difgufted with the ingratitude of a monarch whom he had ferved with fidelity and fuccefs; exhaufted with the calamities which he had endured; and broken with the infirmities which thefe brought upon him, Columbus breathed his laft at Valladolid, on the 20th of May 1506, in the 59th year of his age. In the clofing fcene he exhibited a dignity and compofure

of mind fuitable to the greatnefs of his character, and to thofe fentiments of piety which he had ever cherifhed in all the trials to which his life had been expofed. Ferdinand, who had flighted his well-founded claims when living, beftowed upon him funeral honours, and confirmed to his children their hereditary rights. Columbus was buried in the cathedral at Seville, and on his tomb was engraven an epitaph, in memory of his renowned actions and difcovery of a New World, which in juftice ought to have been denominated Columbia, in order that the name might for ever excite the remembrance of the hero who, in fpite of every obftacle, fucceeded in realizing a project, efteemed by his contemporaries as the chimera of a difturbed imagination. Robertfon's Hift. of America.

Juftinianus, in his curious edition of the Polyglot Pfalter, 1516, of which a beautiful copy is preferved in the Cracherode collection in the Britifh Mufeum, has introduced, by way of commentary on Pf. xix. 4, "their words are gone forth to the ends of the earth," a very curious fketch of the life of Columbus, an account of his difcovery of America, and alfo a defcription of the inhabitants, particularly of the female native Americans.

Columbus, *Congregation of St.*, is the name of a congregation of regular canons, formerly of great extent; having under it an hundred abbeys or monafteries, in the Britifh iflands. See Congregation and Canon.

COLUMELLA, in *Anatomy*. See Uvula.

Columella, in *Botany*, is ufed by Linnæus for the central pillar of a capfule, to which the feeds are ufually attached. Gærtner is content with the term receptacle for this part. See Receptacle.

Columella, Lucius, Junius, Moderatus, in *Biography*, was born at Cadiz, and flourifhed at Rome in the time of the emperor Claudius. He is chiefly celebrated for a work which has come down to our own times, entitled "De Re Ruftica," and which contains, in twelve books, rules concernining the culture of various vegetables, and the management of domeftic animals. A feparate book "De Arboribus," is annexed to thefe. They have gone through many editions, but the beft and moft accurate is that in Gefner's collection of the Rei Rufticæ Scriptores. Moreri.

Columellæ *mufculus teres*, a name given by Morgagni, and fome others, to the mufcle called by Albinus *azygos uvulæ*.

COLUMELLIA, in *Botany*, Willd. 1525. Jacq. Hort. Schoenb. 3. 28. tab. 301. Clafs and order, *fyngenefia fuperflua*. Nat. Ord. *Compofitæ*, Linn. *Corymbiferæ*, Juff. Vent.

Eff. Ch. Receptacle naked, honey-combed. Down with a toothed margin. Common calyx cylindrical, imbricated. Rays of the florets undivided.

Sp. C. *biennis*. *Root* biennial. *Stem* cylindrical, pubefcent, corymbous at the top. *Leaves* an inch and a half long, feffile, linear, obtufe, hairy. *Flowers* both of the difk and ray yellow, feffile, folitary at the divifions of the branches. A native of the Cape of Good Hope.

COLUMN, in *Architecture*, *columna*, Latin, derived from *columen*, a fupport. In a ftrictly architectural fenfe a column may be defined as an object confifting of a nearly cylindrical fhaft with a capital, and either with or without a bafe. The column, as forming the principal part of an order of architecture, will be confidered under the articles Doric, Ionic, Corinthian, Tuscan, and Composite *Orders*, and in the prefent article we fhall treat of columns according to their matter, conftruction, difpofition, and ufe; under the firft head may be placed

Column, *moulded*, is that made by impaftation of gravel and flints of divers colours, which are bound together with a cement, which grows perfectly hard, and receives a polifh like marble

The fecret of making thefe, it appears, the ancients were mafters of, by the columns lately difcovered near Algiers; which are, doubtlefs, the ruins of the ancient Julia Cæfarea; on all thefe is found the very fame infcription in antique characters; the contours, accents, and even faults, being repeated in every fhaft; an inconteftible proof of their being moulded.

Column, *fufible*. Under this term are comprehended, not only columns of various metals, and other fufible matters, as glafs, &c. but alfo thofe of ftone, faid to have been caft; the fecret of which fome will have us believe to have been known to the ancients.

Column, *tranfparent*, any column made of tranfparent matter; as were thofe of cryftal in the theatre of Scaurus, mentioned by Pliny; and thofe of tranfparent alabafter, in the church of St. Mark, at Venice.

Column, *water*, is a fort whofe fhaft is formed of a large *jet d'eau;* which fpouting out water violently from the bafe drives it within the tambour of the capital, which is made hollow; whence, falling down again, it has the effect of a liquid cryftal column. See Fountain.

An inftance of this we have at Quinto d'Aveiro, near Lifbon.

Column, *hydraulic*, is that whofe fhaft appears to be of cryftal; being formed by a number of little threads of water, falling from holes made in a girt of metal, at equal diftances, by means of a pipe mounting through the middle thereof; as in the gardens at Verfailles.

Column, *hydraulic*, alfo denotes a column from whofe top proceeds a *jet d'eau*, to which the capital ferves as a bafon; whence the water defcends by a little pipe, which turns fpirally around the fhaft. Such are the Ionic columns of the cafcade of the Belvidera at Frefcati; and thofe of the vineyard Matthei at Rome.

Columns, *with regard to their Conftruction.*

Column *of bands or tambours*, a column whofe fhaft is formed of feveral courfes of ftone or blocks of marble of lefs height than the diameter of the column, this is what Ulpian means by *columna ftructilis*, or *adpacta*, which is oppofite to the *columna folida*, or *integra*, i. e. of one piece. This method is only practifed in very large columns, for inftance as the Trajan column. Smaller columns are often compofed of three or four pieces, and this method the French diftinguifh by a particular term, *colonne par troncons*, of which we have no proper tranflation.

Column *of Mafonry*, is built of rough ftones or compafs bricks, and covered with ftucco.

Column, *geminated*, that whofe fhaft is formed by three fimilar and equal fides, or ribs of ftone, fitted within one another; and faftened at bottom with iron pins, and at the top with cramp-irons. This is to be fluted, that the joints may be the lefs difcernible.

Column, *encruftated*, is made of feveral ribs, or thin fhells of fine marble, or fome other rare ftone, cemented upon a mould of ftone, brick, or the like. This is done with defign both to fave the precious matter, as oriental jafper, lapis lazuli, agate, &c. or to reprefent pieces of fuch ftones of an extraordinary fize, by the neatnefs and clofenefs of the incruftation, which renders the joints imperceptible.

Column, *banded;* a column whofe fhaft has feveral bands or cinctures either plain or ornamented, which project fomewhat beyond the general line of the fhaft.

Banded columns were firft introduced by De Lorme at the Chapel de Villers-Coherets, and at the Thuilleries, who imagined

imagined this method of concealing the joints of the different blocks of ftone forming the fhafts.

Column, *fluted*, called alfo *channelled*, and *ftriated column*; that whofe fhaft is adorned with flutes or channellings; either from top to bottom, or only two thirds of its height.

Column, *cabled or rudented*, is a fluted column, whofe channels are filled in with aftragals which generally reach one third of the height of the fhaft from the bafe.

Column, *cylindrical*, is that which has neither fwelling nor diminution.

Column, *diminifhed*, is that which has no fwelling, but whofe fhaft is tapered in a ftraight line from the bafe to the capital. This is the method obferved in, we believe, all the Grecian remains of architecture, and in many of the Roman, as in the portico of the Pantheon. The oppofite practice of giving an entaris or fwelling in the middle of the fhaft is obfcurely mentioned by Vitruvius, and has been generally followed by modern architects.

Column, *oval*. There are a few inftances of oval columns in the remains of antiquity. The Maffini Palace at Rome, and the frontifpiece of the church of the P. P. de la Merci at Paris offer fome modern examples.

Column, *paftoral*, that whofe fhaft is formed in imitation of the trunk of a tree, with bark and knots.

This kind of column, in the Tufcan proportion, may be ufed in the gates of parks and gardens; and in the decoration of paftoral fcenes, &c.

Column, *polygonous*; a column of which the horizontal fection forms a polygon. There are various examples of this form in Egyptian architecture, it is alfo obferved in the lower part of the columns of a portico on the ifland of Delos and at the temple of Cora.

Column, *twifted*, a column whofe fhaft is twifted round in the manner of a fcrew with fix circumvolutions. Vignola firft difcovered a method of drawing it by rule. The barbarous and ridiculous practice of twifting columns has been much ufed by modern architects, efpecially in the fcreens and altar-pieces of churches. The moft celebrated inftance is the Baldaquin of St. Peter's. Columns fpirally fluted are feen in the temple of Spolets, they are alfo not unfrequent on the farcophagi's and other ornamental works of the lower ages.

Column, *Corolitic*, that adorned with foliages, or leaves and branches turned fpirally around the fhaft; or in form of crowns and feftoons.

Thefe were ufed by the ancients for erecting ftatues on; which hence took the denomination of *corolitic*. They are very fuitable in triumphal arches, and decorations of theatres.

Column, *hermetic*. See Herma.

Columns, *denominated from their difpofition*.

Column, *inferted*, or *backed*, is that let into a well, a third or fourth part of its diameter.

Column, *niched*, is that whofe fhaft enters, with half its diameter, into a wall, which is hollowed for its reception; with its plane parallel to the projecture of the tore. Such is that in the portal of St. Peter at Rome.

Column, *angular*, is an infulated column, placed in the coin, or corner of a portico; or inferted into the corner of a building: or even a column that flanks an angle, either acute or obtufe, of a figure of many fides.

Columns, *cantoned*, are thofe engaged in the four corners of a fquare pillar, to fupport four fprings of an arch.

Columns, *coupled*, are thofe difpofed, by two and two, fo as almoft to touch each other at their bafes, and capitals, as thofe in the periftile of the Louvre and at St. Paul's cathedral.

Column, *doubled*, is an affemblage of two columns, joined in fuch a manner, as that the two fhafts penetrate each other with a third of their diameter. Such are thofe of the four angles in the court of the Louvre.

Column, *flanked*, according to M. Blondel, is a column engaged with one half, or at leaft one-third of its diameter, between two demi-pilafters.

Columns, *grouped*, are thofe placed on the fame pedeftal, or focle; either by three and three, or by four and four.

Column, *infulated*, is that ftanding free, and detached on all fides, from any other body.

Columns, *median*. Vitruvius gives the name *columnæ medianæ* to the two columns in the middle of the porch, which have their intercolumniation larger than the reft: that if thefe laft, for inftance, be *pycnoftle*, the *medianes* are *euftyle*.

The term may alfo be applied to the middle row of columns, in a frontifpiece adorned with three orders.

Columns, *denominated from their ufe*.

Column, *aftronomical*, is a kind of obfervatory, in form of a very high tower; built hollow, and with a fpiral afcent to an armillary fphere placed at the top, for obferving the motions of the heavenly bodies.

Such is that, of the Doric order, erected at the Hotel de Soiffons, at Paris, by Catherine De Medicis, for the obfervations of Orontius Fineus, a celebrated aftronomer of that time.

Column, *chronological*, that which bears fome hiftorical infcription, digefted according to the order of time; as by luftres, olympiads, fafti, epochas, annals, &c. At Athens there were columns of this kind, whereon were infcribed the whole hiftory of Greece digefted into olympiads.

Column, *funeral*, a column placed over a tomb, and bearing an urn, or fome fymbol or infcription relating to the deceafed. See Cippus.

Column, *gnomonic*, is a cylinder, whereon the hour of the day is reprefented by the fhadow of a ftyle.

Of thefe there are two kinds: in the one, the ftyle is fixed, and the hour-lines are no more than the projection of a vertical dial on a cylindrical furface.

In the other, the ftyle is moveable; and the hour-lines are drawn to the different heights of the fun, in the different feafons of the year. See Dial.

Column, *indicative*, that which ferves to fhew the tides, &c. along the fea-coafts. Of this kind, is the nilometer at Grand Cairo, whereon the overflowings of the Nile are expreffed: by this they form a judgment of the fucceeding feafon: when the water, for inftance, afcends to twenty-three feet, it is a fign of great fertility in Egypt.

Column, *itinerary*, a column with feveral faces, placed in the crofs-ways in large roads; ferving to fhew the different routs, by the infcriptions thereupon.

Column, *lactary*, at Rome, according to Feftus, was a column erected in the herb-market, which is now the place Montanara; which had a cavity in its pedeftal, wherein young children, abandoned by their parents out of poverty or inhumanity, were expofed, to be brought up at the public expence.

Column, *legal*. Among the Lacedæmonians there were columns raifed in public places, whereon were engraven the fundamental laws of the ftate.

Column, *limitrophous*, or boundary, is that which fhews the

the limits of a kingdom, or country conquered. Such was that, which Pliny fays Alexander the Great erected at the extremities of the Indies.

As to thofe of Hercules, ordinarily called his columns, or pillars; they are two very fteep mountains in the ftreights of Gades, now Gibraltar.

Column, *manubiary*, from the Latin *manubiæ, fpoils of the enemy;* a column adorned with trophies, built in imitation of trees, whereon the fpoils of enemies were anciently hung.

Column, *menian*, any column which fupports a balcony, or meniana. The origin of this kind of column, Suetonius and Afcanius refer to one Menias; who, having fold his houfe to Cato and Flaccus, confuls, to be converted into a public edifice, referved to himfelf the right of raifing a column without-fide, to bear a balcony; whence he might fee the fhows.

Column, *miliary*, was a column of marble, raifed by order of Auguftus, in the middle of the Roman Forum; from whence, as a centre, the diftances of the feveral cities, &c. of the empire were reckoned, by other miliary columns difpofed at equal diftances, on all the grand roads. This column was of white marble; the fame with that which is now feen on the balluftrade of the ftaircafe of the capitol at Rome. Its proportion is maffive; being a fhort cylinder, fupporting a fymbol of the globe of the earth.

It was called *milliarium aureum*, as having been gilt, at leaft the ball, by order of Auguftus. It was reftored by the emperors Vefpafian and Adrian; as appears by the infcriptions.

Column, *military*, among the Romans, a column whereon was engraven a lift of the forces in the Roman army, ranged by legions, in their proper order; with defign to preferve the memory of the number of foldiers, and of the order preferved in any military expedition.

The Romans had another kind of military column, which they called *columna bellica*, ftanding before the temple of Janus; at the foot whereof the conful declared war, by throwing a javelin towards the enemies countries.

Column, *phofphorical*, a light houfe; or a hollow column, built on a rock or the tip of a mole, or other eminence, to ferve as a lantern to a port.

Column, *fymbolical*, is a column reprefenting fome particular country, by the attributes proper thereto; as that of the French order, fet with *fleurs de lis*, in the frontifpiece of the Jefuits church at Rouen: or fome memorable action; as the *Corvinian column*, on which was a crow; erected to Valerius Maximus, furnamed Corvinus, in memory of his defeat of a giant in the army of the Gauls, by the affiftance of a crow.

Under the title of *fymbolic columns*, may alfo be comprehended thofe that ferve for fymbols. Such is that on a medal of Nero, which exprefs the ftability of the Roman empire. See Symbol.

Columns, *hiftorical*, *memorial*, *honorary*, *triumphal*. Under this head may be placed various diftinguifhed columns, which rank among the eminent works of art ancient and modern, and form the chief ornaments of the fituation in which they are placed. The moft celebrated of thefe is the triumphal column of Trajan at Rome. This monument was built by Apollodorus the moft famous Roman architect in the Forum Romanum. The height of the column is 106 feet, with a diameter of nearly 13 feet; it is placed on a pedeftal of 19 feet high; upon the capital there is a crowning which formerly fupported a ftatue of the emperor, but, at prefent, a bronze ftatue of St. Peter, about 14 feet in height. The bafe and capital are of the Tufcan order. The column, with the crowning, is compofed of 34 tamboons or blocks of white marble, and the fhaft is adorned, mounting fpirally from top to bottom, reprefenting the victories of Trajan over the Dacæ. Four eagles at the corners of the pedeftal fupport, in their beaks, feftoons of laurel, and the fides of the pedeftal are richly ornamented with a variety of military weapons. The infide of the column contains a ftaircafe, which afcends to the capital, and as each block of ftone forms the whole diameter of the fhaft, the fteps are wrought out of the folid.

The Antonine column, though inferior in defign, and the beauty of fculpture to the laft mentioned, is one of the moft confiderable monuments of ancient Rome. It was erected by Marcus Aurelius, and confecrated by him to Antoninus Pius, whofe ftatue was placed upon the fummit, on the fhaft however are reprefented the action of Marcus in the Marcoman war. The column is $96\frac{1}{2}$ feet in height, with a diameter of $11\frac{1}{2}$, raifed upon a pedeftal of $26\frac{1}{2}$ feet. The conftruction of this column is exactly fimilar to that of Trajan; its bafe and capital have Doric profile.

At Alexandria there is a remarkable column, which is commonly called Pompey's pillar. It is a column of the Corinthian order raifed upon a fhort pedeftal. The fhaft is 67 feet long, and nearly nine feet in diameter, at the bottom of a fingle piece of granite. The whole height of the column and pedeftal is about 94 feet.

At Conftantinople there were two triumphal columns fimilar to thofe of Trajan and Antoninus; the column of Conftantine is entirely deftroyed, and of the other erected to Arcadius by Theodofius, only the pedeftal and the firft courfe of the fhaft remains.

Laftly, may be mentioned the monument of London, which is the largeft column in exiftence, being fifteen feet in diameter, and 202 feet high, including the pedeftal and crowning. This column was erected in memorial of the great fire of London; its architect was Sir C. Wren.

Column, *roftral*, a triumphal column adorned with the beaks or prows of gallies, in memorial of a naval victory. The firft roftral column was erected in the capitol, on occafion of the defeat of the Carthaginians by C. Duillius. Auguftus conftructed four with the prows of the fhips taken from Cleopatra.

Column, *Scenography of*. See Scenography.

Column, in French *Colonne*. Column has been very erroneoufly defined by many writers on military fubjects to be a long deep file of troops or baggage. This definition, confining a column to a file of troops, fo far from giving a true idea of it, conveys one totally erroneous. For a column confifts both of ranks and files. A column may, therefore, be defined to be a corps or body of men with ranks and files in the form either of a fquare or rectangle, who march in time, or with one and the fame movement, leaving a fufficient interval between every two of the faid ranks and files, in order to avoid confufion. A column may be in the form of a fquare, having its front equal to its depth; or it may be of a rectangular form, having either its front equal to one of the fhorteft fides of the rectangle, and its depth equal to one of the longeft, or its front equal to one of the longeft fides of the rectangle, and its depth equal to one of the fhorteft.

In marching troops in columns, particularly towards the enemy, great care fhould be taken, that they advance as nearly as poffible alike, and not one before another, that they may, if attacked, be able to afford mutual aid and affiftance to one another, and that as they approach the field of battle they preferve their diftances with fo much accuracy,

accuracy, that when they wheel and form there may be neither too much nor too little ground for each fquadron and battalion. This is a nice point, and an operation that is feldom executed correctly.

The moft difadvantageous order of march is that which compels an army to move in one column. The more columns it is divided into, and the fmaller their depth, the more eafily and expeditioufly are the troops compofing them formed in order of battle. And the moft advantageous method of marching an army is that which makes it move in order of battle, without dividing it into columns at all. But open, level, and unembarraffed ground of fufficient extent for this purpofe is rarely to be met with.

Column, *Clofe*, a folid compact column, with very little fpace or intervals between the divifions compofing it.

Column, *Open*, a column with intervals between the the divifions equal commonly to their refpective fronts.

Column, among *Printers*, is half a page, when the page is divided into two parts, from top to bottom. See Printing.

COLUMNA, Fabius, in *Biography*, a learned botanift, was born at Naples in 1567. He attached himfelf early to the ftudy of natural hiftory, particularly to acquire a knowledge of the properties of plants, in which he became eminent. He excelled alfo in the knowledge of languages, of mufic, of mathematics, and in drawing, of which he is faid to have made much ufe, the greater part of the engravings in his works being taken from his own defigns. He was led to ftudy the works of Diofcorides, Boerhaave fays, in order to find a remedy for eliptic fits, to which he was fubject. That he was not fuccefsful in his fearch is probable, as he is faid to have received the greateft benefit, having previoufly tried numerous medicines, by the application of a cauftic to one of his thighs. The operation was performed by Severinus in the year 1630. He died in 1651, aged 83 years, and is faid to have totally out-lived his faculties. Haller gives him great credit as a reviver and improver of the ftudy of botany, for the light he threw on many obfcure paffages in Diofcorides, and for the number of plants he defcribed not before known. The figures of the plants he has given, which he generally affifted in executing, are among the earlieft copper-plate engravings in that part of natural hiftory. His firft work, which was publifhed when he was only 24 years of age, "Plantarum aliquot hiftoria, in qua defcribuntur planto rariores, antiquorum delineationibus refpondentes." Neap. anno 1592, 4to. far exceeding what had been before done in that line. The engravings alfo are more accurate than had been before feen. "In phu (the wild valerian) characterem exacte expreffit." Haller fays, it is the plant, the root of which, Diofcorides recommended in his complaint. He took of it for a long time with advantage, he fays, but it did not effect a cure. The works were republifhed in 1744, 4to. by James Plaucus, with obfervations by the Lyncei, a fociety of naturalifts, to which Fabius had belonged. Annexed is a fhort hiftory of his life. "Minus cognitarum rariorumque noftro cælo orientium ftirpium, ecphrafis qua non paucæ ab antiquioribus defcriptæ difquiruntur, et declarantur," Rome, 4to. This was prepared for the prefs in the year 1606. The dedication was written in the year 1610, but it did not appear until the year 1616. He now delineated the flowers, fruits, and feeds of the plants, and began to arrange them from the fimilitudes of thofe parts. A fecond part of this work foon followed. In 1627, his "Adnotationes, et additiones ad opus Francifci Hernandes, et Nardi Antonii Recchi" appeared. In this he makes further advances in the claffification of plants, from the refemblance of the petals. "Stylum et ftamina novit." In his work appear the firft dawning of the fyftem, by which Linnæus, more than a century afterwards, became immortalized. He was a member of the illuftrious academy of the Lincei, eftablifhed at Rome, which rendered great fervices to the republic of letters as long as it fubfifted. Columna invented a mufical inftrument, which he called "Sambuca Lyncia," from the name of his academy; it was compofed of 500 ftrings of different lengths, and the tone of each was divided in four parts, according to the method of Ariftoxinus, to include all the genera, diatonic, chromatic, and enharmonic. He publifhed his invention in a work likewife entitled "Sambuca Lyncia," printed at Naples in 1618. Some later editions were publifhed under the title, "Dell' inftrumento perfetto." We make no reflections on the excellence of this inftrument, having never feen it; but conjecture, that from the belly being loaded with fo great number of ftrings, the tone muft be very feeble; it muft likewife have been difficult to tune for all the three genera, and ftill more difficult to keep in tune. Haller Bib. Botan. Eloy. Dict. Hift.

Columna *nafi*, is ufed by fome writers of anatomy, for the flefhy end of the nofe, jutting out over the upper lip.

Columna *oris*, is fometimes ufed for the uvula.

Columna *regia*, in *Ancient Geography*, a place of Italy, over-againft Sicily, on the bank of the ftrait, and near Regium Julium. It is mentioned in the Itinerary of Antonine.

COLUMNÆ, a name given by Ephorus, cited by Pliny, to a fmall ifland on the route from the Red Sea to the ifland of Cerne. G. Hardouin thought they were the Mafcarenhas ifles.

Columnæ *albæ*, or white columns, called by Herodotus (l. v. c. 118.) λευκαι στηλαι, a place of Afia Minor, to the fouth of the river Marfias, and very near it.

Columnæ *carneæ*, in *Anatomy*, called alfo *lacertuli*, and *columnæ cordis*, are feveral fmall mufcles in the ventricles of the heart; derived, and, as it were, detached from the parieties of thofe ventricles, and connected by tendinous extremities to the valves of the heart.

Thefe little columns, or pillars, being faftened to the parietes of the heart on one fide, and the tricufpid and mitral valves on the other, do, by the contraction in the fyftole of the heart, draw out the valves; and by that means not only fhut the orifices of the veins, but more exactly clofe the ventricles in their fyftole.

Columnæ *herculis*, the columns of Hercules, in *Ancient Geography*, the name given to the ftrait of Gibraltar, called alfo *Fretum Gaditanum* and *Fretum Herculæum*. Thefe columns of Hercules were properly the two mountains of Calpe in Europe, and of Abyla in Africa. Some have fuppofed that Hercules called them by his name; but others confider Hercules as an imaginary hero, whofe name is formed of the Phœnician "Harokel," fignifying a merchant or voyager. Hence, they fay, it is not aftonifhing, that this ftrait fhould be called "the Strait of Voyagers," and that its name fhould be derived from the Phœnician language, fince the Phœnician navigators had made it known, and continually failed through it.

COLUMNAR *Marble*. See Basaltes.

Columnar *ftrata*, a mineralogical term for the prifms into which different ftrata of the earth are fometimes found fplit or divided, generally in a direction perpendicular to the lamina of the ftrata or nearly; thefe moft commonly occur in bafalt or trap, thofe of Stople in Saxony, exceed 300 feet in length, without any articulation or divifion. Dolomieu obferved columnar bafalt in the ftrata of mount Etna.

Etna. At Caſtleton in Derbyſhire, Mr. Mawe obſerved an irregular column in the Toad-ſtone or trap (Mawe's Derb. p. 40 and 51). Porphyry is often found in a columnar form, ſee 2 Berg. Journ. 1790, 325, and Haiding, 48. Sand ſtone in the eaſt and north parts of Bohemia, are often ſplit into columns, reſembling baſalts, 2 Berg. Journ. 1792, 70. Lime-ſtone is ſometimes found rent into polygonal pillars of 4, 5, &c. ſides like baſalts, as at Ruoms and Ridon in the Vivarois, and in Saxony. Charpentier 49. See BASALT, TRAP and PRISMATIC *columnars*.

COLUMNARIS, in *Botany*, a name given by ſome to the tail, milky bell-flower; the *campanula lacteſcens*, Ger. Emac. Ind. 2.

COLUMNARIUM, in *Roman Antiquity*, a heavy tribute, demanded for every pillar of a houſe. It was firſt laid on by Julius Cæſar, in order to put a ſtop to the extravagant expences laid out on ſumptuous buildings.

COLUMNEA, in *Botany*, (ſo named by Plumier in honour of Fabius Columna, or Fabio Colonna, of the noble family of Colonna in Italy,) Linn. Gen. 792. Schreb. 1064. Willd. 1210. Plum. 33. Juſſ. 121. Claſs and order, *didynamia angioſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Scrophulanæ*, Juſſ.

Gen. Ch. *Cal.* One-leafed, deeply five-cleft, generally ſomewhat ſwelling at the baſe, permanent; ſegments erect, equal, lanceolate. *Cor.* monopetalous, much longer than the calyx, labiate; upper lip erect; lower lip two or three-cleft. *Stam.* Filaments four free; anthers joined together. *Piſt.* Germ ſuperior, egg-ſhaped; ſtyle filiform, the length of the upper lip; ſtyle bifid, obtuſe. *Peric.* Capſule globular, one or two-celled. *Seeds* numerous, ſmall, attached to a large receptacle.

Eſſen. Ch. Calyx five-cleft. Corolla labiate; upper lip erect, emarginate; lower lip three-cleft. Anthers connected. Capſule, one or two-celled. *Seeds* bedded in the receptacle.

Sp. 1. C. *Scandens.* Linn. Sp. Pl. Mart. 1. Lam. 1. Willd. 1. Jacq. Hort. vol. iii. tab. 48. Amer. Pict. 88. tab. 170. Plum. Gen. 28. ic. tab. 89. fig. 1. Lam. Ill. tab. 524. fig. 1. "Leaves egg-ſhaped, acute, entire or ſlightly crenated, ſomewhat villous; calyx pubeſcent; ſegments entire; corolla pubeſcent; upper lip undivided." *Root* perennial. *Stem* ſlender, very long, pale green, ſlightly villous, either creeping on the ground, or attaching itſelf to the trunks of trees, by ſmall lateral roots. *Leaves* oppoſite, petioled, reſembling thoſe of Parietaria. *Flowers* blood-red, two inches long, axillary, ſolitary, villous on the outſide, on ſhort peduncles, a little curved. *Capſule* globular, white, ſoftiſh, reſembling a berry, but opening, about the ſize of a nut, one-celled. A native of South America, and the Weſt Indies. There is a ſeminal variety with yellowiſh flowers. 2. C. *longifolia.* Linn. Mant. 90. Mart. 2. Lam. 3. (Achimenes ſeſamoides; Vahl. Symb. 2. 71. Willd. 1190. Babel. Tſiuli. Rheed. Mal. 9. tab. 87. Seſamum javanicum; Burm. Ind. 133.) "Leaves lanceolate, very long, ſomewhat ſerrated, ſmooth." *Stem* about two feet high, herbaceous, quadrangular, ſmooth, branched. *Leaves* three inches long, oppoſite, nearly ſeſſile. *Flowers* red, oppoſite; in ſimple, long, erect, terminal racemes; border of the corolla four-cleft; upper lip large, oblong, entire; lower lip trifid; anthers divided at the baſe into two diverging lobes, connected, and forming a croſs. *Capſule* egg-ſhaped, two-celled, two valved. *Seeds* numerous, fixed in a globular receptacle. A native of the Eaſt Indies. 3. C. *hirſuta.* Mart. 3. Willd. 2. Hort. Kew. 2. 366. Lam. Ill. tab. 524. fig. 2. Swartz. Prod. 94. Flor. Ind. occ. 2. 1080. (Achimenes major; Brown. Jam. 270. tab. 30. fig. 3. Rapunculus puticoſus; Sloan. Jam. 58. Hiſt. 1. tab 100. fig. 1.) "Leaves egg-ſhaped; acuminate, ſerrated, rough, with hairs on the upper ſurface, ſegments of the calyx tooth-ſerrated, hirſute; corolla hirſute; upper lip bifid." *Root* perennial. Whole plant ſucculent. *Stem* thick, throwing its branches to the height of four or five feet when ſupported. *Leaves* oppoſite alternately larger. *Flowers* large, beautifully variegated; ſegments of the calyx almoſt pinnated like thoſe of the roſe. A native of the cooler mountains of Jamaica; introduced in 1780, by the marquis of Rockingham; flowering in November. 4. C. *hiſpida.* Mart. 4. Willd. 4. Swartz. Prod. 94. Flor. Ind. occ. 2. 1083. "Leaves egg-ſhaped, obtuſe, ſlightly toothed, hiſpid hirſute; ſegments of the calyx entire, hairy; ſtem hairy, ſcabrous." A native of Jamaica. 5. C. *rutilans.* Mart. 5. Willd. 3. Swartz. Prod. 94. Flor. Ind. occ. 2. 1083. "Leaves ovate-lanceolate, ſlightly toothed, rather ſcabrous, hirſute and coloured underneath; calyx villous; ſegments laciniated; corollas villous." A native of Jamaica, in ſhady woods, attached to the trunks of trees. 6. C. *ſtellata.* Willd. 6. Lour. Cochin. 384. "Leaves ſtellate; flowers ſolitary; ſtem creeping." *Stem* herbaceous, perennial, cylindrical, ſlender, whitiſh. *Branches* ſomewhat erect, four inches long, very tender. *Leaves* egg-ſhaped, three lines long, ſerrated, ſtellate in threes, pale green, odoriferous, petioled. *Flowers* white, ſtriped with red, axillary, hirſute, peduncled; tube of the corolla ſcarcely gibbous; upper lip arched, trifid; lower bifid; anthers egg-ſhaped, connected, ſeparated with difficulty. *Capſule* awl-ſhaped, two-celled. The whole plant, except the capſule, hairy. A native of Cochin-china. It is an aquatic, of a very pleaſant appearance and ſmell, and being emollient and cooling, is uſed as a waſh by the women, for which purpoſe it is cultivated in pots or tubs filled with water, having earth at the bottom.

COLUMNEA *erecta*; Lam. See CYRILLA *pulchella*.

Propagation and Culture. All the ſpecies require the heat of a ſtove. They are propagated by ſeeds, and ſhould be treated like other tender exotics.

COLUMNELLA, *little column*, denotes the ſubſtance that paſſes through the capſule, and connects the ſeveral partitions and ſeeds.

COLUMNIA POMPEI, in *Ancient Geography*, a place of Thrace, at the entrance of the Thracian Boſphorus, on the coaſt of the Euxine ſea.

COLUMNIATED *winding ſtairs*. See STAIRS.

COLUMNIFERÆ, in *Botany*, the thirty fourth natural order in the "Philoſophia Botanica," of Linnæus, and the thirty-ſeventh of "Prælections." In the "Philoſophia Botanica," it contains the following genera; camellia, xylon, goſſypium, urena, hibiſcus, turnera, malope, lavatera, althæa, alcea, malva, melochia, ſida, napæ, waltheria, mentzelia, hermennia, helicteres, and ſtewartia. In the Prælections all theſe are continued, except mentzelia, which is removed to the calycanthemæ; and xylon, which was ſuppreſſed as a diſtinct genus by Linnæus himſelf, and its ſpecies placed under bombax. The following are added by Linnæus, triumfetta, bixa, corchorus, theobroma, grewia, muntingia, tilia, all of which originally formed part of the now ſuppreſſed order culmineæ; and beſide theſe, malachra? pentapetes, bombax, adanſonia, heliocarpus, antichorus, mahernia, kleinhovia, ayenia, microcos, thea, kiggclaria. Sterculia is placed by Linnæus under both the columniferæ and the tricoccæ. In the "Philoſophia Botanica" it had been placed among the latter, and when it was after-

wards removed to the former, it was moft probably left in its original ftation, merely through inadvertence. The following have fince been added; but Gifcke acknowledges himfelf in doubt whether the arrangement would in all cafes have been approved by Linnæus. Symplocos, Linn., and ternftroemia, Linn., referred to this order by Swartz.; palavia, Cav.; anoda, Cav.; ruizia, Cav; affonia, Cav.; dombeya, Cav.; ochroma, Swart.; paronia, Cav; achania, Sol. Swart.; (malvavifcus, Dill. Cav.) Lagunæa, Cav.; cienfugofia, Cav.; myrodia, Swart. (Quararibea, Aubl. Cav.), aubletia, Schreb. (Apeiba, marcgr. Aubl. Swart.) Marila, Swart.; bubroma, Schreb.; malacodendron, Mitch. Cav. eroteum, Swart.

Linnæus confeffes that the effential character of the order is not to be underftood from the name, which properly belongs only to fome of the more remarkable genera. In all of them the root is fibrous; in none bulbous or tuberous. The ftem in moft is herbaceous, but fome are large trees; it is amongft the latter only, that thorns are to be found, and prickles only in fome hibifci. Scarcely any plant in the whole order is fmooth. All have ftipules in pairs. The leaves are never oppofite, moft commonly petioled; the foliation, as far as Linnæus could recollect, always plaited, and many have glanduliferous pores under the rib. There are no tendrils in any plant of the order. The inflorefcence is various. The calyx in many is fimple and five-cleft; in fome double. The petals in moft are five; but fince the filaments are united, and in moft genera adhere to them, the corolla falls off all together, as if it confifted only of one petal. Their claws, by converging often, conftitute the nectary. The piftils, or at leaft the ftigmas, are equal in number to the parts of the fruit. The fruit is always fuperior, but various in other refpects. None of the fpecies are poifonous or fetid; they are generally more or lefs mucilaginous; and the flowers of moft are beautiful.

COLUMPNATENSIS, in *Ancient Geegraphy*, an epifcopal fee in Africa in Mauritania Cæfarienfis, according to the conference of Carthage.

COLUPPA, in *Botany*, Rheed. See ILLECEBRUM *feffile.*

COLURES, in *Geography* and *Aftronomy*, are two great circles, imagined to interfect each other at right angles in the poles of the world.

The word is derived from κολος, *mutilus*, or *truncatus*, and ουρα, *tail;* q. d. *appearing with the tail cut off*; becaufe never feen entire above the horizon.

The colures pafs one of them through the folftitial, and the other through the equinoctial point of the ecliptic; whence the firft is denominated the *folftitial*, and the fecond *equinoctial colure.*

The equinoctial colure determines the equinoxes; and the folftitial, the folftices.

By thus dividing the ecliptic into four equal parts, they alfo mark the four feafons of the year.

It is difputed over what part of the back of Aries the equinoctial colure paffed in the time of Hipparchus. Sir Ifaac Newton, in his Chronology, takes it to have been over the middle of the conftellation. Father Souciet infifts on its having paffed over the dodecatemorion of Aries, or midway between the rump and firft of the tail. We have fome obfervations in the Philofophical Tranfactions, N° 466, concerning the pofition of this colure in the ancient fphere, from a draught of the conftellation Aries, in the Aratæa publifhed at Leyden and Amfterdam, 1652, which feem to confirm fir Ifaac's opinion; but the antiquity and authority of the original draught may ftill remain in queftion. See CHRONOLOGY.

COLURI, in *Geography*, an ifland in the gulf of Engia, near the coaft of Livadia, about feven miles long and two wide; 10 miles W. of Athens. N. lat. 38°. E. long. 23° 36′.

COLUSITANUS, in *Ancient Geography*, an epifcopal fee in the proconfular Africa, according to the conference of Carthage; fuppofed to be the fame with *Calcitanenfes.*

COLUSSA, a Greek town of Paphlagonia.

COLUTEA, in *Botany*, (Κολουτεα, the name of a plant in Theophraftus). Tourn. Clafs 22. fect. 3. Gen. 2. Linn. Gen. 880. Schreb. 1196. Willd. 1365. Gært. 488. Juff. 359. Vent. 3. 412. Baguenandier; Encyc. Clafs and order, *diadelphia decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminofæ*, Juff. Vent.

Gen. Ch. *Cal.* Perianth one-leafed, bell-fhaped, five-cleft, erect, permanent. *Cor.* Papilionaceous. Standard, wings and keel differing in different fpecies with refpect to number and proportion. *Stam.* Filaments nine united; one feparate; anthers fimple. *Pift.* Germ fuperior, oblong, compreffed peduncled; ftyle afcending; ftigma bearded on the lower fide. *Peric.* Legume very large, membranous, tranfparent, generally inflated, appearing almoft empty, perfectly one-celled. *Seeds* fmall, kidney-fhaped, attached to the two edges of the upper future.

Eff. Ch. Calyx five-cleft. Stigma bearded on one fide. Legume peduncled, membranous, inflated or compreffed, one-celled.

Obf. This fpecies is nearly allied to aftragalus and phaca. The total want of a partition in the legume is its only certain generic diftinction. The aftragali are completely two-celled. The phacæ have a partial partition, which extends the whole length, but only half the breadth of the legume, making it femi-bilocular.

Sp. 1. C. *arborefcens.* Common bladder-fenna. Linn. Sp. Pl. 1. Mart. 1. Lam. 1. Willd. 1. Gært. tab. 154. fig. 4. Lam. Ill. 624. fig. 2. Bot. mag. tab. 81. (C. veficaria; Bauh. Pin. 396. Tourn. 649. C. hirfuta; Roth. Germ. I. 305. II. 168.) "Leaflets inverfely heart-fhaped." Linn. "Leaflets oval-obcordate; ftandard gibbous, abbreviated." Hort. Kew. A fhrub. *Stems* feveral, woody, twelve or fourteen feet high; branches numerous, woody. *Leaves* alternate, winged, terminated by an odd one; leaflets nine or eleven, green and fmooth above, glaucous underneath. *Flowers* yellow, with a reddifh curved line at the bafe of the ftandard, in a fhort raceme, confifting of three or four flowers; wings only a little fhorter than the keel. *Legume* clofed at the tip. *Seeds* twenty or more. A native of the warmer parts of Europe; obferved by Mr. Ray, in the afcent to the crater of mount Vefuvius, where there are fcarcely any other plants. It flowers with us in the early part of June, and fometimes again in the month of Auguft, continuing till October. Both leaves and legumes are purgative, and may be fubftituted for the officinal fenna, (caffia fenna,) but muft be taken in larger dofes. They have an acrid, naufeous tafte. The feeds, in the quantity of a dram or two excite vomiting: but notwithftanding thefe qualities, the plant is faid by Haller and Ray to afford a food grateful to cattle. 2. C. *cruenta.* Oriental bladder fenna. Mart. 2. Willd. 2. L'Heretier Stirp. nov. 2. tab. 41. Hort Kew. 3. 55. Lam. Ill. tab. 624. fig. 3. (C. orientalis, flore, fanguinei coloris, luteâ maculâ notato. Tourn. Cor. 44. C. fanguinea. Pal. roff. 1. 88. C. orientalis. Lam. 2. C. humilis. Scop. infubr. 2. 23. tab. 12) "Shrubby; leaflets wedgfhaped, inverfely heart-fhaped; ftandard gibbous, obtufe, very fmall." *Stem* woody; branches feven or eight feet high. *Leaves* pinnated; leaflets eleven or thirteen, fmall, fmooth, glaucous, more flefhy than thofe of the preceding fpecies.

Flowers

Flowers deep red, with two yellow fpots on the ftandard, fmall; wings confiderably fhorter than the keel; keel erect, appearing cut off at the end. *Legume* opening beneath the tip into a wide hole. Difcovered by Tournefort in the Levant; cultivated by Miller in 1752. 3. C. *pocockii.* Pocock's bladder-fenna. Mart. 3. Willd. 3. Hort. Kew. 3. 55. (C. procumbens; L'Heretier Stirp. nov. 2. tab. 42. C. halepica; Lam. 3.) "Shrubby; leaflets roundifh-elliptical, very obtufe, mucronate; ftandard gibbous, elongated, afcending." A lower fhrub than the preceding. *Branches* flender, fpreading. *Leaflets* thirteen or fifteen, very fmall, entire, of a cinereous-green colour underneath. *Flowers* bright yellow, larger than thofe of C. arborefcens, opening a month earlier, and continuing in fucceffion till late in the autumn; peduncles fhorter than the leaves, axillary, folitary, one or two-flowered. The feeds were firft brought to England from Turkey, by Dr. Pococke, and are faid by Dr. Ruffell to be very common about Aleppo. 4. C. *frutefcens.* Scarlet bladder-fenna. Linn. Sp. Pl. 2. Mart. 4. Lam. 4. Willd. 4. Bot. Mag. tab. 181. "Leaflets oblong, retufe, hoary underneath; branches filky-tomentous." A fhrub, from two to four feet high; branches erect. *Leaflets* from twenty-one to twenty-five, green and fmooth on their upper furface. *Flowers* bright fcarlet large; peduncles axillary, from three to five-flowered; keel confiderably longer than the ftandard; wings very fmall. *Legumes* very large. A native of the Cape of Good Hope, and other parts of Africa. 5. C. *americana.* Mart. 8. Houft. MSS. "Shrubby; leaflets egg-fhaped, emarginate; legumes oblong, compreffed, acuminate." *Stem* twelve or fourteen feet high, much branched; leaflets feven, light green. *Flowers* bright yellow, two or three upon each peduncle. *Legumes* near four inches long, compreffed, winged, ending in long points. Sent to Miller in 1730, by Dr. Houfton, from Vera Cruz in New Spain. 6. C. *galegifolia.* Bot. Mag. tab. 792. "Shrubby; leaflets oval, emarginate, in about nine pairs, with a terminal one; legumes on longifh pedicels." *Stem* low, zig-zag; branches herbaceous, angular. *Stipules* two, egg-fhaped, fmall, embracing the common petiole, but diftinct from it. *Flowers* dull red, inclining to orange, in a many-flowered raceme; common peduncles longer than the leaves, axillary; pedicels alternate, fhort, curved; bracte under each flower, fingle, fmall, egg-fhaped; calyx-teeth wide at the bafe, with white villous margins; ftandard roundifh, fomewhat reflexed, marked at the bafe with a greenifh yellow fpot; wings fmaller than the keel; keel one-petalled, when folded nearly orbicular; ftyle hairy on the upper furface of its whole length. *Legume* inflated, membranous, veined, oblong, oval, beaked, on a pedicel four times longer than the calyx. *Seeds* many, fhining, kidney-fhaped. A native of New South Wales. 7. C. *procumbens.* Mart. 9. "Stems trailing; leaflets oblong, egg-fhaped, tomentous; flowers axillary, on very long peduncles." *Stems* feveral, woody, flender, much branched; branches not much more than a foot long; leaflets twenty-five or twenty-feven, fmall, narrow. *Flowers* purple, fmall; peduncles with three or four flowers. *Legumes* little more than half an inch long, but like a fickle, compreffed. *Seeds* kidney-fhaped. A native of the Cape of Good Hope. Cultivated by Miller in 1753. 8. C. *rigida.* Willd. 5. Thunb. prod. 134. "Shrubby; leaflets lanceolate, fmooth; ftem erect, fmooth. A native of the Cape of Good Hope. 9. C. *obtufata.* Willd. 6. Thunb. prod. 134. "Shrubby; leaflets linear; ftem erect; flowers in racemes, reflexed." A native of the Cape of Good Hope. 10. C. *linearis.* Willd. 7. Thunb. prod. 135. "Herbaceous; leaflets linear, acute; ftem erect; racemes terminal, incurved." A native of the Cape of Good Hope.

11. C. *herbacea.* Linn. Sp. Pl. 3. Mart. 6 Lam. 5. Willd. 8. Gært. tab. 154. fig. 2. "Leaflets linear, emarginate, fmooth; ftem herbaceous; racemes axillary." *Roots* annual or triennial. *Stem* near a foot and half high, clothed with very fhort hairs, branched. *Leaflets* fifteen or feventeen, greenifh. *Flowers* dark blood-red, fmall; ftandard ftriated, the length of the wings and keel. *Legumes* fmall, membranous, fomewhat tranfparent, very thin, compreffed, egg fhaped, obliquely mucronate, two valved, peduncled. *Seeds* two or four, rather large, kidney-fhaped, compreffed, of a dull chefnut colour. A native of the Cape of Good Hope; cultivated by Miller in 1731. 12. C. *perennans.* Mart. 5. Willd 9. Hort. Kew. 3. 56 Jacq. Hort. 3. tab. 3. (C. fiftulofa; Retz. Obf. 3. 40. Mart. 7.) "Herbaceous; leaflets oblong, pubefcent; ftem erect; racemes terminal." *Root* perennial. Whole plant flightly pubefcent. *Stem* cylindrical, ftriated, pale green, annual, fimple, or with almoft barren branchlets. *Leaves* alternate, near together, fpreading; leaflets from thirteen to feventeen, entire, obtufe, on very fhort petioles. *Flowers* flefh-coloured, fmall, without fcent; ftandard wide, roundifh, emarginate, marked with deep purple ftreaks; wings fhorter than the keel, oblong, obtufe; keel dark purple, afcending at the end, almoft as long as the ftandard; ftyle fmooth; ftigma obtufe, with white villous hairs, but bearded only at the tip. *Legume* ovate-roundifh, acuminate at both ends, compreffed, flat, little inflated, fmooth, membranous, fomewhat pellucid, not opening of itfelf. *Seeds* few, compreffed black. A native of the Cape of Good Hope; introduced by Dr. Jacquin in 1776. 13. C. *proftrata.* Willd. 10. Thunb. prod. 134. "Leaflets lanceolate, villous; ftem herbaceous, diffufe; peduncles axillary, with about two flowers." A native of the Cape of Good Hope. We fhould have fuppofed this to be C. procumbens taken up by profeffor Martyn from Miller, if Miller had not exprefsly afferted that his plant has woody ftems. 14. C. *excifa.* Willd. 11. Thunb. prod. 134. "Leaflets egg fhaped, cut; ftem herbaceous, decumbent; racemes terminal." A native of the Cape of Good Hope. 15. C. *veficaria.* Willd. 12. Thunb. prod. 134. "Leaflets egg-fhaped; ftem herbaceous, decumbent villous; legumes orbicular, inflated." A native of the Cape of Good Hope. 16. C. *tomentofa.* Willd. 13. Thunb. prod. 135. "Leaflets egg-fhaped, hoary; ftem herbaceous, tomentous; flowers in racemes. A native of the Cape of Good Hope. 17. C. *alpina.* Lam. 6. (Phaca alpina; Linn. P. leguminibus pendulis femiovatis; Gmel. Sib. 4. 35. tab. 14. Aftragulus; Hall. Helv. n. 401. Aftragaloides elatior, erecta, viciæ foliis, filiquis pendulis. Amon. Ruth. 148.) "Herbaceous, much branched; leaflets oblong, elliptical, hairy underneath; flowers pale yellow." *Root* perennial. *Stems* near a foot and half long, weak, fometimes quite upright, fometimes half decumbent and diffufe. *Leaflets* nineteen or twenty-one, green and fmooth above, diminifhing in fize towards the top. *Flowers* yellowifh, in peduncled fpikes, fituated in the axils of the upper leaves; calyx oefet with a few fhort blackifh hairs. *Legumes* veficular, perfectly one-celled, pedicelled in their calyx, demi-oval, or a little crefcent-fhaped, acute, pendulous on the common peduncle. *Seeds* from four to fix, fmall, kidney-fhaped. A native of the mountains of Dauphiné, Switzerland, Lapland, and Siberia. 18. C. *auftralis.* Lam. 7. (Phaca auftralis, Linn.; aftragalus. Hall. Helv. p. 403. Aftragaloides alpina fupina glabra, Till. Hort. Pin. 19. tab. 14. fig. 1.) "Herbaceous, diffufe; leaflets lanceolate, nearly fmooth; peduncles longer than the leaf." *Root* perennial. *Stems* from five to feven inches long, flender, weak, commonly procumbent, almoft fmooth, branched. *Leaflets* thirteen or fifteen, acute.

acute. *Stipules* two, embracing the ftem, oval-obtufe. *Flowers* yellowifh white, with a tint of violet at the extremity of the keel, feffile, in axillary fpikes. *Legumes* veficular, demi-oval, pedicelled in their calyx, terminated by a fhort bent thread, perfectly one-celled, fmooth, not pendulous. *Seeds* five or fix, fmall. A native of the mountains of Provence, Italy, and Switzerland. After fome hefitation, we have placed the laft two fpecies under this genus, in concurrence with La Marck, although that botanift has not, in this particular, been hitherto followed by any other author. Gærtner has even figured the legume of this fpecies alone, to illuftrate the genus phaca. As far, however, as the partition is concerned, he compleatly gives up the point, acknowledging the legume to be abfolutely one-celled, without a veftige of a partition. He has accordingly introduced *aut rarius unicolare*, into his generic character, and has founded the effential diftinction between colutea and phaca on the form of the flowers. To us the entire want of a partition appears decifive. Jacquin, indeed, has attributed to his alpina a half two-celled legume; but he feems to refer to a different plant. There is much confufion in authors with refpect to the fynonyms of phaca-alpina; and that with the kindred fpecies, ftands in need of further inveftigation.

Colutea *argentea cretica;* Tourn. See Coronilla *argentea.*

Colutea *caule geniftæ fungofo;* Bauh. Hift. See Coronilla *juncea.*

Colutea *enneaphyllos filiquofa ind. orient.;* Pluk. Alm. See Indigofera *enneaphylla.*

Colutea *exotica anguftifolia;* Pluk. Alm. See Coronilla *aculeata.*

Colutea *indica humilis, ex qua indigo;* Burm. Zeyl. See Indigofera *tinctoria.*

Colutea *minima difpermos;* Pluk. Phyt. See Indigofera *enneaphylla.*

Colutea *filiquofa glabra ternis quinifve maderafpatana;* Pluk. Alm. See Indigofera *glabra.*

Colutea *filiquofa five fcorpioides major et minor;* Bauh. Pin. See Coronilla *emerus.*

Colutea *fcorpioides;* Cam. Epit. See Coronilla *emerus.*

Colutea *fcorpioides maritima glauca folio;* Bauh. Pin. See Coronilla *glauca.*

Colutea *fcorpioides minor coronata;* Bauh. Pin. See Coronilla *coronata.*

Colutea *fcorpioides odorata;* Alp. Exot. See Coronilla *argentea.*

Colutea *fecunda;* Cluf. See Coronilla *coronata.*

Colutea *zeylanica argentea tota;* Herm. Lugdb. Rai. Hift. See Sophora *tomentofa.*

COLUTHUS, in *Biography*, a Greek poet, a native of Lycopolis, lived under the emperor Anaftafius in the beginning of the fixth century. His only work that has come down to us is upon the "Rape of Helen," which, though of inferior merit, has been frequently edited, and was tranflated into French by M. du Molard in 1742. Moreri.

COLVIUS, Andrew, was born at Dort in Holland, in the year 1594, where he officiated during a confiderable part of his life as paftor of the Walloon church. In 1620, he was chaplain to the embaffy at Venice, and cultivated an intimate friendfhip with the celebrated father Paul, whofe treatife on the inquifition he tranflated from the Italian into the Latin language. Colvius was intimately acquainted with many literary characters of his own age, and was himfelf a philofopher and poet of eminence, but he is chiefly known as a collector of rarities of every defcription, of which, in the year 1655, he publifhed a catalogue intitled "Catalogus Mufcei And. Colvii." He died at Dort in 1671. Moreri.

COLYBA, or Colybus, a term in the *Greek Liturgy*, fignifying an offering of corn and boiled pulfe, made in honour of the faints, and for the fake of the dead.

Balfamon, P. Goar, Leo Allatius, and others, have written on the fubject of *colybæ:* the fubftance of what they have faid, is as follows:

The Greeks boil a quantity of wheat, and lay it in little heaps on a plate; adding beaten peas, nuts cut fmall, and grape-ftones, which they divide into feveral compartments, feparated from each other by leaves of parfley. A little heap of wheat, thus feafoned, they call κολυβα.

They have a particular formula for the benediction of the colybæ: wherein, praying that the children of Babylon may be fed with pulfe, and that they may be in better condition than other people, they defire God to blefs thofe fruits, and thofe who eat them, becaufe offered to his glory, to the honour of fuch a faint, and in memory of the faithful deceafed. Balfamon refers the inftitution of this ceremony to St. Athanafius; but the Greek Synaxary to the time of Julian the Apoftate.

Many of the Latin divines having fpoken injurioufly of this ceremony, Gabriel archbifhop of Philadelphia, has written a difcourfe in its vindication: wherein he endeavours to fhew that the defign of the colyba is only to reprefent the refurrection of the dead, and to confirm the faithful in the belief thereof. The colybæ, he fays, are fymbols of a general refurrection; and the feveral ingredients added to the wheat, fignify fo many different virtues.

COLYBRASSENSIS, in *Ancient Geography*, an epifcopal fee of Africa, in Pamphylia, according to the acts of the council of Conftantinople, held in the year 381.

COLYMBIS, in *Ornithology*. Bellonius defcribes the tufted duck *anas fuligula* of modern writers under the name of *colymbis*.

COLYMBUS, a genus of the *anferes*, having the bill toothlefs, fubulate, ftraight, and pointed; throat denticulated; noftrils linear, and fituated at the bafe of the bill; legs fettered.

Linnæus includes in the *colymbus* genus three families of birds; the guillemot, the divers, and the grebes, each of which, in the opinion of moft ornithologifts, ought to be confidered generically diftinct. The guillemots live chiefly clofe to the fea, and inhabit rocks; they have a flender tongue the fize of the bill, and the bill itfelf of a compreffed form, with the upper mandible a little bent, and the bafe covered with fhort feathers; they are principally diftinguifhed by having the feet three-toed. The divers have a ftrong bill, lefs pointed, cylindrical, the edges of the mandible turned in, the upper one longeft; noftrils divided in the middle by a membrane tongue long, fharp, ferrated at the bafe each fide; legs flender; tail-feathers twenty in number; the chief character of thefe confift in the feet being furnifhed with four-toes, and palmate; they frequent frefh waters. The grebes are without a tail, have a ftrong bill; lores naked; tongue a little cleft at the tip; body depreffed, and thickly covered with foft fhining plumage; wings fhort, and the legs compreffed; the principal characteriftic of this family are the lobate feet; confifting of four toes each. Thofe laft mentioned birds frequent meres, and other inland watery places.

* *Feet three-toed,* Guillemot.

Marmoratus. Above ftreaked with chefnut and brown; beneath

beneath waved with dusky and white; legs tawny; bill, tail, wings, and claws black. *Colymbus marmoratus,* Gmel. *Marbled guillemot,* Lath. Syn. *Uria marmorata,* Lath. Ind. Orn.

Inhabits the western parts of America and Kamtscatka. This bird is ten inches in length; the crown is dusky; some of the greater quill-feathers edged with white; chin dusky, with white stripes.

Lacteolus. Snowy; bill and legs brownish flesh-colour. *Colymbus lacteolus,* Gmel. *Cepphus lacteolus,* Pallas Spic. *White guillemot,* Lath. Gen. Syn. *Uria lacteola,* Lath. Ind. Orn.

Lives on the sea-coasts, and chiefly inhabits the Netherlands. A variety of this bird is described by writers (Sander Naturf. &c.) that has a black spot on each side behind the eyes; interscapulars and area of the wings black; upper mandible black, the lower yellowish.

Grylle. Body deep black; wing-coverts white. *Colymbus grylle,* Linn. Gmel. *Colymbus groenlandicus,* Klein. *Uria minor nigra,* Briss. &c. *Greenland dove, sea turtle,* Albin. *Black guillemot,* Lat. Donov. Brit. Birds, &c.

A general inhabitant of Europe and America, frequenting the sea-coast, and preying on fish; it builds its nest on the ground, the eggs are whitish, and spotted with black. This species is liable to some variation in the disposition of its spots, and appearance of plumage. One variety found at Aoonalashka is of a footy black colour, with a double white band. Another is streaked above; beneath white, banded with cinereous; upper wing-coverts varied with white and black; this is the *uria balthica* of Brunnich, and inhabits Greenland. A second variety mentioned by the same author has the back, wings, and tail black; head, neck, and body beneath, with the spot on the wings white. Dr. Latham describes a variety from Kamtschatka of a black colour, with the crown clouded; the greater wing-coverts, and under side of the body, varied with white and black; throat entirely white; and lastly, the *uria grylloides* of Brunnich is considered by some as a variety of this species; the upper part of the plumage of this bird is spotted white and black, the colour beneath white.

Troile. Body black; breast and abdomen snowy; secondary wing-feathers white at the tip. *Colymbus troile,* Linn. *Lomwia hoieri,* Ray. *Le guillemot,* Buff. *Lumme,* Marten Spits. *Foolish guillemot,* Penn. Donov. Brit. Birds, &c.

This bird inhabits Europe and America, and is found in maritime situations, as its principal food consists of sea-fish; its usual resorts are the steepest and most inaccessible cliffs on the sea-coast, and in such places is seen in vast numbers on our own coasts during the summer, in which season they breed. The places most celebrated as the resort of those birds are the isle of Priestholm, in Beaumaris bay, between Caernarvonshire and the island of Anglesea; on a rock called Godreve, not far from St. Ives, Cornwall; the Farn island, near the coast of Northumberland; and the cliffs about Scarborough, Yorkshire. They are silly birds, and so stupid, that having once attained access to their haunts, they may be knocked down in any numbers with a stick, for though they see their companions killed before them, they never attempt to quit the rocks. In many parts they are killed by the inhabitants both for the sake of their flesh and skin; the former is, however, not remarkable for its delicacy, and has a strong fishy taste. The natives of Greenland and Kamtschatka make garments of their skins. Like the auk, this bird lays but a single egg; the eggs are in more esteem for the table than the flesh. The length of this bird is seventeen inches. There are several varieties of this species.

We have followed the example of Linnæus and Gmelin in considering the four above-mentioned birds as appertaining to the *colymbus* genus, but it should be at the same time observed, that Brunnich constitutes a distinct genus of them under the title of *uria,* and that this genus is adopted by Dr. Latham, in his "Index Ornithologicus," though he adheres to the Linnæan method in his "General Synopsis."

** *Feet four-toed, palmated,* Diver.

Glacialis. Head and neck violaceous black; a white interrupted band on the chin and upper part of the neck. *Colymbus glacialis,* Linn. *Colymbus torquatus,* Brun. *Mergus nævius,* Briss. *Colymbus maximus caudatus,* Ray. *L'Imbrina,* Buff. *Greatest speckled diver* or *loon,* Albin. *Northern diver,* Penn. Donov. Brit. Birds.

This is a large bird, measuring about three feet in length; the upper part of the body with the bill, legs, and tail are black; the back and upper part of the wings is marked with a number of white spots disposed in rows. Inhabits the Northern seas, and is rare in England. The specimen in the London Museum.

In Iceland and Greenland, where those birds breed, they are very frequent. It is also abundant on the shores of Norway, and along the Arctic coasts as far as the river Obey, in the dominions of Russia. It is seldom seen on land, except in the breeding season, being, for the most part, in the open sea, where it is continually diving for fish, which it does with the greatest address. Among the northern maritime nations, the skins of those birds are prepared by the natives, and manufactured with the feathers on them into caps and other articles of dress. Garments, we are told, made of these skins are warm, and never imbibe the least moisture, and are also more durable in wear than might be imagined. The bird is likewise met with among the lakes of Hudson's bay, where the natives adorn their heads with circlets of their feathers.

Immer. Body above blackish, undulated with white; beneath entirely white. *Colymbus immer,* Linn. *Mergus major,* Briss. *Le grand plongeon,* Buff. *Ember goose,* Sibbald. *Imber diver,* Penn. Donov. Brit. Birds.

The length of this bird is two feet; the feathers of the back, wings, and tail are edged with white; in the male bird the front and sides of the head and neck are spotted with brown. This species inhabits the Arctic ocean; it ranks as a British species, but is rarely taken in our country.

Stellatus. Cinereous-brown or dusky, spotted with white; throat pale ash, beneath white. *Colymbus stellatus,* Brun. Gmel. *Mergus minor,* Briss. *Colymbus caudatus stellatus,* Will. *Le petit plongeon,* Buff. *Speckled diver,* or *loon,* Lath.

Observed in plenty about the shores of the Baltic, and white sea, and in America. They occasionally migrate in flocks, pursuing the same course as the shoals of herrings and sprats, the latter in particular, and it is for this reason known in many parts by the name of *sprat loon.* These birds are more common in the temperate, or southern parts of Europe, than any other of the diver tribe. The length is twenty-seven inches, the bill horn colour; legs brown. It builds no nest, but lays its eggs, which are two in number, in the grass on the borders of lakes contiguous to the sea-coast; those eggs are dusky, spotted with black.

Arcticus,

Arcticus. Head hoary; neck beneath violaceous, black, with an interrupted white band. *Colymbus arcticus*, Linn. *Mergus gutture nigro*, Briff. *Black-throated diver*, Lath.

Length two feet; inhabits the north of Europe, Afia, and America.

Septentrionalis. Body above blackifh, beneath white; neck beneath with a fhield-like fpot. *Colymbus feptentrionalis*, Linn. *Mergus gutture rubro*, Briff. *Le plongeon à gorge rouge*, Buff. *Red throated diver*, Lath. Donov. Brit. Birds, &c.

Inhabits Europe, Afia, and America, frequenting lakes, and oftentimes the open fea in queft of prey, which confifts of fifh, marine infects, and crabs. The body is brown above, with minute white fpots, beneath white; bill black, head and chin cinereous, fpotted with brown; neck above with fmall white and brown lines; the legs dufky. Length about thirty inches. Thefe birds lay their eggs in June, the young are hatched and ready to fly before the end of Auguft, and undertake their annual migrations with the parent birds in September. They breed chiefly in America.

Borealis. Body above blackifh, with numerous white ftellated fpots; beneath white; neck on the fore-part rufous. *Colymbus borealis*, Brun.

This bird was fhot near Copenhagen; it refembles in fize and appearance *colymbus ftellatus*, and is, perhaps, a variety of that bird. Brunnich confiders it as a diftinct fpecies.

Striatus. Blackifh, beneath white; head and neck grey, lineated with black. *Colymbus ftriatus*, Gmel. *Striped diver*, Lath.

Inhabits North America, where it frequents lakes; it is reprefented as a noify clamorous bird, and one continually in motion or on the wing, flying backwards and forwards. The bill of this fpecies is dufky, or black, and ftrong; the cheeks white.

Sinensis. Greenifh-brown, with deeper fpots; breaft and belly reddifh-white, fpotted with rufous; wings and tail blackifh. *Colymbus finenfis*, Gmel. *Chinefe diver*, Lath.

This fpecies inhabits China, and is fuppofed to be one of thofe kinds of aquatic birds which are trained up, and employed by the Chinefe for catching fifh. The bill is dufky; and the irides and legs cinereous.

*** *Feet four-toed, and lobed.* Grebe.

Cristatus. Fufcous, beneath white; head rufous; collar black; fecondary quill-feathers white. *Colymbus criftatus*, Linn. *Colymbus cornutus*, Briff. *Le grebe cornu*, Buff. *Crefted grebe*, Lath.

Length of this fpecies twenty-three inches; bill flefh-colour, with the tip brown, beneath white; head tumid, varies in colour by age, and has been defcribed in the firft, fecond, and third years' plumage, as three diftinct fpecies.

Like the reft of the grebe tribe, thefe birds form a floating neft, compofed of grafs and flags, interwoven with the roots and ftalks of other aquatic plants. The female lays four eggs, which are of a white colour, and fits in the neft half immerfed in water till the eggs are hatched. It preys on eels and fifh, which it procures with great facility, by diving into the water. The flefh is rank, but the fkins, which are prepared with the beautiful filken and filvery white plumage on them are in high requeft for muffs and tippets. Many of the grebes are taken on the lakes of Geneva for that purpofe. In England, thofe birds frequent the meres of Shropfhire and Chefhire, and the great fens of Lincolnfhire, in all which places they are known to breed. The tippet grebe is faid to be the young of this fpecies.

Cayanus. Blackifh brown, beneath white; under fide of the neck rufous. *Colymbus cayennenfis*, Gmel. *Le grande grebe*, Buff. *Grebe de Cayenne*, Pl. Enl. *Cayenne grebe*, Lath.

A native of Cayenne. This bird is nineteen inches and a half in length; the bill and legs are dufky; and the lower mandible yellow at the bafe.

Auritus. Blackifh-fufcous, beneath white; neck beneath rufous. *Colymbus auritus*, Linn. *Le petit grebe*, Buff. *Dufky grebe*, Penn. Donov. Brit. Birds.

Inhabits fenny places in Europe and America. Length eleven inches. The bill is black, and red at the fides; irides and lores purple; upper edge of the wings white; legs flefh-colour, inclining to purple.

Cornutus. Head gloffy-green, and tumid; neck beneath, and breaft fulvous; through the eyes a yellow tufted band. *Colybus cornutus*, Gmel. *Horned grebe*, Arct. Zool.

An inhabitant of Hudfon's bay; length twelve inches. Dr. Latham defcribes the little horned grebe, *le petit grebe cornu* of Buffon as a variety of this fpecies.

Rubricollis. Somewhat crefted; chin, cheeks, and regions of the ears afh-coloured; neck beneath, and breaft rufty red; belly and fecondary quill feathers white. *Colymbus rubricollis*. Gmel. *Colymbus fubcriftatus*, Jacq. *Le grebe à joues grifes jougris*, Buff. *Red necked grebe*, Lath. Donov. Brit. Birds.

The length of this bird is eighteen inches; the bill is dufky, and at the fides at the bafe tawny; the legs dufky. This is a Britifh fpecies; the male is very rare, the female fcarcely known; both fexes are preferved in the London Mufeum.

Caspicus. Head fmooth; body above dark brown, beneath filvery; bill lead colour; chin and cheeks white; wing-coverts brown. S. G. Gmel. Inhabits near the Cafpian fea.

Thomensis. Fufcous; beneath white, fpotted with grey; quill-feathers pale rufous; breaft with a black fpot. *Colymbus thomenfis*, Gmel. *Le grebe duc-laart*, Buff. *Black-breafted grebe*, Lath.

Lefs than the common hen; the bill is black, with the tip pale; irides and fpot between the bill and eyes white; legs dufky. Inhabits St. Thomas's ifland in America.

Minor. Fulvous brown; beneath, fpot on the quill-feathers, and lower part of the rump, filvery white; neck beneath tawny grey. *Colymbus minor*, Gmel. *Podiceps minor*, Ray. *Little grebe*, Lath. Donov. Brit. Birds.

This bird inhabits Europe and America, is ten inches in length, and feeds on worms, fmall fifh, and aquatic infects. Buffon defcribes a variety of it under the title of "Le Caftagneuz des Philippines;" it is larger than the former, the plumage above purple brown; and the cheeks and fides of the neck reddifh. Found in the Philippine ifles.

Dominicus. Head fmooth; body beneath thickly fpotted. *Colymbus dominicus*, Linn. *Le caftagneux de St. Domingue*, Buff. *White winged grebe*, Lath.

Inhabits the Antilles and Surinam. Its length is eight inches; the bill is black; body dufky, beneath filvery grey; quill-feathers cinereous white; legs brown.

Hebridicus. Head fmooth; body blackifh; chin black;

black; throat ſub-ferruginous; belly cinereous, mixed with ſilvery. *Colymbus hebridicus*, Gmel. *Black-chin grebe*, Lath.

A ſmall and rare ſpecies, found chiefly in Tiree, one of the iſlands of the Hebrides.

Podiceps. Body fuſcous; bill olive, duſky at the baſe, with a tranſverſe black band in the middle. *Colymbus podiceps*, Linn. *Le caſtagneux à bec circlé*, Buff. *Pied bill grebe*, Lath.

A native of North America; length fourteen inches; irides white; chin black, ſurrounded with white; body beneath ſilvery; breaſt waved with cinereous; ſecondary quill-feathers black at the tip. The female has no black mark on the bill.

Ludovicianus. Fuſcous; ſides of the neck and body ferruginous; beneath white, with tranſverſe blackiſh ſpots. *Colymbus ludovicianus*, Gmel. *Le grebe de la Louſiane*, Buff. *Louſiane grebe.*

Inhabits Louſiane. The head is ſmooth; legs duſky; middle of the belly ſilvery white.

COLYTON, or Culliton, in *Geography*, is a ſmall but ancient market town in Devonſhire, England. It is called by Riſdon, a "borough of reputation:" the houſekeepers of a ſmall diſtrict, called the borough, annually choſe a portreve at the lord's court. At the Norman conqueſt, Colyton was the king's demeſne; and king John granted the inhabitants a fair, to continue eight days. The houſes are in general built with flints and moſtly thatched. The pariſh church is a ſpacious ſtone fabric, with a tower riſing above the chancel, the upper part of which is octagonal. On the ſouth ſide of the chancel is an incloſed burial-place, belonging to the De la Pole family, containing various effigies, and other monumental decorations: and in a ſmall aiſle adjoining, is the figure of a girl, apparently about five years of age, under a canopy of ſtone; ſhe is ſaid to have been the grand-daughter of Edward IV., and to have been choked by a fiſh-bone; over her are the royal and Courtenay arms. Colyton arms is ſituated 153 miles S.W. from London: the number of houſes is 289; of inhabitants 1641.

COLYTTUS, or Collytus, in *Ancient Geography*, the name of a quarter of the city of Athens, belonging to the Egeide tribe, and adjoining to that called Melitos.

COM, or Kom, in *Geography*, one of the oldeſt, and formerly of the largeſt towns of Perſia in the province of Irak Agemi. It has ſuffered greatly by the civil wars with which the Perſian empire has been ſo often diſtracted, but is ſtill a very populous place; 90 miles S. of Caſbin, and 150 N. of Iſpahan. It is celebrated for its ſilk manufactures, chiefly velvet. N. lat. 34°. E. long. 50°.

COMA. See Como.

Coma, in *Medicine*, a preternatural propenſity to ſleep, though the patient frequently does not ſleep, or if he does, awakes without relief. If ſleep enſues, the diſeaſe is called *coma ſomnolentum;* in this caſe the patient continues in a profound ſleep, and when awaked, immediately relapſes, without being able to keep open his eyes. If he does not ſleep, but is continually awakened with frightful dreams, it is called *coma vigil:* in this caſe he appears to ſleep, having his eyes conſtantly ſhut. Coma is produced by debility, by the want of food, exerciſe, &c. See Apoplexy.

Coma, in *Botany*, from κομη, *a head of hair*, is applied to a leafy crown, whether of the proper leaves of the plant, or of bracteas, riſing above the fructification. In the pineapple and crown imperial it is of the former kind; in *ſalvia horminum*, or purple topped clary, of the latter, being moreover elegantly coloured with pink or purple. See Comose.

Coma *aurea, africana frutescens foliis anguſtiſſimis trifidis*, Burm. See Athanasia *erithmifolia.*

Coma *africana frutescens, foliis inferioribus inciſis*, Comm. See Athanasia *dentata.*

Coma *africana fruticans ericæ folio*, Comm. See Chrysocoma *ciliaris.*

Coma *africana fruticans, foliis crithmi marini*, Comm. See Athanasia *erithmifolia.*

Coma *africana fruticans foliis glaucis & in extremitatibus trifidis*, Comm. See Athanasia *trifurcata.*

Coma *africana fruticans foliis linariæ, major*, Comm. See Chrysocoma *cernua.*

Coma *africana fruticoſa omnium maxima*, Comm. See Athanasia *pubeſcens.*

Coma *foliis multifidis glaucis*, Burm. See Athanasia *parvifolia.*

Coma *Berenices, Berenice's Hair*, in *Aſtronomy*, a modern conſtellation of the northern hemiſphere; compoſed of unformed ſtars between the Lion's tail and Bootes.

This conſtellation is ſaid to have been formed by Conon, an aſtronomer, in order to conſole the queen of Ptolemy Euergetes, for the loſs of a lock of her hair, which was ſtolen out of the temple of Venus, where ſhe had dedicated it on account of a victory obtained by her huſband. Ricciol. Alm. lib. vi. cap. 4.

The ſtars in the conſtellation Coma Berenices, in Tycho's Catalogue, are 14; in Hevelius's, 21; and in the Britannic Catalogue, 43.

COMACENUS Lacus, in *Ancient Geography*, the lake of *Como*, which ſee.

COMACHIO, in *Geography*, a ſmall town of Italy, the ſee of a biſhop, in the Ferrareſe, ſurrounded by ſalt marſhes, which render the air inſalubrious, and inhabited chiefly by fiſhermen; 33 miles S.E. of Ferrara. N. lat. 44° 32′. E. long. 12° 6′.

COMACLUM, in *Ancient Geography*, a town of Venetia.

COMAGENA. See Commagene.

COMAGENÆ, a place of Norica, diſtant, according to Antonine's Itinerary, 24 miles from mount Cetius.

COMANA, a town of Pontus, ſeated on the river Iris, towards the mountain of Paryadræ, on the ſouth. It was famous for a temple of Bellona. The town and territory depended on a pontiff, who, on ſolemn days, wore a diadem, and poſſeſſed a kind of ſovereignty. Venus alſo was worſhipped in this city; her feaſt was celebrated with great magnificence, and ſhe had many courtezans.

Comana, a town of Aſia, in the greater Cappadocia, ſeated on the river Sarus, in Cataonia. It was alſo called *Chryſe*, and bore the appellation of Cappadocian.

Comana, or *Bocana*, a town of the iſland of Taprobana, according to Ptolemy.

Comana, or *Commacus*, a town of Aſia, in Piſidia.—Alſo, another town in Phrygia. Ptolemy.

Comana, in *Geography*, a town of South America, in the northern diviſion of Terra Firma. It lies on the north-eaſternmoſt part of the ſea-coaſt.

COMANCHES, or Hietans, a tribe of Indians in Louiſiana in America, who have no fixed place of reſidence, and who have neither towns nor villages. They are divided into ſo many hordes, that they have ſcarcely any knowledge of one another. They never continue in the ſame place for more than a few days, but follow the buffalo, the fleſh of which is their principal food. Some of them purchaſe of the Panis or Towiaches, another tribe, corn, beans, and pumpkins; but their number is ſo great, that theſe articles furniſh a ſmall quantity of their food. Their tents are made of

of ſkins neatly dreſſed, and faſhioned in the form of a cone, affording room for a family of 10 or 12 perſons; thoſe of the chiefs are capable of accommodating 50 or 60 perſons. When they pitch their tents, they form regular ſtreets and ſquares, exhibiting a ſort of town ſuddenly raiſed, as it were by inchantment, and at a ſignal for march, they are as ſuddenly ſtruck: to every tent are allotted two horſes or mules, one for carrying the tent, and another for removing the poles or ſticks, which are neatly made of red cedar; they all travel on horſeback. Their horſes are tied for grazing with a long halter, and they are ſo numerous as to require frequent change of place. Their horſes are ſo managed, as to be remarkably docile and gentle. It is their practice to hunt the buffalo on horſeback; and they kill this animal with the bow, or a ſharp ſtick like a ſpear, which they carry in their hands. They are generally at war with the Spaniards, committing frequent depredation upon the inhabitants of Santa Fé and St. Antoine; but they have been always friendly and civil to any French or Americans who have been amongſt them. With regard to their perſons, they are ſtrong and athletic, and, in advanced life, corpulent. As ſavages, they are uncommonly clean: the dreſs of their women is a long looſe robe, reaching from the chin to the ground, tied round with a fancy ſaſh or girdle, all neatly made of dreſſed leather, on which they paint figures of different colours and ſignifications: the dreſs of the men conſiſts of cloſe leather pantaloons, and a hunting ſhirt, or frock of the ſame. Their continuance in the ſame place does not admit of their making any plantation; but the ſmall Cayenne pepper grows ſpontaneouſly in the country, and with this, together with ſome wild herbs and fruits, particularly a bean that grows plentifully on a ſmall tree, reſembling a willow, called Maſketo, the women cook their buffalo beef in a manner that renders it grateful food. They alternately occupy the immenſe ſpace of country from the Trinity and Braces, croſſing the Red river, to the heads of Arkanſa and Miſſouri, to river Grand, and beyond it, about Santa Fé, and over the dividing ridge on the waters of the Weſtern Ocean, where, as they ſay, they have ſeen veſſels, which they deſcribe as ſhips, with ſails and rigging. Their native language differs from that of any other nation; but they have a mode of making themſelves underſtood to all the Indians by ſigns. Among them are many Spaniſh men and women, who are ſlaves, and who were made priſoners by them in their youth.

COMANI, in *Ancient Geography*, a people of Aſia, probably of Scythia, who inhabited the country Comania, mentioned by Pliny. They were probably the ſame with the Comi of Ptolemy, and the Comari and Coamani, placed by Pomponius Mela in the vicinity of the Paropaniſians.

COMANIA, a country of Aſia, according to Xenophon. See COMANI.

COMANIA, alſo called *Dagheſtan*, a country in the northern part of Turkey in Aſia, ſouth from Little Tartary, and north from Georgia bounded on the eaſt by the Caſpian ſea, W. by the Caucaſus, N. by Circaſſia, and S. by Skirvan. Its inhabitants are known by the name of Comoucks. See DAGHESTAN.

COMANNA, an inland country of Africa, on the Slave coaſt, bounded on the eaſt by Infoko, on the ſouth by Lobadde and Ningo, two provinces of Aquamboe; its northern limit is unknown. Little is known of the country, except that its natives bring great quantities of gold to the markets of Akkaradi, a kingdom touching it on the weſt, who afterwards carry it to Aboni, and thence to the negroes of the ſea-coaſt. Beyond Comanna, in regular ſucceſſion from E. to W. but with unaſcertained boundaries to S. and N., are the kingdoms of Latabi, Equea, Bonu, ſituated far north; Taſu, Quaka, Aboni, Sankug, Agua, and Achem, all ſuppoſed to be rich in gold; but more eſpecially Quaka.

COMARCHIOS, in *Antiquity*, the name of a particular air, or tune, deſigned to be ſung at entertainments.

COMARGO, in *Geography*, a town of North America, in New Leon, ſituate on the ſouth ſide of Rio Bravo, which empties itſelf into the gulf of Mexico on the weſt ſide.

COMARIA PROMONTORIUM, in *Ancient Geography*, a maritime place of India, at the extremity of the peninſula, on this ſide of the Ganges. Ptol. See *Cape* COMORIN.

COMARIS, in *Lithology*, a name given by the Greek writers to the *ſelenites*, or *aphroſelene*.

COMAROIDES, in *Botany*, *alpina argentum*; Seguier. See POTENTILLA *nitida*.

COMARTCH, in *Geography*, a river of South Wales, in the county of Brecknock, which runs into the Yrvon, eight miles W. of Builth.

COMARUM, in *Botany*, (Κομαρος, a name given by Theophraſtus to an evergreen tree, ſuppoſed to be an arbutus.) Linn. Gen. 638. Schreb. 869. Willd. 1004. Gært. 451. Vent. 3. 347. (Pentaphylloides; Tourn.) Claſs and order, *icoſandria polygynia*. Nat. Ord. *Senticoſæ*, Linn. *Roſaceæ*, Juſſ. Vent.

Gen. Ch. *Cal.* Perianth one-leafed, ten cleft, very large, ſpreading, coloured, permanent; alternate ſegments ſmaller, inferior. *Cor.* Petals five, oblong, acuminate, inſerted on the calyx, much ſmaller. *Stam.* Filaments about twenty, awl-ſhaped, inſerted into the calyx, length of the corolla, permanent; anthers creſcent-ſhaped, deciduous. *Piſt.* Germs numerous, roundiſh, very ſmall, collected into a head; ſtyles ſimple, ſhort, from the inſide of the germ; ſtigmas ſimple. *Peric.* none. *Seeds* naked, even-ſurfaced; attached to a large, egg-ſhaped, ſpongy, villous, perſiſting receptacle.

Eſſ. Ch. Calyx ten-cleft, inferior. Petals five, leſs than the calyx. Receptacle egg-ſhaped, ſpongy, villous, perſiſting. Seeds even-ſurfaced.

Sp. C. *paluſtre*. Marſh cinquefoil. Linn. Sp. Pl. Mart. Willd. Flor. Dan. tab. 636. Lam. Ill. tab. 444. Eng. Bot. tab. 172. (Quinquelfolium rubrum; Bauh. Pin. 326. Pentaphyllum paluſtre; Cord. Hiſt. 96. 1. Fragaria, Hall. Helv. n. 1128. Potentilla; Scop. Carn. n. 617.) *Root* creeping. *Stems* decumbent at the baſe, cylindrical, leafy, ſmooth. *Leaves* on long petioles, quinate-pinnated; leaflets on ſhort petioles, oblong, ſerrated, hoary underneath; ſtipules embracing the ſtem. *Flowers* dark purple, ſomewhat panicled; peduncles one-flowered, bractes two, lanceolate; ſtamens, anthers, ſtyle, and receptacle, nearly black. A native of England, and moſt other parts of Europe in boggy ground, and by the ſides of ponds. There is a variety with thicker and more villous leaves, but Miller aſſures us that after one year's growth in a garden it is not to be diſtinguiſhed from the common ſort.

COMARUS PORTUS, in *Ancient Geography*, a name given by Dion Caſſius to a port of Epirus, which he places in the gulf of Ambracia. Strabo calls it Comarus Sinus, and makes it a ſmall gulf of Epirus.

COMAYUAGUA, or VALLADOLID, in *Geography*, a large town of the province of Honduras, in Old Mexico, or New Spain, in North America, on a river which falls into the gulf of Honduras. It is the ſee of a biſhop, and has rich ſilver mines in its neighbourhood; 90 miles S.E. of Truxillo. E. long. 88° 4′. N. lat. 14° 30′.

COMB, an inftrument made of horn, ivory, tortoife-fhell, box, or holly-wood, &c. and ufeful for feparating and adjuting the hair, &c.

Comb-*making*. Combs are not only made for the purpofe of cleaning the hair, but for ornament: they are fometimes fet with brilliant ftones, pearls, and even diamonds; fome again are ftudded with cut fteel; thefe are of different fhapes, and are ufed to faften up the hair when ladies drefs without caps. Combs may of courfe be had of all prices, from the value of a few pence to almoft any fum. They are generally made of the horns of bullocks or of elephants, and fea-horfes teeth, and fome are made of tortoife-fhell and ivory, others of box or holly-wood. The horns of bullocks are thus prepared for this manufactory: the tips are firft fawn off; they are then held in the flame of a wood fire, this is called roafting, by which they become nearly as foft as leather. While in that ftate they are flit open on one fide, and preffed in a machine between two iron plates; they are then plunged into a trough of water, from which they come out hard and flat; they are then fawn into lengths, according to the fize wanted. To cut the teeth, each piece is fixed into a tool called a claw. The maker fits on a triangular fort of a ftool to his work, and under him is placed the claw that holds the horn, ivory, &c. that is to be formed into a comb. The teeth are cut with a fine faw, or rather a pair of faws, and they are finifhed with a file. A coarfer file, called a rafp, is ufed to reduce the horn, &c. to a proper thicknefs; and when they are completely made, they are polifhed with charcoal and water, and receive their laft finifh with powder of rotten ftone. The procefs ufed for making ivory combs is nearly the fame as that already defcribed, except that the ivory is firft fawed into thin flices. The beft ivory comes from the ifland of Ceylon and Achen in the Eaft Indies, as it poffeffes the property of never turning yellow; it is confequently much dearer than any other kind.

Tortoife-fhell combs are much efteemed; and there are methods of ftaining horn, fo as to imitate it, of which the following is one: the horn to be dyed is firft to be preffed into a flat form, and then done over with a pafte, made of two parts of quick-lime and one of litharge, brought into a proper confiftence with foap-ley. This pafte muft be put over all the parts of the horn, except fuch as are proper to be left tranfparent, to give it a nearer refemblance to tortoife-fhell. The horn muft remain in this ftate till the pafte be quite dry, when it is to be brufhed off. It requires tafte and judgment fo to difpofe the pafte, as to form a variety of tranfparent parts, of different magnitudes and figures, to look like nature. Some parts fhould alfo be femi-tranfparent, which may be effected by mixing whiting with a part of the pafte. By this means fpots of a reddifh-brown will be produced, fo as greatly to increafe the beauty of the work. Horn thus dyed is manufactured into combs, and thefe are frequently fold for real tortoife-fhell. The wages of journeymen in this bufinefs are from 21*s*. to 31*s*. per week.

In *Plate* XV. of *Mechanics* is reprefented a machine for cutting combs, for which Mr. William Bundy, of Pratt Place Camden Town, took out a patent in the year 1796, and the fame is defcribed in the Repertory of Arts. The frame A A, *fig*. 3 of the machine, is like a common lathe, containing a fpindle, with a crank and fly-wheel, D, upon it, turned by the alternate motion of the treadle, B, which is moved by the workman's foot; E is a wheel fixed on the crank fpindle, carrying a line in its groove, croffing between the cheeks of the lathe, and paffing over the pulley, F, which turns on a centre fixed in the puppet, G; it has two holes in it to receive the horned catch, *a*, *fig*. 2, fcrewed on the end of an arbor, *b*, about feven inches in length, and half an inch in diameter; this arbor is mounted between two circular brafs plates, H, I, *fig*. 1, connected by three pillars, it carries as many circular fteel cutters, or faws, K, *fig*. 4, as the comb to be cut is to have teeth. M, *fig*. 5, reprefents another arbor, which is fixed in the frame-plates, *fig*. 1, by its ends; it is triangular, and has a piece of fteel, L, *fig*. 4 (called a guide), fitted on it between each faw, on the arbor, *b*. Thefe parts are put together by firft putting the end of the arbor, *b*, *fig*. 2, through the hole in the centre of the frame-plate, I, and fcrewing on the catch, *a*; the end of the arbor, *fig*. 5, is put into a fquare hole made in the plate, I, to receive it, and is fixed by a fcrew; a guide, L, *fig*. 4, is then put on the arbor, M, clofe againft the fhoulder, *d*; next a cutter, K, is put on the arbor, *b*, touching its fhoulder, *e*; a piece of fteel plate, N, called a guide-wafher, is then put on the arbor, M, and another guide, L, clofe to it; the guide-wafher is a little thicker than the cutter oppofite it, fo that the cutters each turn between two guides without touching them. Thefe being in their places, a fmall wafher, O, *fig*. 4, is put on the arbor, *b*, and a cutter, then a guide-wafher and guide, on the arbor, M, and fo on alternately, till the right number of cutters are put on; the fliding fhoulder, *f*, *fig*. 2, is then taken, and with the octagonal nut, *g*, fcrewed faft up againft the laft cutter, put on the arbor, *b*, this will pinch all the cutters and wafhers between the fhoulders, *e* and *f*, and hold them faft. The fame is done to the arbor of the guides, and, laftly, the frame-plate, H, is put on the ends of the pillars, and fcrewed faft; the whole forming the refemblage fhewn in *fig*. 1. The frame-plates with the arbors, as in *fig*. 1, are now to be put in their place in the machine, *fig*. 3, the horns of the catch, *a*, going into two holes in the pulley, F, and the other end of the arbor, *b*, into a centre that goes up with a fcrew in the puppet, Q; the fcrews, *h*, *h*, are defigned to fteady the frame-plates (which hold the arbor of the guides) againft the dove-tail, P P, fupported by brackets projecting from the front of the cheeks, fufficiently to let the block, *i*, which flides in the dove-tail, and holds the comb, be drawn forwards to give room for the hand to put in or take out the combs clear of the cutter. To the bafe of the dove-tail is fcrewed a plate, holding one of the centres for a worm-wheel, *k*, whofe axis is made of fteel, and has its end cut with a deep thread-fcrew; the fcrew-end of this axis works in a centre, fixed to the bafe of the dove-tail, and the block, *i*, is cut away to pafs clear over it and the threads of the fcrews, without touching them. The worm-wheel, *k*, is turned by an endlefs fcrew, on the arbor of the wheel, *r*, which receives its motion from the pulley, *t*, by an endlefs line. The block, *i*, which holds the comb, moves in the dove-tail, and is to carry the comb towards the cutters while cutting. As the fcrew on the axis of the wheel, K, is to carry the block up in lieu of a nut; a knife-edge, faftened to a fmall lever, *l*, moveable on a centre in the face of the block, is applied to it, and kept down (fo that the knife-edge may take into the threads of the fcrew) by a catch fimilar to the latch of a door, which is releafed by pufhing in a thumb-ftud, and allows the fpring, *o*, to throw up the lever, *l*, and difengage the fcrew, fo that the block may be brought forwards in the dove-tail. The piece of ivory intended to be cut into a comb, is put under a plate, *p*, and held down by two fcrews to the face of the block, which is in the fame plane with the arbor of the cutters; the workman then puts down the knife-edge, and the catch keeps it fo; he then turns the machine by his foot, and pufhes the block towards the cutters (the comb refting clofe on the guides) till the knife-edge take the firft thread of the fcrew, which turns round as before defcribed, and pufhes the block and comb up to the cutters, as far as

 the

the fcrew extends, and the cutters faw the teeth in the comb; the thumb-ftud is then pufhed in, and the fpring, *o*, throws the knife-edge up, fo that the block can be brought back by hand, and the comb taken out. The diftance which the comb projects from the face of the block towards the cutters, and confequently the length of the teeth, is regulated by a ftraight edge of metal on the top of the block, *i*, under the plate, *p*, againft which the back of the comb refts; it can be moved parallel to itfelf acrofs the top of the block by two fcrews, (which are feen at the upper corners of the face of the blocks), for combs of longer or fhorter teeth. The fpindle of the crank has a wheel, R, on it, turning an arbor, S, by a line, which carries a fet of cutters for pointing the combs. The arbor is fhewn feparately in *fig*. 6, and a cutter in *fig*. 7; it is made up in the fame manner as the former one, and faftened by a fcrew, T; the ends of the teeth of the comb are applied to this cutter by hand, firft on one fide, and then on the other, till the points are made. This is performed to one comb, while the teeth are cutting in another.

Comb, or *Coomb*, in *Hufbandry*, a meafure of corn, confifting of 2 long ftrikes = 4 Winchefter bufhels = 16 pecks = 32 dry gallons = 128 dry quarts = 256 dry pints = 8601.6 cubic inches = 4.97 cubic feet = 1.843621 cubic yards = 17.32142 cubic links: in fome places the bufhel contains eight gallons and a quart.

Comb, *Coomb*, or *Carnook*, of wheat, according to the 9th and 51ft Henry III. 12th Henry VII., &c., was 256lb. troy = 210.6614lb. avoirdupoife = 2 ftrikes = 16 pecks = 32 gallons = 256 pints or pounds.

Comb, in *Ornithology*, the creft, or red flefhy tuft growing on the head of a cock.

Comb, *in a fhip*, a little piece of timber, fet under the lower part of the beak-head near the middle: it has two holes in it, and fupplies to the fore-tacks, what the cheft-trees do to the main-tacks; that is to bring the main-tacks aboard.

Comb, in the *Manufacture of Tapeftry*. See Tapestry.

COMB-MARTIN, in *Geography*, a town of England, on the north coaft of Devonfhire, in the Briftol channel, with a fmall creek for boats; near it are filver-mines, which formerly yielded a confiderable quantity of ore; 39 miles W. of Bridgewater, and 176 W. of London.

COMBA, in *Ancient Geography*, a town of Afia Minor, in the interior of Lycia, and in the vicinity of mount Cragus. Ptolemy.—Alfo, a marfh of Greece, in Macedonia, near mount Athos, mentioned by Athenæus.

COMBAHEE, in *Geography*, a confiderable river of South Carolina, which enters St. Helena Sound, between Coofa and Afhepoo rivers. The ferry of the fame name on this river is diftant 17 miles from Jackfon's borough; 15 from Pocotaglio, and 52 from Charleftown.

COMBAM, or Commum, a town of Hindooftan, in the country of Cuddapah; 65 miles N. of Cuddapah. Combam is reckoned 25 coffes from Innaconda, and 32 from Ongole, or about 51 geographical miles from the latter. Tavernier calls it Kaman.

COMBAMET, a town of Hindooftan, in the country of Golconda; 68 miles E. of Hydrabad.

COMBANA, or Nommana, in *Ancient Geography*, a town of Afia, in Carmania, fituated near the fea.

CAMBARONES, in *Antiquity*, the fellow-barons or commonalty of the Cinque-Ports.

COMBAT, in a general fenfe, denotes an engagement; or a difference decided by means of arms.

Authors fometimes diftinguifh in an army, between a combat and a battle; the latter expreffing the general action of the whole army; the former only a particular fkirmifh, or engagement of a fingle part; fo that the combat is properly a part of a battle.

Combat, in *Law*, or *fingle combat*, denotes a formal trial, between two champions, of fome doubtful caufe or quarrel, by the fword or batoons.

This form of proceeding was anciently very frequent, particularly among the barbarous nations in their original fettlements; and obtained, not only in criminal, but alfo in civil caufes; being built on a prefumption, that God would never grant the victory but to him who had the beft right. It was originally permitted, in order to determine points refpecting the reputation of individuals, but afterwards became much more extenfive. See Duel. The form and ceremony of the combat are defcribed in the grand Coutumier of Normandy. The accufer, firft, fwore to the truth of his accufation; the accufed gave him the lie: upon which, each threw down a gage, or pledge of battle; and the parties were committed prifoners to the day of combat. See Champion.

Hiftorians tell us, that Alphonfus, king of Caftile, in the eleventh century, defiring to abolifh the Mofarabic liturgy, and to introduce the Roman office; the people oppofing it, it was agreed to terminate the difference by combat, and leave the caufe to the decifion of Heaven. One of the earlieft reftrictions of this practice that occurs in the hiftory of Europe, is that of Henry I. of England; which was afterwards followed by an edict of Louis VII. of France to the fame effect. Robertfon's Hift. of Charles V. vol. i. p. 61, &c. and 350, &c. 8vo.

Combat is alfo ufed for the folemn games of the ancient Greeks and Romans, performed in honour of their gods; as the Olympic games, Pythian, Ifthmian, and Nemæan games; the ludi Actiaci, Circenfes, &c. which fee in their places, Olympic, Isthmian, &c.

The combats here celebrated, were *running*, *wreftling*, *boxing*, *ceftus*, &c. The combatants, who were called *athletæ*, prepared themfelves for it from their youth, by conftant exercife, and a very rigid regimen: they only eat certain things, and at certain hours; drank no wine; had no commerce with women; and both their labour and their reft were regulated.

COMBATANT, in *Heraldry*, termed by the French heralds *confronté*, when two animals are borne in coat armour in a fighting pofture, erect on their hind feet, and facing each other.

COMBATTANT, in *Ornithology*, the name given by French writers to the Linnæan *tringa pugnax*, the bird known in this country by the name of *Ruffs* and *Reeves*, the male being called the Ruff, the female Reeve. See Tringa *pugnax*.

COMBEAUFONTAINE, a fmall town of France, in the department of Upper Saone, chief place of a canton, in the diftrict of Vefoul. It contains 588 and the canton 7596 inhabitants. The territory includes 190 kiliometres and 17 communes.

COMBEFIS, Francis, in *Biography*, a learned French monk, was born at Guienne, in the year 1605. He purfued his ftudies firft under the jefuits at Bourdeaux and afterwards at Paris. He devoted himfelf principally to the purfuit of Greek literature, and was employed in editing new editions of the Greek fathers, for which he received a very handfome remuneration. He likewife publifhed a collection of the lives of different fathers, popes, and martyrs; fome additions to the "Bibliotheca Græcorum Patrum," in Greek and Latin, in three volumes folio; "Hiftoriæ Byzantinæ Scriptores, poft Theophanem," undertaken by

command of the celebrated Colbert. He died in 1679 of the ftone, a difeafe to which ftudious and fedentary men are peculiarly liable. Nouv. Dict. Hift.

COMBANY, in *Geography*, a river of South Wales, in Carmarthenfhire, which difcharges itfelf into the Loughor, 5 miles N.E. of Llanalthy.

COMBER, Thomas, in *Biography*, was born at Wefterham in Kent, in the year 1645, where he received the rudiments of a learned education; from thence he was admitted in Sydney college Cambridge. He was remarkable for diligence in his ftudies, and took his degrees of bachelor of arts in 1662, and of mafter of arts in 1666. Some years afterwards he was created doctor of divinity, probably by a diploma from Lambeth. After this he attained to confiderable rank in the church, and was preferred to the precentorfhip of York, the deanery of Durham, to be chaplain to their majefties, and other pofts of emolument and honour. Dr. Comber maintained a correfpondence with Tillotfon, Burnet, and other moft eminent divines of the age in which he flourifhed. The excellence of his character, and his zeal for the church of which he was a member, were the caufes that led him to that diftinction to which he attained, and which was a fure earneft and pledge of ftill greater preferment if he had lived, but he died in November 1699, in the 55th year of his age, and was buried at Stonegrave in Yorkfhire, of which he was rector. He was author of many learned works relating principally to the Common Prayer, and to the offices of the Church of England.

There was alfo another Dr. Thomas Comber, born in Suffex, Jan. 1575, who was educated in Trinity college Cambridge, and afterwards made dean of Carlifle. In 1642 he was imprifoned, plundered, and deprived of all his preferments, and died at Cambridge in 1653. He is known as the author of "An Hiftorical Vindication of the Divine Right of Tythes," 4to. written in anfwer to "Selden's Hiftory of Tythes." Biog. Brit.

Comber, in *Ichthyology*, a fpecies of wraffe or old-wife fifh, found fometimes on the coaft of Cornwall, and which is defcribed under this name in Ray's Synopfis, No. 163. See Labrus *Comber*.

COMBER-MERE, in *Geography*, a lake of England in the county of Chefter, on the borders of Shropfhire; five miles S. of Nantwich.

COMBINATION, is properly underftood of an affemblage of feveral things by two and two; but is more particularly ufed in *Mathematics*, to denote the variation, or alternation of any number of quantities, letters, founds, or the like, in all the different manners poffible.

P. Merfenne gives us the combination of all the notes and founds in mufic, as far as fixty-four; the fum whereof amounts to ninety figures, or places.

The number of poffible combinations of the twenty-four letters of the alphabet, taken firft two by two, then three by three, &c. according to Mr. Preftet's calculation, amounts to 1391724288887252999425128493402200.

The words in the following verfe may be combined a thoufand and twenty-two feveral ways.

Tot tibi funt dotes, virgo, quot fidera cœlo.

F. Truchet, in the Memoirs of the French Academy, fhews, that two fquare pieces, each divided diagonally into two colours, may be arranged and combined fixty-four different ways, fo as to form fo many different kinds of chequer-work, which appears furprifing enough, when one confiders that two letters, or figures, can only be combined twice. This note may be of ufe to mafons, paviours, &c. See Pavement, and Changes.

Combination, *doctrine of.—Any number of quantities being given, together with the number in each* combination; *to find the number of* combinations.

One quantity, we obferve, admits of no combination; two, a and b, of one, viz. ab; of three, a, b, c, there are three combinations, viz. ab, ac, bc; of four, fix, ab, ac, bc, ad, bd, cd; of five, ten, ab, ac, bc, ad, bd, cd, ae, be, ce, cc, de.

Whence it appears, that the number of combinations proceed as, 1, 3, 6, 10, &c. which are triangular numbers, whofe fide differs by unity from the number of given quantities, or which are produced by the continual addition of the ordinal feries, 0, 1, 2, 3, 4, 5, &c. Hence if the number of things to be combined be q, the fide of the number of combinations will be $q-1$; and therefore the number of combinations $\frac{q-1}{1} \times \frac{q-0}{2}$. See Triangular *number*.

If three quantities are to be combined, and the number in each combination be three, there will be only one combination, abc, if a fourth be added, the combinations will be found abc, abd, bcd, acd; if a fifth, ten, abc, abd, bcd, acd, abe, bde, bce, ace, ade, cde; if a fixth, twenty, &c. The numbers of combinations, therefore, proceed, as 1, 4, 10, 20; i. e. they are the firft pyramidal triangular numbers, whofe fides differ by two units from the number of given quantities. See Pyramidal *number*.

Hence, if the number of given quantities be q, the fide will be $q-2$; and therefore, the number of combinations $\frac{q-2}{1} \times \frac{q-1}{2} \times \frac{q-0}{3}$.

Hence is eafily deduced a general rule for determining the number of combinations in any cafe; for, fuppofe the number of quantities to be combined, q, the exponent of the combination n, the number of combinations will be $\frac{q-n+1}{1} \times \frac{q-n+2}{2} \times \frac{q-n+3}{3} \times \frac{q-n+4}{4} \times \frac{q-n+5}{5}$ &c. till the number to be added be equal to n.

Suppofe, v. gr. the number of quantities to be combined $=6$; the exponent of the combination 4; the number of combinations will be $\frac{6-4+1}{1} \times \frac{6-4+2}{2} \times \frac{6-4+3}{3} \times \frac{6-4+4}{4} = \frac{6-3}{1} \times \frac{6-2}{2} \times \frac{6-1}{2} \times \frac{6-0}{4} = \frac{3}{1} \times \frac{4}{2} \times \frac{5}{3} \times \frac{6}{4}$ $=15$.

Coroll. If it be defired to have all the poffible combinations of the given quantities beginning with the combinations of the feveral two's, proceeding to three's, &c. there muft be added $\frac{q-1}{1} \times \frac{q-0}{2}$, $\frac{q-2}{1} \times \frac{q-1}{2} \times \frac{q-0}{3}$, $\frac{q-3}{4} \times \frac{q-2}{2} \times \frac{q-1}{3} \times \frac{q-0}{4}$, &c.

Whence the number of combinations poffible will be $\frac{q}{1} \times \frac{q-1}{2} + \frac{q}{1} \times \frac{q-1}{2} \times \frac{q-2}{3} + \frac{q}{1} \times \frac{q-1}{2} \times \frac{q-2}{3} \times \frac{q-3}{4} + \frac{q}{1} \times \frac{q-1}{2} \times \frac{q-2}{3} \times \frac{q-3}{4} \times \frac{q-4}{5}$, &c. which is the fum of the unciæ of the binomial, raifed to the power q, and abridged of the exponent of the power increafed by unity, $q+1$. Wherefore, if $1+1=2$ reprefent the binomial to which thefe unciæ belong, $2^q - q - 1$ is the number of all the poffible combinations. V. gr. If the number of quantities be 5, the number of poffible combinations will be $2^5 - 6 = 32 - 6 = 26$.

2. *Any*

2. *Any number of quantities being given, to find the number of changes and alterations, which those quantities, combined in all the manners poſſible, can undergo.*

Suppoſe two quantities, a and b, their variations will be 2; conſequently, as each of thoſe may be combined, even with itſelf, to theſe there muſt be added two variations. The whole number, therefore, will be $2 + 2 = 4$. If there were three quantities, and the exponent of the variations were 2, the combination will be 3, and the changes 3; to which if the three combinations of each quantity with itſelf aa, bb, cc, be added, we ſhall have the number of changes, $3 + 3 + 3 = 9$.

In like manner it is evident, if the given quantities were 4, and the exponent 2, the number of changes would be 16; if 5, 25, &c. in general, if n, n^2.

Suppoſe the quantities 3, and the exponent of variation 3; the number of changes is found $27 = 3^3$; viz. aaa, aab, aba, baa, abb, aac, aca, caa, abc, bac, bca, acb, cab, cba, acc, cac, cca, bba, bab, bbb, bbc, cbb, bcb, bcc, cbc, ccb, ccc.

After the ſame manner, it will appear, if the quantities were 4, and the exponent 3; the number of changes would be $64 = 4^3$; and, in general, if the number of quantities be $= n$, and the exponent 3, the number of changes will be n^3. By thus proceeding, it will be found that if the number of quantities be n, and the exponent n, the number of changes will be n^n; wherefore, if all the antecedents be added, where the exponent is leſs, the number of poſſible changes will be found $n^n + n^{n-1} + n^{n-3} + n^{n-4} + n^{n-5} + n^{n-6}$, &c. Till at length, the number ſubtracted from n leaves 1; becauſe the beginning is from ſingle quantities taken once.

Since then the number of poſſible changes is in a geometrical progreſſion, whoſe firſt or ſmalleſt term is n^1, the greateſt n^n, and the ratio n; it will be $= \frac{n^{n+1} - n}{n - 1}$.

Suppoſe, v. gr. $n = 4$, the number of poſſible changes $\frac{4^5 - 4}{4 - 1} = \frac{1020}{3} = 340$. Suppoſe, again, $n = 24$, the number of poſſible changes will be $\frac{24^{25} - 24}{24 - 1} = 32009658644406818986777955348272600 \div 23 = 1391724288887252999425128493402200$. In ſo many various manners, therefore, may the twenty-four letters of the alphabet be varied and combined among themſelves.

Combination, in *Chemiſtry*, denotes the union of two bodies of different natures, from which a new compound body reſults. An acid united with an alkali furniſhes an inſtance of combination. See Affinity.

Combinations, in *Law*. Combinations to do unlawful acts, are puniſhable before the unlawful acts are executed; this is to prevent the conſequences of combination and conſpiracies, &c. 9 Rep. 57.

Combination, in *Military Science*. One ought to regard combination as forming a part of military ſcience. A general, who has an enterprize in contemplation, ſhould, before he riſks the execution of it, combine well in his mind all the ideas, that can lead to its ſucceſs; and he ought not always to rely on his own ſolution of the caſe. But when his ideas on the ſubject are pretty well fixed, he ſhould lay them before the general officers, who are under his orders or command, for their opinion and concurrence.

COMBINATORY *diſtillation*. See Distillation.

Combinatory *muſic*, *Muſica combinatoria*, that part of muſic which teaches the manner of combining ſounds variouſly; that is, of changing their place and figure in different manners. See Music.

COMBING *of wool*, in *Commerce*, the drawing of wool acroſs the teeth of a kind of card, calculated to diſpoſe it for ſpinning. See Carding and Scribbling.

COMBLEAN. Cordage, which ſerves for charging and diſcharging the pieces of artillery, for mounting them on their carriages, and for raiſing other great weights by means of a crane.

COMBLEMENT des Fossés, the filling of the ditches. When the beſiegers have advanced ſo far as to be maſters of the covert-way, they exert themſelves by every poſſible means to fill up the ditches by eſtabliſhing in them galleries to put their workmen under cover, in order to be able to conduct the miner with ſecurity to his operations, and to retrench themſelves there at the ſame time, to ſecure themſelves againſt the ſallies and inſults of the beſieged.

COMBLES, in *Geography*, a town of France, in the department of the Somme, chief place of a canton, in the diſtrict of Péronne. It contains 1579, and the canton 12,196 inhabitants. The territorial extent is of 155 kiliometres, and it includes 23 communes.

COMBOURG, a ſmall town of France, in the department of Ille and Vilaine, chief place of a canton, in the diſtrict of St. Malo, 18 miles S. of St. Malo. The place contains 4170, and the canton 12,151 inhabitants; the territory includes $217\frac{1}{2}$ kiliometres and 10 communes.

COMBRAILLE, formerly a ſubdiviſion of the biſhopric of Limoges, in France, now a department of Creuſe. It was a barony belonging to the ducal houſe of Orleans.

COMBREA, in *Ancient Geography*, a town of Greece, ſituated to the north of Pallene, on the Thermaic gulf. Herodotus calls the country in which it lay *Croſſæa*, between Lipaxos and Liſæ.

COMBRE'E, in *Geography*, a town of France, in the department of the Mayne and Loire, and chief place of a canton in the diſtrict of Segré; 7 miles W. of Segré.

COMBRET, a town of France, in the department of the Aveiron; 8 leagues E. of Alby.

COMBRETUM, in *Botany*, (the name of a plant in Pliny.) Linn. Gen. 475. Schreb. 641. Gært. 212. Juſſ. 320. (Chigomier, Lam. Encyc.) Claſs and order, *octandria monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Onagræ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, one-leafed, bell-ſhaped, four or five-toothed, caducous. *Cor.* Petals four or five, egg-ſhaped, about the length of the calyx, and placed between its teeth. *Stam.* Filaments eight or ten, generally very long, inſerted into the calyx; anthers egg-ſhaped or oblong. *Piſt.* Germ inferior, linear; ſtyle briſtle-ſhaped, about the length of the ſtamens; ſtigma acute. *Peric.* none. *Seed* ſingle, with four or five thin membranous wings. (*Capſule* with four or five wings. *Seed* linear, ſmall, with four or five angles, Lam.)

Eſſ. Ch. Calyx four or five-toothed, bell-ſhaped, ſuperior, corolla four or five-petalled, inſerted into the calyx. Stamens generally very long. Seed ſingle, with four or five membranous angles.

Sp. 1. C. *laxum*. Linn. Sp. Pl. 1. Mart. 1. Lam. 1. Willd. 1. Jacq. Amer. 104. Gært. tab. 136? Aubl. Guian. i. 350. tab. 137? Lam. Illuſt. tab. 282. fig. 1? Læfl. It. 308. Swartz. Obſ. 143. (Guara frutioſa, Læfl. It. 248?) "Flowers octandrous; ſpikes lax, quite ſimple." Lam. "Leaves oppoſite; racemes lax, without bractes; calyxes villous within." Willd. A ſhrub. *Branches* cylindrical, climbing, younger ones brachiate. *Leaves* three inches long or more, petioled, acuminate, ſometimes obtuſe, entire,

entire, fmooth. *Flowers* yellowifh or whitifh; in fimple, axillary, and terminal fpikes, or rather racemes; ftamens more than an inch long. A native of Guiana and the Weft Indies. 2. C. *fecundum*. Linn. Sp. Pl. 2. Mart. 2. Lam 2. Willd. 2. Jacq. Amer. 103. tab. 176. fig. 30. Swartz. Obf. 144. "Flowers octandrous; fpikes compound, panicle-pinnated." Lam. "Leaves oppofite; racemes unilateral, without bractes; calyces fmooth." Willd. A fhrub, or fmall tree, ten or twelve feet high. *Branches* cylindrical, very long, fupporting themfelves by the neighbouring trees and fhrubs. *Leaves* three or four inches long, on fhort petioles, ovate-oblong, acuminate, entire, fmooth, veined underneath. *Flowers* very numerous, whitifh or yellowifh, in feveral fpikes or racemes, which form a kind of panicle at the fummit of the branches; anthers red. The flowers, and not the racemes, are often unilateral. Lam. A native of South America, in Guiana, and about the neighbourhood of Carthagena. The fynonyms of thefe two fpecies are very confufed and uncertain. Jacquin fuppofes Aublets and Leofling's plants to be the fame, and to conftitute a third fpecies. 3. C. *purpureum*. Mart. 3. Willd. 3. Vahl. Symb. iii. 51. (C. coccineum, Lam 3. Ill. tab. 282. fig. 2. Criftaria coccinea, Sonnerat. It. ii. 247. tab. 140.) "Flowers decandrous; fpikes lax, panicled." Lam. "Leaves oppofite, egg-fhaped, acute; racemes unilateral, bracteate; bractes fhorter than the peduncle; flowers decandrous." Willd. A very fmooth furmentous fhrub, with cylindrical brachiate branches. *Leaves* three inches long, petioled, quite entire, fomewhat coriaceous. *Flowers* bright red, in terminal panicled racemes; bracte folitary, at the bafe of each pedicel briftle-fhaped. A native of the ifland of Madagafcar. 4. C. *decandrum*. Willd. 4. Roxb. Coroman. i. 45. tab. 59. "Leaves oppofite, oblong, acuminate; racemes lax, bractes longer than the flower; flowers decandrous, in two rows." *Flowers* white, in panicled racemes; bractes lanceolate; ftamens alternately fhorter, a little longer than the corolla. A native of woody mountains in the Eaft Indies. 5. C. *alternifolium*. Willd. 5. Jacq. Amer. 104. Pict. 53. tab. 260. fig. 27. (C. decandrum, Mart. 4.) "Leaves alternate; flowers decandrous." A weak climbing fhrub, twenty feet high; older branches prickly. *Leaves* two or three inches long, oval-oblong, ending in a blunt, channelled, cartilaginous, quite entire, fhining, petioled. *Spikes* lax, half a foot long, about ten on one common peduncle, near the end of the little branches, which are often continued weak and leaflefs, fix feet beyond the flowers. *Flowers* fmall, ufually coming out before the leaves on very fhort pedicels. A native of South America, about Carthagena.

COMBRONDES, in *Geography*, a town of France, in the department of Puy de Dôme, chief place of a canton, in the diftrict of Riom, containing 1568 inhabitants. The territorial extent is of 125 kiliometres, with a population of 7580 individuals diftributed in 12 communes.

COMBS *of Bees*. See HONEY-*comb*.

COMBURENDO HÆRETICO. See HÆRETICO.

COMBUST, in *Aftronomy*. When a planet is in conjunction with the fun, or not diftant from it above half their difk; it is faid to be combuft, or in combuftion.

According to Argol, a planet is combuft or in combuftion, when not above eight degrees and thirty minutes diftant from the fun, either before or after him.

COMBUSTA, in *Ancient Geography*, a town of Gallia Narbonnenfis, marked in the Itinerary of Antonine, on the route that leads from Narbonne to the paffage of the Pyrenées.

COMBUSTIO *pecuniæ*, the ancient way of trying mixed and corrupt money, by melting it down, upon payments into the Exchequer. In the time of king Henry II. a conftitution was made, called the trial by combuftion; the practice of which differed little or nothing from the prefent method of affaying filver. But whether this examination of money by combuftion was to reduce an equation of money only of fterling, *viz.* a due proportion of alloy with copper, or to reduce it to pure fine filver, does not appear. On making the conftitution of trial it was confidered that though the money did anfwer *numero et pondere*, it might be deficient in value; becaufe mixed with copper or brafs, &c. Vide Lowndes's Effay upon Coin, p. 5.

COMBUSTION, a fire, a burning, denotes the decompofition of certain fubftances, which are thereby called combuftibles; accompanied with heat and light. The procefs of combuftion, the various phenomena it exhibits, its aftonifhing effects, its infinite ufes, and its devaftations, have at all times, rendered it the principal object of human attention in all the various ftages of life. The whole extent of civil economy, the preparation of food, as well as of almoft all the articles of neceffity and of luxury, moft of the arts of more effential ufe to mankind, fuch as the manufactures of metals, of glafs, of pharmacy, &c. depend almoft entirely upon combuftion. The inclemencies of the weather, and the difmal darknefs of night, are removed by means of combuftion. The moft active inftruments of deftruction depend upon combuftion. The greateft fcenes of wonder, admiration, and terror, like the conflagration of towns, and the eruptions of volcanos, are thofe in which combuftion is the fole actor.

Whilft the wants and the economy of the multitude, have at all times called forth their induftry in devifing eafy methods of lighting and warming their apartments, of cooking their victuals, &c.; the calm contemplations of philofophers have endeavoured to inveftigate the caufe or caufes, the commencement, the progrefs, the various intenfity, and the products of combuftion. It is natural to fuppofe that their firft ideas muft have been extremely fanciful and incoherent; fince the prefent theory, which refts upon the foundation of innumerable experiments and ftrict reafoning, is vaftly different from any fort of hypothefis, which even the wifeft philofopher would have been led to form, without the light of thofe experiments.

The firft plaufible theory of combuftion was formed by Stahl, an eminent chemift. The ftriking difference between bodies combuftible and incombuftible; that is, between bodies that are, and thofe that are not fufceptible of combuftion; induced him to fuppofe that the combuftibles were endowed with a peculiar principal of inflammability, which the incombuftibles had not, and to this fuppofed principle he gave the name of *phlogifton*. According to this fuppofition, when combuftibles were heated to a certain degree, they began to part with this phlogifton, and continued to burn as long as they had phlogifton to lofe; after which, they remained in a ftate of incombuftibility; hence, in the former ftate, thofe bodies were faid to be phlogifticated, and in the latter they were faid to be dephlogifticated. With certain bodies the combuftion was attended with a feparation of other components, fo that afterwards they could not be brought back to their former ftate by the mere addition of phlogifton; but with other bodies, as for inftance, with the metals, the proceffes of dephlogiftication and phlogiftication might be repeated without end. Thus, a piece of zinc in the metallic ftate was fuppofed to be loaded with phlogifton, therefore, when expofed to a fufficient degree of heat, it would burn, *viz.* it would part with its phlogifton, and would thereby be reduced into the ftate

ſtate of a calx, deſtitute of phlogiſton, and of the metallic appearance; but by placing this calx in contact with bodies which contained abundance of phlogiſton, in a proper ſituation, the calx would thereby be enabled to recover its phlogiſton, and with it its metallic ſtate and combuſtibility. It might then be burnt again, and ſo forth. This plauſible theory was no ſooner made known, than it was eagerly adopted by philoſophers and chemiſts; ſo that for a long period it remained the moſt prevailing theory of combuſtion. But though the theory was univerſally adopted, the exiſtence of the principle upon which it was eſtabliſhed could not be proved. There was no exhibiting the phlogiſtion by itſelf; and it was merely a ſuppoſition that a body acquired or loſt its inflammability, according as it was combined with, or deprived of, its phlogiſton. A ſuppoſition which, on a cloſer examination of facts, was found inadequate to the explanation of the concomitant phenomena. For inſtance, when a piece of zinc (and ſuch was alſo the caſe with other combuſtibles as far as they might be ſubjected to experiments) of a determinate weight, was burnt and reduced to a calx, the weight of the calx was found to exceed the original weight of the zinc. It was, therefore, evident that it had acquired ſomething ponderable, and this was utterly repugnant to the phlogiſtic theory, for by the loſs of phlogiſton it ought rather to have loſt part of its original weight. In anſwer to this, a ſtrange idea was ſuggeſted, namely, that the phlogiſton was a principle of lightneſs; ſo that bodies became lighter by the addition of phlogiſton and *vice verſâ*. But this ſuppoſition, ſo ſingular and ſo repugnant to the general laws of gravitation, was ſoon abandoned by philoſophers when a variety of deciſive experiments, the concurrence of recent diſcoveries in other branches of philoſophy, and a ſtrict mode of reaſoning, introduced a new theory of combuſtion, which is both ſupported by accurate experiments, and ſufficient to account for the phenomena. One of the principal labours in the experimental inveſtigation, and the full eſtabliſhment of this new and rational theory, was the unfortunate Lavoiſier, to whoſe genius, and to whoſe perſevering induſtry, the ſcientific world muſt ever think itſelf indebted.

In order to render this theory more eaſily underſtood by the reader, we ſhall prefix the following experiment. Take a glaſs veſſel of a cylindrical ſhape, having a ſtopple capable of excluding the entrance or exit of any air, and let the outſide of this veſſel be graduated, ſo as to divide its capacity into pretty ſmall portions. Put into this veſſel, full of common air, a piece of dry phoſphorus of a determinate weight; cloſe the veſſel tight, and heat gradually that part of it in which the piece of phoſphorus ſtands, by means of the flame of a candle. As ſoon as the phoſphorus has been heated to a certain degree, it takes fire of itſelf, burning with a flame and thick white ſmoke; but it ſoon ceaſes to burn. Suffer the veſſel to cool, and the ſmoke will fall in the form of flakes, if the veſſel and the air contained in it were quite dry, otherwiſe theſe flakes will melt in the moiſture. If, in this experiment, the veſſel be weighed before and after the combuſtion, it will be found preciſely of the ſame weight. When the veſſel is cooled to the actual temperature of the atmoſphere, plunge the aperture of it under water, and in that ſituation remove the ſtopple. You will find that the water riſes in it, which ſhews that a portion of the air has been deſtroyed or abſorbed; in ſhort, it has diſappeared. By meaſuring the height of the water riſen within the veſſel, which is indicated by the graduation on the outſide of it; in general, it will be found that about one quarter of the original quantity of air has diſappeared; and the remaining air will be found unfit for the combuſtion of phoſphorus or of any other combuſtible; and is likewiſe unfit for the reſpiration of animals, ſo that if a bird, a mouſe, or any other animal be confined in it, death will ſoon enſue. If the water which has ruſhed into the veſſel be examined, it will be found to have contracted a ſour taſte indicating that an acid has been generated. If the veſſel, inſtead of being opened in water be inverted and opened in quickſilver, then the flakes which in the preceding experiment were diſſolved by the water, will now remain on the ſurface of the quickſilver. This is the acid of phoſphorus, and if it be carefully gathered and weighed, it will be found together with the remaining phoſphorus (if part of it remains unburned), equal to the weight of the original quantity of phoſphorus together with the weight of the air that has diſappeared. Therefore it is evident that the whole proceſs of combuſtion conſiſts in a decompoſition of the pureſt part of reſpirable or atmoſpherical air; the pure part of it, which is about a quarter of the whole, is decompoſed, its baſe is abſorbed by the combuſtible, and generally communicates to it acid properties, in conſequence of which that portion of the atmoſpherical fluid has been called oxygen gas, from the Greek; meaning the acidifying principle. Therefore, in combuſtion, the decompoſition of the oxygen gas is effected by the burning body, when this body has been heated to a certain degree, which degree varies with the nature of the body. The baſe of the oxygen gas is abſorbed and fixed by the burning body, which has thereby its weight increaſed, and its nature changed; whilſt the caloric being diſengaged, paſſes off in the ſtate of ſenſible heat, and ſometimes with ſuch a portion of light as gives the appearance of red or white heat. Acids in general are formed from the abſorption of oxygen during combuſtion. See Oxygen Gas.

When the combuſtion is accompanied with red heat, but not with flame, it is called *ignition*. But ignition may alſo be applied to incombuſtible ſubſtances, for theſe may be rendered red or white hot, without ſuffering any decompoſition. When a vapour ariſing from the heated body burns over it, it is then called *inflammation*; and when the inflammation is rapid and attended with noiſe, it is called *detonation*. Having now compendiouſly ſtated the new theory of combuſtion, it is neceſſary to add ſeveral neceſſary remarks reſpecting every part of it, which could not be intermixed with the theory without rendering it confuſed and leſs intelligible.

In the firſt place, ſince the proceſs of combuſtion conſiſts in a decompoſition of oxygen gas, the generalizing ſpirit of modern philoſophy includes every proceſs, in which oxygen gas is decompoſed, under the general name of combuſtion; thus, animal reſpiration, in which this gas is decompoſed, its baſe abſorbed, and heat evolved; may be reckoned amongſt the proceſſes of ſlow combuſtion. See Respiration. The gradual abſorption of oxygen by metallic bodies may alſo be reckoned amongſt thoſe proceſſes.

Since combuſtion conſiſts in a decompoſition of oxygen gas, it naturally follows that without oxygen no combuſtion can take place. The oxygen, however, may be contained in other ſubſtances, in conſequence of which thoſe ſubſtances become capable of aſſiſting combuſtion. Now there are ſeven of thoſe ſubſtances, which, from their containing oxygen, are called *ſupporters* of combuſtion; and theſe are oxygen gas, atmoſpheric air, nitrous oxyd, nitric oxyd (which is procured by digeſting copper and mercury in diluted nitrous acid, and collecting the gas which is extricated), nitric acid, oxygenized mu-

riatic acid, and hyperoxygenized muriatic acid. See the nature of those substances under the article Gas. It also follows that with a given combustible, the quickness of the decomposition is proportionate to the supply of oxygen, which shews the reason why a fire is increased by blowing common air, and much more by blowing oxygen gas upon it. But cæteris paribus with different combustibles, the fire is strongest when the combustible has the strongest attraction for oxygen. The flame of hydrogen gas urged by oxygen gas is reckoned to produce the most intense heat.

A combustible body, though exposed to oyxgen, generally requires to be heated to a certain degree before the combustion commences. That degree varies with the nature of the body, and the purity of the oxygen; so much so that some of them, though not many, take fire immediately on being exposed to some of the above-mentioned supporters of combustion in the common temperature of the atmosphere, whilst others must be heated to a red and even to a white heat, before the decomposition takes place.

When the combustion has once commenced, the heat or caloric, in the form of sensible heat, which is extricated from the oxygen gas, raises the temperature of the adjacent parts of the combustible to that degree which is necessary for its combustion, and the heat evolved by the burning of this part heats the next and so on. But this is not the case with all sorts of combustibles; for some there are which must be kept up at a given high temperature in order to effect their combustion, and a diamond is of this sort. However the nature of combustibles in this respect varies according to the purity and quantity of oxygen. For instance, if a slender steel wire be exposed to the flame of a candle in common air, that part of it only will burn, which is acted upon immediately by the flame; but if the same wire be lighted by means of a bit of tinder, and then be plunged in a vessel full of oxygen gas, it will burn successively to the very end, like a slip of paper; exhibiting a remarkable bright light, and very considerable heat.

Of the simple bodies of nature, the chemists reckon three combustible ones, and two that are incombustible. The former are sulphur, phosphorus, and hydrogen; and the latter are azote and muriatic acid; but amongst the compound bodies, the combustibles are much more numerous. Such are oils, acids, and a vast variety of others which being of a fluctuating nature need not be particularly specified.

A variety of experiments, which may be found under the article Gas, prove that gasses owe their elastic nature to a considerable quantity of caloric, which must necessarily combine with their base, in order to assume the aerial form. Therefore, when, in consequence of the superior affinity of the combustible for oxygen, the oxygen gas is decomposed, and its base condensed, the caloric, which was necessary to its aerial form, being set at liberty, appears in the form of sensible heat; hence the heat which accompanies combustion is naturally supposed to proceed from the oxygen gas; and the quantity of it varies according to the rapidity of the process, so much so that in certain processes like the decomposition of oxygen effected by metallic substances in common air, it is not attended with any sensible degree of heat; for the heat evolved, being very slight, is instantly dissipated among the surrounding bodies.

With certain combustible bodies a peculiar process takes place. It is a remarkable slow process of spontaneous combustion. The body, by attracting oxygen from the atmosphere, becomes thereby gently heated, in consequence of which its affinity to oxygen is increased, a greater decomposition of the latter ensues, more heat is evolved, and thus the process is gradually accelerated until flame and visible combustion take place. Such is sometimes the case with hay, the saw-dust of certain woods, and various other substances. The well known mixture of iron filings and sulphur moistened with a little water, is an instance of this sort; for if this mixture be buried a little below the surface of the ground, it will of itself, after the lapse of several hours, burst forth in a state of ignition. This experiment has been generally called the *artificial volcano*.

Though heat in combustion is derived from the oxygen gas, the derivation of light is not so evident. It has been for a long time supposed that this element also was one of the components of oxygen gas; but the observations made respecting the light yielded by several bodies when they are slightly heated, or even spontaneously, and that some of them yield much more light than others, seem to prove, that light forms a component principle of most bodies, and that it is evolved from the combustible. It is likely, however, that part of it may be derived from the oxygen also.

The following list of bodies subject to spontaneous inflammation is given by professor Bartholdi; meaning the inflammation occasioned by different bodies acting upon each other, without the aid of another body previously in a state of combustion.

1. Friction. Thus pieces of wood rubbed against each other are thereby inflamed. The best for this purpose are box-wood rubbed against mulberry, or laurel against poplar, or against ivy, &c. It is in consequence of friction that the wheels and axletrees of carriages sometimes take fire, when they are not sufficiently greased. In turning also, pieces of wood sometimes take fire.

2. The action of the sun's rays concentrated by lenses, or concave reflectors, or even by plane reflectors, provided their reflections be thrown upon the same spot. See Burning-*Glass*, and Reflectors.

3. The sudden slacking of quicklime has sometimes been known to produce the combustion of adjacent bodies.

4. The fermentation of animal and vegetable substances. Thus great accumulations of hay, turf, or flax, and hemp, heaps of linen rags in paper mills, &c. take fire, provided they are not quite dry; for without moisture, fermentation and the consequent evolution of heat cannot take place.

5. The accumulation of animal and vegetable substances covered with an oil, especially when the oil is of a drying quality. Thus lamp-black mixed with linseed oil is apt to take fire, and an earth of a brown colour, called the *black wad of Derbyshire*, sprinkled over with a little linseed oil, takes fire and appears red-hot like burning small coal, in about an hour's time.

6. There are several substances, which have the property of inflaming spontaneously, increased by torrefaction. Coffee, French beans, lentils, &c. are of this nature.

7. Sulphurated and phosphorated hydrogen gas. The cause of subterraneous fires and volcanoes in general, is attributed to the decomposition of pyrites, or metallic sulphurets, buried in the interior of the earth. These pyritous masses are decomposed by the contact and concurrence of water and air, and the decomposition is always accompanied with a great extrication of caloric, and a disengagement of a very inflammable gas, called *sulphurated hydrogen gas*. This gas inflames at an elevated temperature, and communicates the inflammation to the sulphur of the pyrites, to the coal and other bituminous matters, which generally accompany it.

8. Sulphuret and phosphuret of lime and of potash, formed in the combustion of several vegetables.

9. Phosphorus sometimes contained in charcoal.

The laſt particulars which we need take notice of, concerning the theory of combuſtion, are its products. But theſe muſt not be miſtaken for thoſe bodies which exiſted in certain combuſtibles, and have been left by themſelves when the other components of the combuſtible have been ſeparated, ſuch as earthy particles, &c. The real products of combuſtion are thoſe which did not exiſt before, and theſe, upon a ſtrict examination, will be found to be either water, or an oxyde, or an acid. Water conſiſts of oxygen and hydrogen. See WATER. An oxyde is a compound of the combuſtible with oxygen, but not ſuch as to poſſeſs decided acid properties, (and the proceſs is called *oxydation*), or an acid, which conſiſts of the acidifiable part of the combuſtible, combined with oxygen ſufficiently to give it decided acid properties. Thus, the combination of carbon and oxygen forms the carbonic acid gas, and this is produced in almoſt every combuſtion, alſo in reſpiration, &c.

COMCHE, in *Geography*, a town of Perſia, where the caravans reſt in their way from Iſpahan to Ormus.

COME, in *Biography*. See COSME.

COME. The ſmall fibres or tails of malt, upon its firſt ſhooting forth, are thus called.

COME-IN. Soldiers are ſaid to come in as recruits, volunteers, &c. when they come to join any particular corps or ſtandard.

COME-OVER. When men deſert from one army and join another oppoſed to it, they are ſaid to come over to the one, which they join or go over to.

To come *in to*, to join, to bring aid or aſſiſtance.

To come *up with*, to overtake. *To come up with an enemy*, is a military phraſe much made uſe of.

COME *ſopra*, in the *Italian Muſic*, literally ſignifies *as above*, and is uſed when any foregoing part is to be repeated.

COMEA, in *Ancient Geography*, a place of European Myſia, which was an epiſcopal ſee, called by the council of Nice *Comeenſis*.

COMEDÆ, a people of Scythia, compriſed by Ptolemy under the general name of Sacæ.

COMEDONES, a name given to a ſpecies of worm, with which the children of Miſnia, and ſome other countries, are terribly afflicted; and of which Hoffman, in his "Treatiſe of Endemial Diſeaſes," gives this account; children in the country are frequently ſeized with a ſort of tabes, which ſo deſtroys their fleſh, that they appear merely like ſhadows. The common people generally ſuppoſe theſe children to be under the influence of witchcraft; but ſuch as have inquired more narrowly into the diſtemper, have found that it is owing to certain worms, reſembling black hairs or cords, lodged under the ſkin. When the ſkin is rubbed with honey, in a bath, or any warm place, they will appear and come out; but when it is contracted by cold, they keep concealed within. See AFFECTIO *bovina*, and DRACUNCULI.

COMEDY, in its proper ſenſe, ſignifies an allegorical repreſentation of ſome characteriſtic tranſaction in private life. The drama, under its various forms, has in all ages and countries been cultivated, not only as a rational and polite amuſement, but as a ſerious art, affecting the moral conduct of men, and influencing the condition of ſociety. According to the field it occupies, whether the lighter traits of incidental character, or the important events of life, it aſſumes the form of tragedy or comedy. The firſt commands awe; the laſt excites more pleaſureable and exhilarating ſenſations. The firſt exhibits the fall of a hero; the laſt conducts the fortunes of lovers to the goal of marriage, and ſets down the eccentricities of every character it meets with on the way. If therefore tragedy is more exalted, comedy comes cloſer to the heart, and appeals more powerfully to the experience of man. The ſtronger paſſions, the virtues, the crimes, the ſufferings of mankind are the theme of the one: our humours, our follies, the effervefcence of youth, or the ſeverity of years the topics of the other. Terror and pity are the inſtruments of pleaſure in the firſt caſe, but ridicule in the laſt.

It is therefore very eaſy to diſcriminate the general ſpirit and ſtrain of comedy from that of tragedy. Neither is it leſs moral or leſs uſeful, when conſidered as a ſatirical exhibition of human life, with all its improprieties and abſurdities. There is nothing in the nature of theſe compoſitions, in either kind, which militates againſt good morals; though a French author endeavoured to affix the imputation of a profane and antichriſtian ſpirit on the great Corneille. The improvement of manners, the regulation of ſocial intercourſe, the ſubjection of vicious conduct to the laſh of infamy, are among the benefits reſulting from this ſpecies of poetry. Ridicule often ſucceeds where argument fails. Yet is it a dangerous weapon, when unſkilfully wielded. For it is by no means the teſt of truth. It may be applied to miſlead and ſeduce, inſtead of reforming; and the blended colours of ridicule are ſometimes more difficult to ſeparate, than the ſtrong lights and ſhades of truth and error. Cicero quotes ſome lines of a comedy, where love is repreſented as the greateſt of the deities. On the ſtrength of this ſentiment, he exclaims loudly againſt comic poetry as a corrector of morals; contending at the ſame time, that the art could not exiſt, if it had not vanity or villainy to feed upon. Beſides this, it happens too frequently, that the ridicule falls where it is leaſt deſerved. This however is the fault of the writer, and not to be imputed to the nature of his ſubject. It depends on the combatant, whether the ſword ſhall be drawn in a good cauſe, or in a bad one. The ſucceſs of tragic repreſentations gave riſe to the ancient comedy at Athens. In the latter, as well as in the former, the unity of action and ſubject is abſolutely requiſite, and thoſe of time and place ſhould be as nearly as poſſible preſerved. By this is meant, that the time of action ſhould be reduced to moderate limits, and the place never changed but with the termination of the act. The ſcenes of converſation muſt be united in a natural ſucceſſion, and the ſtage ſhould be perpetually occupied during the continuance of the act. The audience ſhould likewiſe be made to perceive the neceſſity of the various perſonages appearing and diſappearing juſt as they do. By theſe means, the imitation is allied to probability, and pleaſes in proportion. Probability is indeed more indiſpenſibly neceſſary in comedy, which deſcends to ordinary life, than in tragedy. Nature, whether in the management of the incidents, or the delineation of character and ſentiment, is the only ſolid foundation for this ſpecies of writing. The ſcene and ſubject of comedy ſhould be laid in the country and time, where and when it is to be repreſented. The little proprieties or indecorums of character and behaviour vary with the moment, and become unintereſting or unintelligible, except where they are ſeen and known in real life.

The various perſonages in a well managed comedy ought to be diſtinctly marked, without the affectation of contraſting them by pairs. Ordinary writers may ſeem to acquire a ſtrong light and ſhadow by quaint artifices like theſe: but a maſter looks no further than real life, and repreſents it as it is. The diction ſhould be eaſy, natural, and poliſhed, on a level with the converſation of gentlemen in the higher walks, but above the groſſneſs of the vulgar in the lower. Perhaps there is nothing in the art ſo difficult, as to ſupport a ſpirited and happy dialogue. The parade of miſplaced wit has ſpoiled almoſt as many comedies as actual dulneſs.

The feaſt of Bacchus, Suſarion on his ſtage, and Theſpis in his cart, are the humble origin uſually aſcribed to the drama. Suſarion repreſented his firſt pieces towards the year 580 B. C. Theſpis made his firſt attempts in tragedy, and acted his Alceſtis in 536 B. C. The former attacked the vices and abſurdities of his time; and the latter treated more noble ſubjects, which he took from hiſtory. See DRAMA and THEATRE. Comedy had three ſtages among the Greeks. The ancients indulged in the licence, not only of dramatiſing actual and well-known occurrences, but of identifying them with living perſons. The name even of Socrates was not withheld from theatrical ridicule; and the philoſopher was among the number of the audience. This licence in proceſs of time was interdicted by the authority of the magiſtrates. The players no longer at liberty to ſport with real names, contrived maſks to reſemble the features of thoſe whom they meant to attack: this was the middle comedy. This latter abuſe was ſcarcely leſs offenſive than the former; and was at length prohibited. Deprived of maſks as well as of names, the new comedy confined itſelf within thoſe modeſt and moral bounds, which Menander ſet to its irregularities in the time of Alexander the Great. On this model, Plautus and Terence formed their ſtyle, without taking the trouble of transferring the ſcene to their own country. This ſpecies of entertainment was then ſcarcely naturalized among the Romans; and their performances were rather tranſlations than originals. In the courſe of time, Rome diſtinguiſhed its comedy, founded on native manners, by the name of Comædia Togata, and that which was borrowed from the Greeks, was diſtinguiſhed as the Comædia Palliata.

Before the introduction of modern comedy, a ſpecies of dramatic repreſentation was in vogue, taken from the ſtories in the Old and New Teſtament, the Martyrdoms of the Saints, and other religious ſubjects. They were called myſteries: as the myſtery or the Play of the Paſſion, the myſtery of the Acts of the Apoſtles, the myſtery of the Apocalypſe, &c. Theſe entertainments were at firſt given in the churches, and made a part of the eccleſiaſtical ceremonies. Afterwards the myſteries were played on a public ſtage. On the entrance of Charles VII. into Paris in the year 1437, ſcaffolds were erected all along the great ſtreet, St Deny's, on which were acted, with ſplendid and appropriate decorations, the Annunciation of the Bleſſed Virgin, the Nativity, our Lord's Paſſion, his Reſurrection, the day of Pentecoſt, and the laſt Judgment. In the year 1486, the chapter of the cathedral at Lyons voted ſixty livres to the performers in the myſtery of Jeſus Chriſt's paſſion. About 1540, the ſame city exhibited on Sundays and holidays, for the ſpace of three or four years, the greater part of the hiſtorical facts in the Old and New Teſtament, ſucceeded by a farce, in the ſame manner as in our theatres. The popular name of the play-houſe was Paradiſe. Theſe ſacred comedies were much in faſhion in France under Francis I. who patronized them, and attended their repreſentation. One of thoſe, which attracted his approbation, was entitled the myſtery of the paſſion of our Lord and Saviour Jeſus Chriſt. It is ſaid in the title page to have been performed "triumphantly at Angiers:" and indeed ſo it muſt have been; for there were one hundred and forty-one characters in the dramatis perſonæ. The date of it is 1541. But the abuſes to which theſe religious performances gave riſe occaſioned at length a very ſevere law throughout the kingdom, againſt the exhibition of "Our Lord's Paſſion," and other ſimilar ſubjects. Many of theſe pieces are ſtill extant in print.

One of the firſt objects in modern comedy, is the Spaniſh theatre, fertile as it has been in dramatic productions. Lopez de Vega, Guillin, and Calderon, are the principal comic writers of Spain. The firſt of theſe, and the moſt celebrated, is ſaid to have written above a thouſand plays. But our ſurpriſe at their number is leſſened when we become acquainted with their nature. Neither the unities, nor any other rules of dramatic writing are in any degree obſerved. One piece often contains the life of a man, nor is the ſcene limited to one quarter of the globe. They are for the moſt part tragi-comedies, taken from Spaniſh hiſtory; where war and heroiſm are coarſely mixed up with ridicule and buffoonery. Allegorical and mythological characters, the Pantheon and the ſacred myſteries, contribute their joint ſtock to theſe extravagant and unique performances. Yet are they not without ſtrong traits of genius, and much ſplendour of imagination. The characters are ſometimes well drawn, and the ſituations happy. To this writer, more than any other, are the public indebted for that taſte for the ſurpriſing, which ſo ſtrongly pervades the modern drama. It is plain from his own apologies, that Lopez de Vega complied with the whimſical fancies of his countrymen; and that had he been at liberty to have led the taſte of his times, inſtead of following it, his ſtories would have been more natural, his intrigues more ſkilfully entangled and unravelled, and his characters more conſiſtently preſerved.

The French comic theatre is in general an excellent ſchool of manners; correct, chaſte, and decent. It may well boaſt of ſuch writers as Regnard, Dufreſny, Dancourt, and Marivaux; but Moliere is the glory of their ſtage. No writer in any department roſe to a higher reputation, in the brilliant age of Louis XIV. It may indeed be queſtioned, whether any comic writer has ever appeared with ſo many excellencies and ſo few defects. Vice and folly are the only objects of his ſatire. Though his characters are often peculiar to his own country and times, the ridicule is applied ſo juſtly as ſcarcely to have loſt its force with foreigners or with poſterity. His mirth is not indulged at the expence of good morals. The "Miſanthrope," and "Tartuffe," are in verſe; they therefore riſe into greater dignity, and aſſume the ſtyle of elegant ſatire. In his proſe comedies he is more ludicrous. His excellence conſiſts more in the ſtrength of his characters, than in the conduct of his plots. He is occaſionally too farcical in his proſe, and too prolix in his verſe. "Tartuffe" in the grave comedy, and his "Avare," in the lighter, are uſually conſidered as his maſter-pieces.

Engliſh comedy abounds more in original characters, than the comedy of any other modern nation. Humour is a leading feature in the character of the people. The freedom of our government and manners affords a wider ſcope to the comic muſe, than ſhe is allowed in the deſpotic courts of the continent. This boldneſs has, however, too often degenerated into a licence almoſt bordering on the immorality of the ancient Greek comedy. But this error has, however, been corrected in later times, and the ſtage has conformed to the more decent manners of an age which is rapidly diſcarding the groſſneſs of vice from public view.

It now only remains to give a character of ſome of our moſt eminent comic writers.

Shakſpeare decidedly takes the lead in each department of the drama; but his excellencies are ſo univerſally felt and underſtood that it would be ſuperfluous to enter into a criticiſm of his productions. Of Jonſon it will only be neceſſary to notice a few leading pieces. "Every Man in his Humour" is a play which places this writer ſcarcely lower than

than the higheft, whether we advert to the variety of its characters or the energy of its compofition. It is to the credit of the prefent tafte, that it regained poffeffion of the ftage, in defiance of its obfolete allufions, and antiquated garb. "Every Man out of his Humour" has much lefs to recommend it than the preceding comedy, though ftrongly marked in point of character. It has undergone the ufual fate of perfonal fatire, to die with the individuals at whom it glances.

"Cynthia's Revels" and the "Poetafter" are chiefly to be remembered, as having been acted by the children of queen Elizabeth's chapel; a relic of theatrical entertainment after the mode of its ancient inftitution, when the facred myfteries were reprefented by the choir of the church or monaftery.

Volpone is perhaps the beft of this author's comedies. The language and character are wrought up to the higheft finifh, and the poet exhibits an originality of plot, conception, and execution, which proves that he could throw afide the trammels of the ftudent, and lay claim to the honours of an unindebted thinker, as well as thofe of a fuccefsful imitator. The pictures of Volpone and Mofca are finely imagined, and their circumftances moft happily delineated. His "Epicœne" is exceeded by few comedies in the Englifh language. If to thefe two we add the "Alchymift," the merits of which are univerfally allowed, though the object of its fatire has given place to other errors and other follies, we fhall form fuch a conftellation of comic genius, as will outfhine all competition but that of his illuftrious contemporaries. His later pieces, confifting of his "Bartholomew Fair," "Staple of News," "New Inn," "Magnetical Lady," and "Tale of a Tub," rather detract from his reputation than augment it; and prove, what many other dramatic writers would have done well to confider, that faculties devoted to the entertainment of the public will at length be exhaufted, without fome fources of repletion from change of fcene or circumftances.

The triumvirate, fuch as was never equalled, before or fince, in the republic of letters, was completed by John Fletcher, whofe merits are clofely blended with thofe of his affociate Beaumont. His genius rather affimilates with Shakfpeare than with Jonfon, to whom he is confeffedly inferior in propriety and precifion, while he furpaffes him in creative powers and poetical fecundity.

The next writer that obtained a large portion of the public favour and attention was Davenant, whofe propenfity to poetry is faid to have appeared fufficiently early in life to attract the favourable notice of Shakfpeare, though the great bard died when this young rhymer was only ten years old. What is commonly confidered as Davenant's firft play was produced in 1629, though he had attempted dramatic compofition two or three years before. It is not worth while to enumerate the order or titles of his plays and mafques; which were in general well received, and procured his promotion to the laurel, vacant by the death of Jonfon, as a reward for the affiduity with which he directed the diverfions of the court, as long as the troubles of the times permitted it to have any. It was to his addrefs, that the people were indebted for the gradual reftoration of the mufes, after an interregnum of feverity and gloom. At firft he prevailed on men of tafte and learning to countenance a hafty fpecies of dramatic melange, which was allowed becaufe it was bad, by the ignorant bigots who held the reins of empire, while rational and regular plays were abfolutely prohibited. But he imperceptibly enlarged his fphere of compofition, and after the reftoration obtained the patent of the theatre in Lincoln's Inn Fields. The ftage is not perhaps more deeply indebted to any man than to Davenant, for the convenience and aptitude of its arrangements in the manager's department. Befides many lefs material improvements, it owes to him the introduction of female performers, and painted fcenery; and from his revival of "Macbeth" and the "Tempeft" may be dated that devotion to embellifhment, which has ever fince inundated the Englifh ftage, and, in the judgment of feverer critics, overwhelmed the fenfe and difcernment of the audience. His irregular entertainments, reforted to in the firft inftance only as fubftitutes for better things, may indeed be confidered as the root of all that theatrical evil, we fo gravely condemn, but at the fame time fo freely encourage. Yet he had the praife of bringing forward to the public eye fcenery, women, and Betterton.

Maffinger was alfo among the fterling fupports of the Englifh drama; of which he may juftly be reputed one of the fathers. His ftyle was rough, manly, and vigorous; he preffed upon his fubject with a fevere but mafterly hand; his wit was cauftic, and his ferious dialogue, according to its fubject, ftern and impreffive, or natural, eafy, and interefting.

Dryden did not commence his career as a writer for the theatre, till the thirty-fecond year of his age; but from that period he kept poffeffion of it, and produced eight and twenty dramas, not indeed without competition or cenfure, but with a large fhare of predominant reputation. His firft production was the "Wild Gallant;" a comedy, which met with fo indifferent a reception, that had Dryden been a man of fortune, the ftage had never again been benefited by his affiftance. He was affociated with Davenant, in the alteration of the "Tempeft;" but he acknowledges the invention and writing of the new characters chiefly to belong to his colleague. We cannot, however, help contemplating the perfections of Shakfpeare with aftonifhment, when we find that two fuch powerful minds could produce little or no addition to the effect.

On the character of his comedies, it will not be difficult to decide. He has, himfelf, acknowledged his inaptitude to that fpecies of compofition; and certainly his plays in general have much lefs merit than his other writings. Yet, after all, he has eftablifhed a reputation that will never fade, even in this branch of poetry; and his drama of the "Spanifh Friar" may be felected, as an inftance of happy coincidence and real ingenuity, in the combination of ferious and rifible materials. Indeed the unfitnefs of his comic performances for modern reprefentation arifes more from their extreme licentioufnefs and immorality than from any defect of power.

The comedies of Otway are defervedly excluded from the reading defk as well as from the ftage, on account of their undifguifed obfcenity.

Congreve, at the age of twenty-one, produced the "Old Bachelor," at the theatre in Drury Lane, to amufe himfelf in a flow recovery from a fit of ficknefs. It received fome requifite touches from the maturer judgment of his friends, and Dryden declared that he had never feen fuch a firft play. The "Double Dealer," and "Love for Love" fucceeded it, at an interval of a year each. Five years afterwards his comedy, called the "Way of the World," clofed his dramatic labours at a time of life, when writers in general are but beginning their career. The indifferent fuccefs of his mafterpiece excited his difguft at the caprices of the public. He never refumed his pen in the fervice of the theatre, except to write a mafque, called the "Judgment of Paris," and

and an opera, called "Semele," which was never reprefented; but as his fame refts on his five regular pieces, we may confider him as loft to the ftage, after the unkind reception of a play, which has fince vindicated its ftation among the moft brilliant ornaments of the drama.

It is on his comedies principally, that Congreve's reputation fubfifts. Here, all is luminous, all genuine, pointed, and original. His men of fafhion are gentlemen, and even his fops are wits. Congreve is confidered as having lefs humour and lefs of real life, than his illuftrious rivals of the fock. But, furely "Forefight" abounds with the richeft humour, and that of a defcription, which, though now antiquated, was living and current at the time. Indeed it is an undoubted teftimony to the happy drawing of this character, that though it is only recognized by the modern fpectator as a picture of the days that are gone by, it never fails to excite rifibility on the ftage in a very powerful degree. The leading feature of Congreve's genius is wit. Dr. Johnfon fays, that he formed a peculiar idea of comic excellence, which he fuppofed to confift in gay remarks and unexpected anfwers. Now, certainly, in adopting fuch a theory of compofition, he too much narrowed his own fphere. Still, however, no more is to be required of a writer, than what he himfelf undertakes; and Congreve performed what he undertook with a brilliancy of fuccefs, which, with the exception of Mr. Sheridan, has neither been rivalled nor approached in the revolution of the century that has elapfed. It has been objected, that "his perfonages are a kind of intellectual gladiators; every fentence is to ward or ftrike; the conteft of fmartnefs is never intermitted." This remark is undoubtedly true; yet, when we find Congreve thus formidably cenfured for the exuberance of his wit, it is impoffible not to feel as the king of Pruffia did, when he wifhed a certain mad commander to bite fome of his generals.

Could the licentioufnefs of Congreve's topics be as eafily juftified as the overflowings of his gaiety, his fame would continue to blaze without danger of eclipfe. But in truth, the offence his mufe occafions to the purer ears of a more moral age, has an unhappy tendency to fhorten his theatrical exiftence. The obfervation applies equally, if not in a greater degree, to all his witty, but gracelefs contemporaries; and it may be remarked on fuch freedoms in general, that they create difguft and alienation, at leaft in fome minds, in a place and on an occafion, where it fhould be as much an author's ftudy never to offend any, as occafionally to pleafe all; confequently though they may increafe the number of temporary plaudits, they infect the vitals of a reputation, that otherwife might have been immortal, with a principle of early decay.

To particularize the merits either of Congreve's rivals, Wycherly, Farquhar, Vanburgh, &c. or the numerous clafs of writers in the fucceeding ages, who have cultivated the *comedie larmoyante*, would exceed the limits of this article. The latter is indeed almoft as obfolete as the coarfe but fterling wit of king Charles's days. It has given place to the diftorted portraits and philofophy-run mad of the German fchool; a tafte from which it is moft devoutly to be wifhed that the drama may be fpeedily refcued.

COMENII, in *Ancient Geography*, a people of Illyria, according to Ptolemy, adjoining to the Daurfiani and Vardæani.

COMENITZA, in *Geography*, a town of European Turkey, in the province of Epire, 52 miles S.W. of Delfino.

COMENIUS, JOHN AMOS, in *Biography*, a celebrated grammarian and divine, was born in the year 1592, in Moravia. He ftudied at Herborn, and returned to his own country in 1614, and was appointed rector of a college there. In 1618 he became paftor of the church at Fulnec, and was appointed mafter of the fchool which had been lately erected. Here he conceived the idea of an improved method of teaching the languages, but his writings on this fubject were deftroyed in 1621, when the town was taken and plundered by the Spaniards. In 1624 he retired from the perfecutions inflicted upon the Proteftants in Germany, to Lefna, a city of Poland, where he devoted himfelf to the inftruction of young perfons in the Latin language: here he publifhed in 1631 his "Janua Linguarum referata," a work which obtained for him great reputation, and which was fpeedily tranflated into 12 European languages, and alfo into the Arabic, Turkifh, Perfian and Mogul languages. He was now invited into Sweden to take the charge of the public fchools in that kingdom, which he declined; and having publifhed the "Panfophiæ Prodromus," or "Forerunner of Univerfal Science," he was folicited by the parliament of England to undertake the reformation of the fchools there. He arrived in London Sept. 1641, but owing to the civil wars his propofals were neglected, and he went to Sweden, and from thence to Elbing in Pruffia, where he employed fix years in perfecting his new method of inftruction, but did not meet with fufficient encouragement to induce him to publifh his thoughts on the fubject. In 1648 Comenius was invited to the court of Sigifmund Ragotfki, prince of Tranfylvania, where he lived four years, and propofed regulations for the college of Patak, upon the plan of his Panfophia, from whence he returned to Lefna, and continued there till 1656, when the town was burnt in the war between the Swedes and the Poles. On this occafion he loft all his manufcripts excepting what he had compofed on his Panfophia, and the Apocalypfe. He fled into Silefia, thence to Brandenburgh, afterwards to Hamburgh, and laftly to Amfterdam, where he continued till his death, which happened in 1671. At Amfterdam he publifhed his "New Method of Teaching," which added nothing to his reputation, and which the learned Bayle has declared of no worth whatever in the art of inftruction. In this opinion he is fanctioned by the concurrent voice of the learned in every fucceeding age to the prefent time.

Comenius was not only intent upon the reformation of fcholaftic learning, but he embraced the notions of a fpeedily approaching millennium, and pointed out as characters who were to be eminently diftinguifhed in fulfilling the prophecies, Guftavus Adolphus, Cromwell, and others, who had little claim to the honours of a divine miffion. Succeeding events contributed to diffipate, in fome meafure, the enthufiaftic notions which he had embraced and cherifhed. By fome of his contemporaries he was charged with having poffeffed more knavery than credulity, but of this there feems to be no fatisfactory evidence. He publifhed "Commentaries on the Apocalypfe," fome treatifes on the Socinian controverfy, and "Hiftoria Fratrum Bohemorum," in 4to. Nouv. Hift. Dict. Bayle.

COMENOLITARI, in *Geography*, a country of modern Greece, which comprifes the ancient kingdom of Macedonia and Theffalia.

COMENSES, in *Ancient Geography*, a people of Afia Minor, towards Galatia, according to Pliny. Hardouin calls them Chomenfes, deriving their name from Choma, a town fituated in the interior of Lycia.

COMERCHIN, in *Geography*, a town of European Turkey, in the province of Romania; 62 miles E. of Emboli.

COMES *Nervi Phrenici*, in *Anatomy*, is a fmall branch of the internal mammary artery. See ARTERIES.

Comes, in *Antiquity*. See Count.

Comes, Natalis, in *Biography*, was born at Milan in the fixteenth century, and is greatly diftinguifhed for his claffical learning. He tranflated from Greek into Latin the "Deipnofophiftæ of Athenæus," the "Rhetoric of Hermogenes," and he publifhed poems of his own in both thefe languages. In 1581 he publifhed a hiftory of his own times from 1545 to 1572, but his principal work is a fyftem of mythology entitled, "Mythologiæ, five Explicationis Fabularum, lib. x." It was dedicated to Charles IX. of France. He died in 1589, and on account of his love of allegory and myfticifm he was denominated by Jofeph Scaliger "Homo futiliffimus." Moreri.

Comes *Domefticorum Equitum et Peditum*: Colonels of the archers of the body guard of the Roman emperors. Thofe archers were all of them chofen men of Armenia; and their number amounted to feven thoufand five hundred.

COMESSAZZA, in *Geography*, a river of Italy, which runs into the Oglio; 9 miles N.E. of Sabionetta.

COMESSAZZO, a town of Italy, in the duchy of Mantua, 3½ miles N. of Sabionetta.

COMESUS, a lake of America, in the ftate of New York; 27 miles S. of the lake of Ontario.

COMET, in *Aftronomy*, a heavenly body, in the planetary region, appearing fuddenly, and again difappearing: and during the time of its appearance moving in a proper, though very eccentric orbit, like a planet. Comets, like the planets, move in different planes, but the motion of fome of them is direct, and that of others retrograde.

Comets, popularly called *blazing ftars*, have this to diftinguifh them from the other ftars, that they are ufually attended with a long train of light, always oppofite to the fun, and which is of a fainter luftre, the farther it is from the body. Hence arifes a popular divifion of comets into three kinds, viz. *bearded*, *tailed*, and *hairy comets*; though in effect this divifion rather relates to the feveral circumftances of the fame comet, than to the phenomena of feveral.

Thus, when the comet is eaftward of the fun, and moves from it, it is faid to be *bearded*, becaufe the light precedes it in manner of a beard. When the comet is weftward of the fun, and fets after it, it is faid to be *tailed*, becaufe the train follows it in manner of a tail. Laftly, when the comet and the fun are diametrically oppofite, (the earth being between them), the train is hid behind the body of the comet, excepting a little that appears around it in form of a border of hair, or *coma*, whence it is called *hairy*, and whence the name of comet is derived.

Comets, *nature of*.—As to the nature of comets, the infrequency of their appearance, together with the feeming irregularities of their phenomena, have left philofophers of ancient, and even more modern times, much in the dark. Thofe who lived before Ariftotle, accounted for them by fuppofing the heavenly fpaces full of an infinite number of ftars; and many of them too remote, or too fmall, to have ever come under the notice of aftronomers; thefe invifible ftars they farther fuppofed to move by their own proper motion every way; finifhing their courfes in very unequal times. Now, a comet, according to them, was a vaft heap or affemblage of thefe little ftars, meeting together, by reafon of the inequality of their motions, and uniting into a vifible mafs; which muft again difappear, as thofe ftars feparated, and each proceeding in its courfe. But how thofe ftars fhould thus meet, coalefce, and form a body, which in all pofitions of the fun fhould refemble a tail, and again feparate, is a myftery.

This opinion, therefore, Ariftotle eafily overturned; fubftituting another in its ftead. According to Ariftotle, comets were only a kind of tranfient fires or meteors, confifting of exhalations raifed to the upper region of the air, and there fet on fire; far below the moon's courfe. But neither is this hypothefis more juft than the other: for on this principle, the light of the comet, being independent of the fun, would be difperfed every way alike, without any appearance of a train, or tail, which is contrary to the phenomena. Moreover, they are obferved at the fame time in places on the earth very remote from each other. Befides, the modern aftronomers who have meafured the diftance between the comets and the earth, find that the comets have no fenfible diurnal parallax; which could not be, were they not much more remote than the moon, whofe parallax is fenfible; and yet as they have a fenfible annual parrallax, they are not fo remote as the fixed ftars. Indeed, there were fome, Pliny tells us, among the ancients, who, "had jufter notions; who took thefe ftars to be perpetual, and believed they moved in their proper orbs; but were never feen, unlefs when left by the fun." Ariftotle, in his firft book of Meteors, mentions this doctrine of the ancient philofophers; and obferves, that fome of the Italians, called Pythagoreans, faid, that a comet is one of the planets, but that they do not appear unlefs after a long time, and are feen but for a fhort time, which happens alfo to Mercury. Apollonius Myndius declared, that he took comets for regular ftars; affirming alfo, that the comets were reckoned by the Chaldæans among the planets, and to have their periods like them. He alfo ventured to foretel, that one day the periods and laws of their motion would be difcovered. And more fully Seneca, Quæft. Nat. lib. vii. He had himfelf feen at leaft two comets, one in the reign of Claudius, the other in that of Nero; befides that which he faw in his youth, a little before the death of Auguftus, which in one place he calls a comet, and in another a prodigy. He intimates that he thought them above the moon, and argues ftrongly againft thofe who imagined that they were meteors elevated into the air by winds, or who held fome other abfurd opinions concerning them. "I am not of the common opinion," fays he, "nor do I take a comet to be a fudden fire, but efteem it among the eternal works of nature." *Quid autem miramur cometas, tam rarum mundi fpectaculum, nondum teneri legibus certis, nec initia illorum finefque innotefcere, quorum ex ingentibus nec intervallis recurfus eft? Veniet tempus quo ifta quæ nunc latent, in lucem dies extrahat, & longioris ævi diligentia. Veniet tempus quo pofteri noftri tam aperta nos nefciffe mirentur. Erit qui demonftret aliquando, in quibus cometæ partibus errent; cur tam fe ducti a cæteris errent, quanti qualefque fint.*

This prediction we have feen accomplifhed in our days by the great fir Ifaac Newton; whofe doctrine concerning them will appear in the fequel of this article. Seneca recommended it to aftronomers to keep a catalogue of the comets, in order to be able to determine whether they returned at certain periods. The authority of Ariftotle, however, long prevailed; and comets were generally confidered as meteors, exifting in our atmofphere, till the time of Tycho Brahe. This excellent aftronomer was the firft among the moderns, who, after diligently obferving the comet of 1577, and finding that it had no fenfible diurnal parallax, affigned it its true place in the planetary regions. (See his book De Cometa, anni 1577.)

Although few comets have approached fo near the earth as to have a diurnal parallax, they afford fufficient indications of an annual parallax; that is, the revolution of the earth in her orbit caufes their apparent motion to be very different from

from what it would be, if they were viewed from the ſun, or any fixed place. See the firſt of the phenomena recited in the ſequel. This ſhews that they are not ſo diſtant as the fixed ſtars, which have no annual parallax; and, as Hevelius obſerves, affords a proof of the earth's revolution round the ſun; for, without ſuppoſing that, theſe motions of comets are inexplicable. Tycho was preceded by Kepler, who, in his book "De Cometis," concluded from obſervations of the comets which appeared in 1607 and 1618, that comets move freely through the planetary orbs, with a motion not much different from a rectilineal one; but of what kind he could not preciſely determine. He was followed by Hevelius, an accurate obſerver of the heavenly bodies, who found, by his own obſervations of two comets that appeared in his time, that they were not ſubject to diurnal parallax; that calculations of their places, made upon a ſuppoſition that they moved in ſtraight lines, did not agree with their true places; but that their orbits were concave towards the ſun; and concluded, that they moved in parabolic trajectories.

Hevelius, from a great number of obſervations, propoſes it as his opinion, that the comets, like the ſolar maculæ or ſpots, are formed and condenſed out of the groſſer exhalations of his body: or that they are generally in the atmoſphere of a planet, and diſcharged from it, partly by the rotation of the planet, and then revolved about the ſun in a parabola by the force of projection and its tendency towards the ſun, in the ſame manner as a projectile upon the earth's ſurface deſcribes a parabola. In which notion he agrees nearly with Kepler, who maintains, that comets are generated in the æther in vaſt numbers, like fiſhes in the ocean; though they do not all become viſible; either becauſe of their ſmallneſs, or becauſe they lie a long time under the horizon.

But ſir Iſaac Newton has ſhewn the fallacy of this hypotheſis, by proving that the comet of 1680, in its paſſage through the neighbourhood of the ſun, would have been diſſipated, had it conſiſted of exhalations of the ſun and planets: for the heat of the ſun, it is allowed, is as the denſity of his rays, i. e. reciprocally as the ſquares of the diſtances of places from the ſun. Wherefore, ſince the diſtance of that comet in its perihelion, December the 8th, was obſerved to be to the diſtance of the earth from the ſun, nearly as 6 to 1000; the ſun's heat in the comet at that time, was to his heat with us at midſummer, as 1000000 to 36, or 28000 to 1.

And again, finding by experiment, that the heat of boiling water is little more than three times the heat of our dry earth, when expoſed to the midſummer's ſun; and aſſuming the heat of red-hot iron to be about three or four times as great as that of boiling water; he thence concludes, that the heat of the dried earth, or body of the comet in its perihelion, muſt be near 2000 times as great as that of red-hot iron.

Such an immenſe heat once acquired in its perihelion, the comet muſt be a long time in cooling again. The ſame author computes, that a globe of red-hot iron, of the dimenſions of our earth, would ſcarce be cool in 50000 years. If then the comet be ſuppoſed to cool 100 times as faſt as red-hot iron; yet ſince its heat was 2000 times greater, ſuppoſing it of the bigneſs of the earth, it would not be cool in a million of years.

James Bernoulli, in his "Syſtema Cometarum," ſuppoſes ſome primary planet revolving round the ſun in the ſpace of four years and one hundred and fifty-ſeven days; and at the diſtance, from his body, of 2583 ſemidiameters of the magnus orbis; this planet, he concludes, either from its vaſt diſtance, or ſmallneſs, to be inviſible to us: but, however, to have, at various diſtances from him, ſeveral ſatellites moving round him, and ſometimes deſcending as low as the orbit of Saturn; and that theſe becoming viſible to us, when in their perigæum, are what we call comets.

Des Cartes advances another opinion: he conjectures that comets are only ſtars, formerly fixed like the reſt, in the heavens; but which becoming by degrees covered with maculæ, or ſpots, and at length wholly robbed of their light, cannot keep their place, but are carried off by the vortices of the circumjacent ſtars; and, in proportion to their magnitude and ſolidity, moved in ſuch manner as to be brought nearer the orb of Saturn; and thus coming within reach of the ſun's light, rendered viſible.

But the vanity of all theſe hypotheſes abundantly appears from the phenomena of comets; the chief of which we ſhall enumerate; as being the teſt by which all theories are to be tried.

Firſt, then, thoſe comets which move according to the order of the ſigns, do all, a little before they diſappear, either advance ſlower than uſual, or elſe go retrograde, if the earth be between them and the ſun; and more ſwiftly, if the earth be ſituate in a contrary part. On the other hand, thoſe which proceed contrary to the order of the ſigns, proceed more ſwiftly than uſual, if the earth be between them and the ſun; and more ſlowly, or go retrograde, when the earth is in a contrary part.

2. So long as their velocity is increaſed, they move, nearly, in great circles; but towards the end of their courſe, they deviate from thoſe circles; and as often as the earth proceeds one way, they go the contrary way.

3. They move in ellipſes, having one of their foci in the centre of the ſun; and by radii drawn to the ſun, deſcribe areas proportionable to the times.

4. The light of their bodies, or nuclei, increaſes in their receſs from the earth toward the ſun; and on the contrary, decreaſes in their receſs from the ſun.

5. Their tails appear the largeſt and brighteſt, immediately after their tranſit through the region of the ſun, or after their perihelion.

6. The tails always decline from a juſt oppoſition to the ſun towards thoſe parts which the bodies, or nuclei, paſs over, in their progreſs through their orbits.

7. This declination, *cæteris paribus*, is the ſmalleſt, when the heads, or nuclei, approach neareſt the ſun: and is leſs, ſtill, nearer the nucleus of the comet, than towards the extremity of the tail.

8. The tails are ſomewhat brighter, and more diſtinctly defined in their convex than in their concave part.

9. The tails always appear broader at their upper extreme than near the centre of the comet.

10. The tails are always tranſparent, and the ſmalleſt ſtars appear through them.

Theſe are the chief phenomena of comets; which it is evident, cannot eaſily be reconciled with the wild notions of the ancients, and the weak conjectures of many of the moderns.

"The comets," ſays ſir Iſaac Newton, "are compact, ſolid, fixed, and durable bodies: in one word, a kind of planets; which move in very oblique orbits, every way with the greateſt freedom; perſevering in their motions, even againſt the courſe and direction of the planets; and their tail is a very thin ſlender vapour, emitted by the head or nucleus of the comet, ignited or heated by the ſun."

This

This at once folves all the foregoing phenomena: for, 1. "It is evident, that thofe which proceed according to the order of the figns, a little before they difappear, muft move more flowly, or appear retrograde, if the earth be betwixt them and the fun; and fwifter if the earth be in a contrary part. On the contrary, thofe proceeding againft the order of the figns," &c. For fince this courfe is not among the fixed ftars, but among the planets; as the motion of the earth either confpires with them, or goes againft them; their appearance, with regard to the earth, muft be changed; and, like the planets, they muft fometimes appear fwifter, fometimes flower, and fometimes retrograde.

2. "When the comets move the fwifteft, they muft proceed in ftraight lines; but in the end of their courfe, decline," &c. Becaufe, in the end of their courfe, when they recede almoft directly from the fun, that part of the apparent motion which arifes from the parallax, muft bear a greater proportion to the whole apparent motion.

3. "The comets muft move in ellipfes, having one of their foci in the centre of the fun." Becaufe they do not wander precarioufly from one fictitious vortex to another; but, making a part of a folar fyftem, return perpetually, and run a conftant round.

Hence, their elliptic orbits being very long and eccentric they become invifible, when in that part moft remote from the fun.

From confidering the curvity of the paths of comets, fir Ifaac concludes, that when they difappear, they are much beyond the orb of Jupiter; and that in their perihelion they frequently defcend below the orbit of Mars, and the inferior planets.

4. "The light of their nuclei muft increafe in their recefs from the fun, and *vice verfa.*" Becaufe as they are in the regions of the planets, their accefs toward the fun bears a confiderable proportion to their whole diftance.

From obfervations of the comet of 1680, fir Ifaac Newton found, that the vapour in the extremity of the tail, January 25th, began to afcend from the head before December 11th; and had therefore fpent more than forty-five days in its afcent; but that all the tail which appeared December 10th, afcended in the fpace of thofe two days, then juft paft fince its perihelion. The vapour, therefore, at the beginning, when the comet was near the fun, afcended with a prodigious fwiftnefs; and afterwards continued to afcend with a motion retarded by the gravity of its particles; and by that afcent increafed the length of the tail; but the tail, notwithftanding its length, confifted almoft wholly of vapours, which had afcended from the time of its perihelion; and the vapour which afcended firft, and compofed the extreme of the tail, did not vanifh till it was too far from the fun to be illuminated by him, and from us to be vifible. Hence alfo, the tails of comets that are fhorter, do not afcend with a quick and continual motion from the head, and then prefently difappear; but are permanent columns of vapours and exhalations, gathered from the head, by a very gentle motion, and a great fpace of time; which yet, by participating of that motion of their heads they had at the beginning, continue eafily to move along with their heads through the celeftial regions: whence alfo the vacuity of thofe regions is argued. See Vacuum.

5. "Their tails muft appear the largeft and brighteft immediately after their tranfit through the region of the fun." Becaufe, then, their heads being the moft heated, will emit the moft vapours.

From the light of the nucleus, or apparent ftar, we infer their vicinity to the earth, and that they are by no means in the region of the fixed ftars, as fome have imagined; fince, in that cafe, their heads would be no more illuminated by the fun, than the planets are by the fixed ftars.

6. "The tails muft ftill decline from a diftinct oppofition to the fun, towards the parts which the heads pafs over, in their progrefs through their orbits." Becaufe all fmoke, or vapour, emitted from a body in motion, tends upwards obliquely, ftill receding from that part, towards which the fmoking body proceeds.

7. "That declination will be ftill the leaft near the nucleus of the comet; and when the comet is neareft the fun." Becaufe the vapour afcends more fwiftly near the head of the comet, than in the higher extremity of its tail; and when the comet is at a lefs diftance from the fun than when at a greater.

8. "The tail is brighter, and better defined in its convex part than in its concave." Becaufe the vapour in the convex part, which goes firft, being fomewhat nearer and denfer, reflects the light more copioufly.

9. "The tail muft appear broader towards the higher extremity of the comet than towards the head." Becaufe the vapour in a free fpace is perpetually rarefied and dilated.

10. "The tails muft be tranfparent." Becaufe confifting of infinitely thin vapour, &c.

Thus accurately does the hypothefis tally to the phenomena.

Comets, *phafes of.*—The nuclei, which we alfo occafionally call the *heads* and *bodies* of comets, viewed through a telefcope, fhew a very different face from thofe of the fixed ftars, or planets. They are liable to apparent changes, which fir Ifaac Newton afcribes to changes in the atmofphere of comets; and this opinion was confirmed by obfervations of the comet in 1744. Hift. Acad. Scienc. 1744. Sturmius tells us, that, obferving the comet of 1680, with a telefcope, it appeared like a coal dimly glowing, or a rude mafs of matter illumined with a dufky fumid light, lefs fenfible at the extremes than in the middle; rather than as a ftar, which appears with a round difk, and a vivid light.

Hevelius obferved of the comet of 1661, that its body was of a yellowifh colour, very bright, and confpicuous, but without any glittering light: in the middle was a denfe ruddy nucleus, almoft equal to Jupiter, encompaffed with a much fainter, thinner matter. February 5th, its head was fomewhat bigger and brighter, of a gold colour; but its light more dufky than the reft of the ftars: here, the nucleus appeared divided into feveral parts. February 6th, the difk was leffened; the nuclei ftill exifted, though lefs than before: one of them, on the lower part of the difk, on the left, much denfer and brighter than the reft, its body round, and reprefenting a very lucid little ftar: the nuclei ftill encompaffed with another kind of matter. February 10th, the head fomewhat more obfcure, and the nuclei more confufed, but brighter at top than bottom. February 13, the head diminifhed much, both in magnitude and brightnefs. March 2d, its roundnefs a little impaired, its edges lacerated, &c. March 28th, very pale and exceeding thin; its matter much difperfed; and no diftinct nucleus at all appearing.

Weigelius, who faw the comet of 1664, the moon and a little cloud illumined by the fun at the fame time, obferved, that the moon, through a telefcope, appeared of a continued luminous furface; but the comet very different; being perfectly like a little cloud in the horizon illumined by the fun.

fun. From thefe obfervations it was, that Hevelius concluded comets to be like maculæ, or fpots formed out of the folar exhalations.

Comets, *magnitude of.* The eftimates that have been given by Tycho, Hevelius, and fome others, of the magnitude of comets, are not fufficiently accurate to be depended upon; for it does not appear, that they diftinguifhed between the nucleus and the furrounding atmofphere. Thus Tycho computes that the true diameter of the comet in 1577, was in proportion to the diameter of the earth as 3 is to 14. Hevelius made the diameter of the nucleus of the comet of 1661 and alfo that of 1665 at the commencement of their appearances to be lefs than a 10th part of the diameter of the earth, and from the parallax and apparent magnitude of the head of the comet of 1652 on the 10th of December, he computed its diameter to be to that of the earth, as 52 to 100. By the fame method he found the true diameter of the head of the comet of 1664 to be at one time 12 femi-diameters of the earth, at another time not much above 5 femi-diameters. The diameter of the atmofphere is often ten or fifteen times as great as that of the nucleus; the former, in the comet of 1682, was meafured by Flamfteed, and found to be 2′, but the diameter of the nucleus only 11 or 12″. Some comets, from the apparent magnitude and diftance compared, have been judged to be much larger than the moon, and even equal to fome of the primary planets. The diameter of that of 1744, when at the diftance of the fun from us, meafured about 1′, and therefore its diameter muft be about three times the diameter of the earth: at another time the diameter of its nucleus was nearly equal to that of Jupiter.

Hence it has been conjectured that fome of the folar eclipfes, recorded in hiftory, that cannot be verified by calculation from tables of the fun and moon, have been occafioned by the interpofition of comets between the fun and the earth. The eclipfes of the fun mentioned by Herodotus (l. vii. c. 37, and l. ix. c. 10.) have been thus accounted for, and alfo the eclipfe that happened a few days before the death of Auguftus, mentioned by Dion: and it is obfervable, that Seneca faw a comet the fame year. Hiftory records fome comets that have appeared as large as the fun, (vid. Seneca, N. Q. l. 7. c. 15); and, therefore, if fuch a comet near its perigee were to come between the fun and our earth, it would eclipfe him for a time. Some have thought that the darknefs which occurred at our Lord's crucifixion might have been occafioned by a comet then paffing between the earth and the fun. (Hevel. Cometogr. p. 540. Freret, reflexions fur un ancien phenomene celefte au temps d'Ogyges, Mem. de Literature, vol. xix. p. 357).

Dr. Herfchel obferved feveral comets which feemed to him to have no nucleus. The fix comets difcovered by his fifter were of this kind, and appeared to be mere collections of vapours condenfed about a centre. Five more were obferved by himfelf, which were nearly of the fame nature. This circumftance, he fays, "throws a myftery over their deftination, which feems to place them in the allegorical view of tools, probably defigned for fome falutary purpofes to be wrought by them; and, whether the reftoration of what is loft to the fun by the emiffion of light may not be one of thefe purpofes, I fhall not prefume to determine. The motion of the comet difcovered by M. Meffier, June, 1770, plainly indicated how much its orbit was liable to be changed by the perturbation of the planets, from which, and the little agreement that can be found between the elements of the orbits of all the comets that have been obferved, it appears clearly that they may be directed to carry their falutary influence to any part of the heavens."

Comets, *Formation of the tails of.* Sir Ifaac Newton fhews, that the atmofphere of comets will furnifh vapour fufficient to form their tails: this he argues from that wonderful rarefaction obferved in our air, at a diftance from the earth: a cubic inch of common air, at the diftance of half the earth's diameter, or four thoufand miles, would neceffarily expand itfelf fo far as to fill a fpace larger than the whole region of the planets. Since then the coma or atmofphere of a comet, is ten times higher than the furface of the nucleus, counting from the centre thereof; the tail, afcending much higher, muft neceffarily be immenfely rare: fo that it is no wonder the ftars fhould be vifible through it.

Now, the afcent of vapours into the tail of the comet, he fuppofes occafioned by the rarefaction of the matter of the atmofphere at the time of the perihelion. Smoke, it is obferved, afcends the chimney by the impulfe of the air wherein it floats; and air, rarefied by heat, afcends by diminution of its fpecific gravity, taking up the fmoke along with it: why then fhould not the tail of a comet be fuppofed to be raifed after the fame manner by the fun? for the fun beams do not act on the mediums they pafs through any otherwife than by reflexion and rarefaction.

The reflecting particles, then, being warmed by the action, will again warm the æther wherewith they are compounded; and this, rarefied by the heat, will have its fpecific gravity, whereby it before tended to defcend, diminifhed by the rarefaction, fo as to afcend, and carry along with it thofe reflecting particles, whereof the tail of the comet is compofed.

This afcent of the vapours will be promoted by their circular motion round the fun; by means whereof, they will endeavour to recede from the fun, while the fun's atmofphere, and the other matters in the celeftial fpaces, are either at reft, or nearly fo; having no motion but what they receive from the fun's circumrotation.

Thus are the vapours raifed into the tails of comets in the neighbourhood of the fun, where the orbits are moft curve; and where the comets, being within the denfer atmofphere of the fun, have their tails of the greateft length.

The tails thus produced, by preferving that motion, and at the fame time gravitating towards the fun, will move round his body in ellipfes, in like manner as their heads; and, by this means, will ever accompany, and freely adhere to their heads. In effect, the gravitation of the vapours towards the fun will no more occafion the tails of the comets to forfake their heads, and fall down towards the fun, than the gravitation of their heads will occafion them to fall off from their tails: but by their common gravitation, they will either fall down together to the fun, or be together fufpended, or retarded. This gravitation, therefore, does not at all hinder, but that the heads and tails of comets may receive and retain any pofition towards each other, which either the above mentioned caufes, or any other, may occafion. The tails, therefore, thus produced in the perihelion of comets, will go off along with their heads into remote regions; and either return thence, together with the comets, after a long feries of years; or rather, be there loft, and vanifh by little and little, and the comets be left bare; till at their return, defcending towards the fun, fome little fhort tails are gradually and flowly produced from the heads; which afterwards, in the perihelion, defcending down into the fun's atmofphere, will be immenfely increafed.

The vapours, when they are thus dilated, rarefied and

diffused through all the celestial regions, the same author observes, may probably, by little and little, by means of their own gravity, be attracted down to the planets, and become intermingled with their atmospheres.

He adds, that for the conservation of the water, and moisture of the planets, comets seem absolutely requisite; from whose condensed vapours and exhalations, all that moisture which is spent in vegetations and putrefactions, and turned into dry earth, &c. may be resupplied and recruited. For all vegetables grow and increase wholly from fluids; and, again, as to their greatest part, turn, by putrefaction, into earth again; and earthly slime being perpetually precipitated to the bottom of putrefying liquors. Hence, the quantity of dry earth must continually increase, and the moisture of the globe decrease, and at last be quite evaporated, if it has not a continual supply from some part or other of the universe. And I suspect, adds our great author, that the spirit, which makes the finest, subtilest, and the best part of our air, and which is absolutely requisite for the life and being of all things, comes principally from the comets. So far are they from portending any hurt or mischief to us which the natural fears of men are apt to suggest from the appearance of any thing that is uncommon and astonishing.

On this principle, there seems to be some foundation for the popular opinion of presages from comets; since the tail of a comet thus intermingled with our atmosphere, may produce changes very sensible in animal and vegetable bodies.

But the transmutation of water into earth is now justly exploded: Woodward, Boerhaave, and others, having observed that water is only an agent in conveying the nutritious matter to vegetable bodies, and not that matter itself.

Another use which sir Isaac Newton conjectures comets may be designed to serve, is that of recruiting the sun with fresh fuel, and repairing the consumption of his light by the streams continually sent forth in every direction from that luminary. In support of this conjecture he observes, that comets in their perihelion may suffer a diminution of their projectile force, by the resistance of the solar atmosphere; so that by degrees their gravitation towards the sun may be so far increased, as to precipitate their fall into his body. Thus also, fixed stars which have been gradually wasted, may be supplied with fresh fuel, acquire new splendour, and be taken for new stars: of this kind are those fixed stars, which appear on a sudden, or shine with a surprising brightness at first, and afterwards vanish by degrees.

There have been various conjectures about the generation of the tails of comets. Apian, Cardan, Tycho Brahe, and some others, apprehended that they were produced by the sun's rays transmitted through the nucleus of the comet, which they supposed to be transparent, and there refracted as in a lens of glass, so as to form a beam of light behind the comet. But this cannot be the case, because the figure of a comet's tail does not correspond to such a refraction, and also because such refracted light would not be seen by an eye placed sideways to it, unless it fell upon some reflecting substance denser than the circumambient æther. Kepler supposed, that the rays of the sun carry away some of the gross parts of the comet which reflect the sun's rays, and give the appearance of a tail. Hevelius thought, that the thinnest parts of the atmosphere of a comet are rarefied by the force of the heat, and driven from the fore-part and each side of the comet towards the parts turned from the sun. Des Cartes accounted for the phenomenon of the tail by the refraction of light from the head of the comet to the eye of the spectator. If this were the case, the planets and principal fixed stars must have tails also; for their rays pass through the same medium before they reach our eyes, as light from the comets does. Mairan supposes that the tails are formed out of the luminous matter that composes the sun's atmosphere, which is supposed to extend as far as the orbit of the earth, and to furnish matter for those northern lights called the *Aurora Borealis*, which see. M. De la Lande combines this hypothesis with that of Newton above recited. He thinks that part of the vapour which forms them arises out of the atmosphere rarefied by heat, and is pushed forward by the force of the light streaming from the sun; and also that a comet passing through the sun's atmosphere is drenched therein, and carries away some of it. Mr. Rowning, who is not satisfied with sir Isaac's opinion, accounts for the tails of comets in the following manner. It is well known, says he, that when the light of the sun passes through the atmosphere of any body, as the earth, that which passes on one side, is by the refraction thereof made to converge toward that which passes on the opposite one; and the convergency is not wholly effected either at the entrance of the light into the atmosphere, or at its going out; but beginning at its entrance, it increases in every point of its progress. It is also agreed that the atmospheres of the comets are very large and dense. He therefore supposes that by such time as the light of the sun has passed through a considerable part of the atmosphere of a comet, the rays thereof are so far refracted toward each other, that they then begin sensibly to illuminate it, or rather the vapours floating therein; and so render that part they have yet to pass through visible to us: and that this portion of the atmosphere of a comet, thus illuminated, appears to us in form of a beam of the sun's light, and passes under the denomination of a comet's tail. Rowning's Natural Philosophy, part iv. chap. 11.

We have an inquiry into the cause of the tails of comets, by Mr. Euler, in the Mem. de l'Acad. de Berlin, tom. ii. p. 117, seq. He thinks there is a great affinity between these tails, the zodiacal light, and the Aurora borealis; and that the common cause of them all, is the action of the sun's light on the atmosphere of the comets, of the sun, and of the earth. He supposes that the impulse of the rays of light on the atmosphere of comets, may drive some of the finer particles of that atmosphere far beyond its limits; and that this force of impulse combined with that of gravity towards the comet, would produce a tail, which would always be in opposition to the sun, if the comet did not move. But the motion of the comet in its orbit, and about an axis, must vary the position and figure of the tail, giving it a curvature, and deviation from a line drawn from the centre of the sun to that of the comet; and that this deviation will be greater, as the orbit of the comet has the greater curvature, and that the motion of the comet is more rapid. It may even happen, that the velocity of the comet, in its perihelion, may be so great, that the force of the sun's rays may produce a new tail, before the old one can follow; in which case the comet might have two or more tails. The possibility of this is confirmed by the comet of 1744, which was observed to have several tails while it was in its perihelion. See AURORA *borealis*, and ZODIACAL *light*.

Dr. Hamilton urges several objections against the Newtonian hypothesis; observing, that we have no proof of the existence of a solar atmosphere; and if we had, that when the comet is moving in its perihelion, in a direction at right angles to the direction of its tail, the vapours which then arise partaking of the great velocity of the comet, and being also specifically lighter than the medium in which they move,

must

muſt ſuffer a much greater reſiſtance than the denſe body of the comet does, and therefore ought to be left behind, and would not appear oppoſite to the ſun; and afterwards they ought to appear towards the ſun. Beſides, if the ſplendour of the tails be owing to the reflexion and refraction of the ſun's rays, it ought to diminiſh the luſtre of the ſtars ſeen through it; which would have their light reflected and refracted in like manner; and conſequently their brightneſs would be diminiſhed. He concludes that the tail of a comet is formed of matter which has not the power of refracting or reflecting the rays of light; but that it is a lucid or ſelf-ſhining ſubſtance; and from its ſimilarity to the *Aurora borealis*, produced by the ſame cauſe, and a proper electrical phenomenon. Dr. Hamilton ſupports his opinion by the following arguments. A ſpectator, at a diſtance from the earth, would ſee the Aurora borealis in the form of a tail oppoſite to the ſun, as the tail of a comet lies. The Aurora borealis has no effect upon the ſtars ſeen through it, nor has the tail of a comet. The atmoſphere is known to abound with electric matter, and the appearance of the electric matter in vacuo reſembles exactly that of the Aurora borealis, which, from its great altitude, may be conſidered to be in as perfect a vacuum as we can make. The electric matter in vacuo ſuffers the rays of light to paſs through, without being affected by them. The tail of a comet does not expand itſelf ſideways, nor does the electric matter. Hence, he ſuppoſes the tails of comets, the Aurora borealis, and the electric fluid to be the ſame kind of matter. As a further confirmation of this opinion it may be added, that the comet in 1607 appeared to ſhoot out the end of its tail. Le P. Cyſat remarked the undulations of the tail of the comet in 1618. Hevelius obſerved the ſame in the tails of the comets in 1652 and 1661. M. Pingrè noticed the ſame appearance in the comet of 1769: and theſe are circumſtances ſimilar to the Aurora borealis. Dr. Hamilton conjectures, that the uſe of the comets may be to bring the electric matter, which continually eſcapes from the planets, back into the planetary regions. Theſe arguments very much corroborate this hypotheſis; and if it be true, we may further add, that the tails are hollow; for if the electric fluid only proceed in its firſt direction and do not diverge ſideways, the parts directly behind the comet will not be filled with it; and this thinneſs of the tails will account for the appearance of the ſtars through them. Dr. Halley ſeemed inclined to this hypotheſis, when he ſaid, that the ſtreams of light in an Aurora borealis ſo much reſembled the long tails of comets, that at firſt ſight they might well be taken for ſuch: and that this light ſeems to have a great affinity to that which the effluvia of electric bodies emit in the dark. Phil. Tranſ. N° 347. Hamilton's Philoſophical Eſſays, p. 91, &c.

Hevelius particularly informs us, that he obſerved the comet of 1665 to caſt a ſhadow upon the tail, for in the middle of its length there appeared a dark line. Caſſini alſo obſerved in the tail of the comet of 1680 a darkneſs in the middle of the tail; and the ſame appearance was taken notice of by a curious obſerver in the tail of the comet of 1744. The lengths of the tails of comets are various, and depend on a variety of circumſtances. Longomontanus mentions a comet that in 1618, December the 10th, had a tail which appeared under an angle of 104°: that of 1680 appeared under an angle of 70°, according to ſir I. Newton, and very brilliant: the comet of 1744 had a tail, which at one time appeared to extend 16° from its body; and which, allowing the ſun's parallax to be 10″, muſt have been above 23 millions of miles in length. The diameter of its nucleus was nearly equal to that of Jupiter. The tail of the comet of 1759 appeared, according to M. Pingré, under an angle of 90°; but the light was very faint. The length of a comet's tail may be thus found. Let S (*Plate* IV. *Aſtronomy. fig.* 23.) be the ſun, E the earth, C the comet, C L the tail when directed from the ſun; then, knowing the place of the comet, we know the angle E C L, E C, and the angle C E L, the angle under which the tail appears; hence we find C L the length of the tail. If the tail deviate by any angle L C M, found from obſervation, we ſhall then know the angle E C M, with C E, and the angle C E M, to find C M.

M. Fatio has ſuggeſted that ſome of the comets have their nodes ſo very near the annual orbit of the earth; that if the earth ſhould happen to be found in that part next the node, at the time of a comet's paſſing by; as the apparent motion of the comet will be incredibly ſwift, ſo its parallax will become very ſenſible; and the proportion thereof to that of the ſun will be given: whence ſuch tranſits of comets will afford the beſt means of determining the diſtance of the earth and ſun.

The comet of 1472, *v. gr.* had a parallax above twenty times greater than the ſun's: and if that of 1618 had come down in the beginning of March to its deſcending node, it would have been much nearer the earth, and its parallax much more notable. But, hitherto, none has threatened the earth with a nearer appulſe than that of 1680: for, by calculation, Dr. Halley finds that November 11th, 1 h. 6 min. P. M. that comet was not above one ſemidiameter of the earth, to the northward of the way of the earth; at which time had the earth been in that part of its orbit, the comet would have had a parallax equal to that of the moon: what might have been the conſequence of ſo near an appulſe, a contact, or, laſtly, a ſhock of the celeſtial bodies?

If the earth had been at this time in that part of her orbit neareſt to that node of the comet, through which it paſſed, their mutual gravitation muſt have cauſed a change in the plane of the orbit of the earth, and in the length of our year. Dr. Halley adds, that if ſo large a body, with ſo rapid a motion as that of this comet near its perihelion, were to ſtrike againſt our earth, a thing by no means impoſſible, the ſhock might reduce this beautiful frame to its original chaos. Whiſton, who, from Flamſteed's meaſure of the apparent diameter of this comet, concluded its nucleus to be about ten times as big as the moon, or equal to a fourth part of our earth, attributes the univerſal deluge, in the time of Noah, to its near approach. His opinion was, that the earth paſſing through the atmoſphere of the comet, attracted from it a conſiderable part of the waters of the flood; that the proximity of the comet raiſed a great tide in the ſubterraneous waters, ſo that the outward cruſt of the earth was changed from ſpherical to oval; that this could not be done without making fiſſures and cracks in it; that through theſe fiſſures the ſubterranean waters were forced, in conſequence of the change of the hollow of the earth into a leſs capacious form;—that, along with the water thus ſqueezed up upon the ſurface of the earth, much ſlime or mud would riſe; which, together with the groſſer parts of the comet's atmoſphere, would, after the ſubſiding of the water partly into the fiſſures and partly into the lower parts of the earth to form the ſea, cover all over to a conſiderable depth the antediluvian earth:—and thus he accounts for trees and bones of animals being found at very great depths in the earth. He alſo ſuppoſed, that before the fall the earth revolved round the ſun in the plane of the ecliptic, keeping always the ſame points of its ſurface towards the ſame fixed ſtars; by this means, as every meridian would come to the ſun but once in a whole revolution, a day and a year were then the ſame: but that a comet ſtriking obliquely upon the

earth gave it the diurnal rotation. Moreover, he apprehended, that the antediluvian year confifted of 360 days: but that the additional matter depofited upon the earth from the atmofphere of the comet at the time of the deluge, fo retarded its revolution round the fun, that it is not now performed in lefs than 365 days and about a quarter.

The fame comet, he imagined, would probably, by coming near the earth after being heated to an immenfe degree in its perihelion, be the inftrumental caufe of that great cataftrophe, the general conflagration, foretold in the Sacred Writings, and from ancient tradition, mentioned by heathen writers. See CONFLAGRATION, DELUGE, and *Theory of the* EARTH.

COMETS, *diftance of.* The analogy between the periodical time of the planets, and their diftances from the fun, difcovered by Kepler, takes place alfo in the comets. Hence, the mean diftance of a comet from the fun may be found by comparing its period with the time of the earth's revolution round the fun: thus, the period of the comet that appeared in 1531, 1607, 1682, and 1759, being about 76 years, its mean diftance is found by this proportion; as 1 the fquare of one year, the earth's periodical time, is to 5776 the fquare of 76, the comet's periodical time, fo is 1000000 the cube of 100, the earth's mean diftance from the fun, to 5776000000 the cube of the comet's mean diftance; the cube root of which is 1794, the mean diftance itfelf, in fuch parts as the mean diftance of the earth contains 100. If the perihelion diftance of this comet 58 be taken from 3588 double the mean diftance, we fhall have the aphelion diftance 3530 of fuch parts as the diftance of the earth contains 100; and this is a little more than 35 times the diftance of the earth from the fun. By a like method the aphelion diftance of the comet of 1680 comes out 138 times the mean diftance of the earth from the fun, fuppofing its period to be 575 years; fo that this comet in its aphelion goes to more than 14 times the diftance from the fun that Saturn does.

The limit of a comet's diftance may be very eafily afcertained from its tail, it being fuppofed to be directed from the fun. Let S (*fig.* 24.) be the fun, E the earth, E T the line in which the head of the comet appears, E W the line in which the extremity of the tail is obferved, and draw S T parallel to E W; then the comet is within the diftance E T; for if the comet were at T, the tail would be directed in a line parallel to E W, and therefore it could never appear in that line. T E W is known by obfervation, and confequently its equal E T S, together with T E S, the angular diftance of the comet from the fun, and E S, to find S T the limit. E. G. On December 21, 1680, the diftance of the comet from the fun was 32° 24′, and length of the tail 70°; hence S T : S E :: fin. 32° 24′ : fin. 70° :: 4 : 7 nearly; confequently the comet's diftance from the fun was lefs than $\frac{4}{7}$ of the earth's diftance from the fun. Hence fir Ifaac Newton deduced this conclufion, that all comets, whilft they are vifible, are not further diftant from the fun than three times the earth's diftance from the fun. This muft, however, depend upon the goodnefs of the telefcope, and magnitude of the comet. Vince's Aftr. vol. i. p. 446.

COMETS, *motion of.* If the paths of comets be fuppofed directly parabolical, as fome have imagined, it would follow, that being impelled toward the fun by a centripetal force, they defcend as from fpaces infinitely diftant; and by their falls acquire fuch a velocity, as that they may again run off into the remoteft regions; ftill moving upwards, with fuch a perpetual tendency as never to return. But the frequency of their appearance, and their degree of velocity, which does not exceed what they might acquire by their gravity towards the fun, feem to put it paft doubt that they move, planet-like, in elliptic orbits, though exceedingly eccentric; and fo return again, though after very long periods.

The apparent velocity of the comet of 1472, as obferved by Regiomontanus, was fuch as to carry it through 40° of a great circle in 24 hours: and that of 1770 was obferved to move through more than 45° in the laft 25 hours.

G. S. Doerfell, minifter at Plaven in Upper Saxony, made obfervations upon the comet of 1680, and found that its motion might very well be reprefented by a parabola, having the fun in its focus; but not underftanding the laws by which the motion of a body in a parabola is regulated, he erred confiderably in his parabola, making the perihelion diftance about 12 times greater than it was. This was publifhed five years before the "Principia" of Newton, in which this illuftrious author proved that Kepler's law, by which the planetary motions are regulated, was a neceffary refult of his theory of gravity; whence it immediately followed, that comets were governed by the fame law; and the obfervations upon them agreed fo accurately with his theory, as to leave no doubt of its truth.

Newton, Flamfteed, Halley, and the Englifh aftronomers, &c. feem fatisfied of the return of the comets. Caffini, and others of the French, thought it highly probable; but De la Hire, and others, oppofed it.

Thofe on the affirmative fide fuppofe the comets to defcribe orbits prodigioufly eccentric, infomuch that we can only fee them in a very fmall part of their revolution: out of this, they are loft in the immenfe fpaces; hid not only from our eyes, but from our telefcopes. That little part of their orbit near us, M. Caffini, &c. has found to pafs between the orbits of Venus and Mars.

For the reafons of the return of comets, M. Caffini gives thefe which follow. 1. In confidering the courfe of the comets, with regard to the fixed ftars, they are found to keep a confiderable time in the arc of a great circle, *i. e.* a circle whofe plane paffes through the centre of the earth: indeed, they deviate a little from it, chiefly towards the end of their appearance; but this deviation is common to them with the planets.

2. Comets, as well as planets, appear to move fo much the fafter as they are nearer the earth; and when they are at equal diftances from their perigee, their velocities are nearly the fame.

By fubtracting from their motion the apparent inequality of velocity occafioned by their different diftances from the earth, their equal motion might be found: but we fhould not be certain this motion were their true one; becaufe they might have confiderable inequalities, not diftinguifhable in that fmall part of their orbit vifible to us. It is, indeed, probable, their real motion, as well as that of the planets, is unequal in itfelf: and hence we have a reafon why the obfervations made, during the appearance of a comet, cannot give the juft period of their revolution.

3. There are no two different planets whofe orbits cut the ecliptic in the fame angle, whofe nodes are in the fame points of the ecliptic, and whofe apparent velocity in their perigee is the fame; confequently, two comets feen at different times, yet agreeing with all thofe three circumftances, can only be one and the fame comet. And this were the comets of 1577 and 1680 obferved to do; and thofe of 1652 and 1698; not that this exact agree-

agreement, in these circumstances, is absolutely necessary to determine them the same comet. M. Cassini finds the moon herself irregular in them all: accordingly, he is of opinion, there are several which disagree herein, and yet may be accounted the same.

The great objection against the return of comets, is, the rarity of their appearance, with regard to the number of revolutions assigned to them.

In 1702, there was a comet, or rather the tail of one, seen at Rome, which M. Cassini takes to be the same with that observed by Aristotle, and that since seen in 1668, which would imply its period to be thirty-four years. Now, it may seem strange, that a star which has so short a revolution, and of consequence such frequent returns, should be so seldom seen.—Again, in April, of the same year, 1702, a comet was observed by Mess. Bianchini, and Maraldi, supposed by the latter to be the same with that of 1664, both by reason of its motion, velocity, and direction. M. de la Hire took it to have some relation to another he had observed in 1698, which M. Cassini refers to that of 1652. On this supposition, its period appears to be forty-three months; and the number of revolutions between 1652 and 1698, fourteen: but it is hard to suppose, that in this age, wherein the heavens are so narrowly watched, a star should make fourteen appearances unperceived; especially such a star as this which might appear above a month together: and of consequence be frequently disengaged from the crepuscula.

For this reason M. Cassini was very reserved in maintaining the hypothesis of the return of comets, and only proposed those for planets, where the motions are easy and simple, and are resolved without straining, or allowing many irregularities.

M. de la Hire proposes one general difficulty against the whole system of the return of comets, which would seem to hinder any comet from being a planet: and it is this; that by the disposition necessarily given to their courses, they ought to appear as large at first as at last; and always increase, till they arrive at their greatest proximity to the earth: or, if they should chance not to be observed, as soon as they become visible, for want of attention thereto; at least it is impossible but they must frequently shew themselves before they have arrived at their full magnitude and brightness. But he adds, that none were ever yet observed till they had arrived at it.

But the appearance of a comet in the month of October 1723, while at a great distance, so as to be too small and dim to be viewed without a telescope, may serve to remove this obstacle, and set the comets, still, on the same footing with the planets.

Sir Isaac Newton supposes, that as those planets which are nearest the sun, and revolve in the least orbits, are the smallest; so among the comets, such as in their perihelion come nearest the sun, are the smallest, and revolve in lesser orbits.

In order to prove that comets describe ellipses, and not parabolas or hyperbolas, Dr. Halley, in his "Synopsis of the Astronomy of Comets," advances the following reasons. "Hitherto I have considered the orbits of comets as exactly parabolic; upon which supposition it would follow, that comets being impelled towards the sun, by a centripetal force, would descend as from spaces infinitely distant; and, by their so falling acquire such a velocity, as that they may again fly off into the remotest parts of the universe, moving upwards with a perpetual tendency, so as never to return again to the sun. But since they appear frequently enough, and since none of them can be found to move with an hyperbolic motion, or a motion swifter than what a comet might acquire by its gravity to the sun, it is highly probable they rather move in very eccentric elliptic orbits, and make their returns after long periods of time; for so their number will be determinate, and perhaps not so very great. Besides, the space between the sun and the fixed stars is so immense, that there is room enough for a comet to revolve, though the period of its revolution be vastly long. Now the *latus rectum* of an ellipsis is to the *latus rectum* of a parabola, which has the same distance in its perihelion, as the distance in the aphelion, in the ellipsis, is to the whole axis of the ellipsis. And the velocities are in a subduplicate ratio of the same; wherefore, in very eccentric orbits, the ratio comes very near to a ratio of equality; and the very small difference which happens, on account of the greater velocity in the parabola, is easily compensated in determining the situation of the orbit. The principal use therefore of the table of the elements of their motions, and that indeed which induced me to construct it, is, that whenever a new comet shall appear, we may be able to know, by comparing together the elements, whether it be any of those which has appeared before, and consequently to determine its period, and the axis of its orbit, and to foretel its return. And, indeed, there are many things which make me believe, that the comet which Apian observed in the year 1531, was the same with that which Kepler and Longomontanus more accurately described in the year 1607; and which I myself have seen return, and observed in the year 1682. All the elements agree, and nothing seems to contradict this my opinion, besides the inequality of the periodic revolutions; which inequality is not so great neither, as that it may not be owing to physical causes. For the motion of Saturn is so disturbed by the rest of the planets, especially Jupiter, that the periodic time of the planet is uncertain, for some whole days together. How much more therefore will a comet be subject to such like errors, which rises almost four times higher than Saturn, and whose velocity, though increased but a very little, would be sufficient to change its orbit, from an elliptical to a parabolical one. And I am the more confirmed in my opinion of its being the same; for, in the year 1456, in the summer-time, a comet was seen passing retrograde between the earth and the sun, much after the same manner; which, although nobody made observations upon it, yet, from its period, and the manner of its transit, I cannot think different from those I have just now mentioned. And since looking over the histories of comets, I find, at an equal interval of time, a comet to have been seen about Easter, in the year 1305, which is another double period of 151 years before the former. Hence, I think, I may venture to foretel that it will return again in the year 1758." Dr. Halley computed, *lævi calamo*, as he himself informs us, the effect of Jupiter upon this comet in 1682, and found that it would increase its periodic time above a year, in consequence of which he predicted its return at the end of the year 1758, or the beginning of 1759. M. Clairaut computed the effects both of Saturn and Jupiter, and found that the former would retard its return in the last period 100 days, and the latter 511 days; and he determined the time when the comet would come to its perihelion to be in April 15, 1759, observing that he might err a month, from neglecting small quantities in the computation. It passed the perihelion on March 13, within 33 days of the time computed. Now if we suppose the time stated by Dr. Halley, to mean the time of its passing the perihelion, then if we add to that 100 days, arising from the action of Saturn which

which he did not confider, it will bring it very near to the time in which it did pafs the perihelion, and prove his computation of the effect of Jupiter to have been very accurate. If he mean the time when it would firft appear, his prediction was very accurate, for it was firft feen on December the 14th, 1758, and his computation of the effects of Jupiter will then be more accurate than could have been expected, confidering that he made his calculations only by an indirect method, and in a manner profeffedly not very accurate. Dr. Halley, therefore, had the glory, firft to foretel the return of a comet, and the event anfwered remarkably to his prediction. He further obferved, that the action of Jupiter, in the defcent of the comet towards its perihelion in 1682, would tend to increafe the inclination of its orbit; and accordingly the inclination in 1682 was found to be 22′ greater than in 1607. From the obfervations of M. Meffier upon a comet in 1770, M. Edric Profperin, member of the Royal Academies of Stockholm and Upfal, fhewed, that a parabolic orbit would not anfwer to its motions, and he recommended it to aftronomers to feek for the elliptic orbit. This laborious tafk was undertaken by M. Lexell, who has fhewn that an ellipfe, in which the periodic time is about 5 years and 7 months, agrees very well with the obfervations. (See Phil. Tranf. for 1779.) As the ellipfes which the comets defcribe are all very eccentric, aftronomers, for the eafe of calculation, fuppofe them to move in parabolic orbits for that part which lies within the reach of obfervation, by which they can very accurately find the place of the perihelion of a comet, its diftance from the fun, the inclination of the plane of its orbit to the ecliptic, and the place of the node. But before we can determine the orbit of a comet, from obfervation, it will be neceffary to premife fuch particulars refpecting the motion of a body in a parabola, as may be requifite for fuch an inveftigation.

Accordingly let A P M (*fig.* 25.) be a parabola, S it's focus, A the vertex, P the place of the body, draw P Q perpendicular to A S, and P D perpendicular to the tangent P T, alfo S M perpendicular to A D. Now, by the property of the parabola, Q D is equal to half the latus rectum; hence if $AS=1$, then $QD=2$; alfo the angle $PSA = 2\ PDA$; therefore if Q D be radius, P Q will be the tangent of P D A, or $\frac{1}{2}$ P S A; hence to the radius A S, P Q will be twice the tangent of $\frac{1}{2}$ P S A; therefore if $2t=PQ$, t will be the tangent of (z) half the true anomaly P S A, to the radius $AS=1$. Alfo, by the property of the parabola, $AQ\times 4AS=PQ^2$, hence $AQ=t^2$; alfo the area $AQP=\frac{4}{3}t^3$; and as $QS=1-t^2$, the area $QPS=t-t^3$; hence the area $ASP=\frac{1}{3}t^3+t$; alfo the area $ASM=\frac{4}{3}$. Now let a and b be the times in which the comet moves from A to M. and from A to P; then, as the areas defcribed about S are proportional to the times, $a:b::\frac{4}{3}:\frac{1}{3}t^3+t$, therefore $at^3+3at=4b$.

Hence if a, and the true anomaly be given, we have the time $b=\frac{1}{4}at^3+\frac{3}{4}at$. Alfo, becaufe $a:b::\frac{4}{3}:\frac{1}{3}t^3+t$, therefore if the true anomaly, and confequently t, be given in different parabolas, the times of defcribing thofe true anomalies from the perihelions will be in proportion to the times of defcribing 90° from the perihelions.

If the times a and b be given, the true anomaly may be found from refolving the cubic equation $t^3+3t=\frac{b}{\frac{1}{4}a}$, which may be done thus. In the right-angled triangle C A B, (*fig.* 26.) let $AB=1$, $AC=\frac{b}{\frac{1}{4}a}$, and compute B C; then find two mean proportionals between $BC+AC$ and $BC-AC$, and their difference is the value of t.

Take the fluxion of $t^3+3t=\frac{4b}{a}$, and we have $\dot{t}=\frac{4}{3a}\times\frac{\dot{b}}{1+t^2}$; but $\dot{t}=\overline{1+t}^2\times\dot{z}$; hence we get $2\dot{z}=\frac{8}{3a}\times\frac{\dot{b}}{\overline{1+t}^2}=\frac{8}{3a}\times\overline{\text{cof. } z}^4\times\dot{b}$ the variation of the true anomaly correfponding to any fmall variation $\dot{b}$ of time expreffed in decimals of a day, a being expreffed in days.

Let S A (*fig.* 25.) be the mean diftance of the earth from the fun; then the area of the circle, defcribed with that radius, will be 3.14159; alfo the area $AMS=\frac{4}{3}$. Now the velocity in the parabola : velocity in the circle :: $\sqrt{2}:1$; for let P p (*fig.* 27.) be an indefinitely fmall arc defcribed by the body, S the place of the fun, S N a line drawn from the focus S, perpendicular to a tangent to the parabola A P D at the point P; then, 1ft, *The velocity* u *in any point* P *of the parabola, is as the fquare root of the parameter to the axis, divided by* S N: for, the velocity is as the arc P p or $u=p$P: now, pM being perpendicular to F S, in the fimilar right-angled triangles pPM, PSN, SN : SP :: pM : $p\mathrm{P}=\frac{p\mathrm{M}\times \mathrm{SP}}{\mathrm{SN}}$. But the parameter is as the fquare of the defcribed fectors; therefore R (the parameter) $=p\mathrm{M}^2\times \mathrm{SP}^2$, and $\sqrt{\mathrm{R}}=p\mathrm{M}\times\mathrm{SP}$; and by fubftitution, pP or $u=\frac{\sqrt{\mathrm{R}}}{\mathrm{SN}}$ or $u=\frac{\sqrt{4\mathrm{AS}}}{\mathrm{SN}}$, from the nature of the parabola. 2dly, *The velocity* u *in any point* P *of the parabola, is to the velocity* V *of a body running through the circumference of a circle with a central force tending to its centre, the radius being equal to* S P, *as* $\sqrt{2}:1$. For, fince $u=\frac{\sqrt{4\mathrm{AS}}}{\mathrm{SN}}$, $u^2=\frac{4\mathrm{AS}}{\mathrm{SN}^2}$; or, becaufe $\mathrm{SN}^2=\mathrm{SP}\times\mathrm{SA}$ (by the property of the Parabola), $u^2=\frac{4\mathrm{AS}}{\mathrm{SP}\times\mathrm{AS}}=\frac{4}{\mathrm{SP}}$. But the circle whofe radius is S P, being taken as an ellipfis, its parameter is $=2$ S P; and the velocity V being uniform, it is every-where as $\frac{\sqrt{2\mathrm{SP}}}{\mathrm{SP}}$; therefore $\mathrm{VV}=\frac{2\mathrm{SP}}{\mathrm{SP}^2}=\frac{2}{\mathrm{SP}}$: confequently $u^2:\mathrm{V}^2::\frac{4}{\mathrm{SP}}:\frac{2}{\mathrm{SP}}::2:1$; and therefore $u:\mathrm{V}::\sqrt{2}:\sqrt{1}::\sqrt{2}:1$.

The areas defcribed in the fame time will be in the fame ratio as the velocities, becaufe at A the motion in each orbit being perpendicular to S A, the areas defcribed will be as the velocities, and it being fo in one cafe, it muft be always fo, becaufe in each orbit refpectively equal areas are defcribed in equal times. But the times of defcribing any two areas are as the areas directly, and the areas defcribed in the fame time inverfely; therefore $\frac{3.14159}{1}:\frac{4}{3\sqrt{2}}\left(\frac{\sqrt{8}}{3}\right)$ :: the time of the revolution in the circle = 365d. 6h. 9′ : the time of defcribing A M = 109d. 14h. 46′. 20″. Now as the time of defcribing A M is in a given ratio to the time in the circle, which varies as $\mathrm{AS}^{\frac{3}{2}}$, therefore if r = the perihelion diftance in any other parabola, we have $1^{\frac{3}{2}}:r^{\frac{3}{2}}$ :: 109d. 14h. 46′. 20″ : the time of defcribing 90° in that parabola from the perihelion. Hence, knowing the time correfponding to any true anomaly in that parabola whofe perihelion diftance = 1, we know the time correfponding to the fame true anomaly in any other parabola, becaufe the times

times of describing 90° are as the times corresponding to the same true anomaly; therefore if n be the number of days corresponding to any given anomaly in that parabola whose perihelion distance is unity, then $n r^{\frac{3}{2}}$ will be the time t corresponding to the same anomaly in that whose perihelion distance is r; this may be readily found thus. Multiply the log. r by 3 and divide by 2, and to the quotient add the log. n, and the sum will be the log. of the time required. Hence also $n = \frac{t}{r^{\frac{3}{2}}}$; therefore if from the log. t we subtract $\frac{3}{2}$ log. r, it gives the log. n of the number of days corresponding to the same anomaly in the parabola, whose perihelion distance $= 1$; hence the anomaly will be found from a table which exhibits the times corresponding to the true anomaly for 200000 days from the perihelion, in that parabola whose perihelion distance is unity. This table may be constructed by the preceding problem, by taking $a = 109,6154$, and assuming $b = 1, 2, 3, 4$, &c. and finding the corresponding values of t. Dr. Halley first constructed a table of this kind. M. de la Caille changed it into a more convenient form, by putting the areas for the times; Mr. Vince has given that which was computed by M. de Lambre. (See Vince's Astron. vol. i. p. 454, &c.)

Draw S Y perpendicular to the tangent; then S P : SY :: S Y : S A, therefore $\sqrt{SP} : \sqrt{SA}$ :: S P : S Y :: rad. : cos. P S Y, or $\frac{1}{2}$ P S A the true anomaly; or S P : S A :: $\overline{\text{rad.}}^2 : \overline{\text{cos. } \frac{1}{2} \text{ true anom.}}^2$ Hence, if $SA = 1$, and $a + x = \frac{1}{2}$ P S A, $a - x = \frac{1}{2} p$ S A, then $1 : \sqrt{SP}$ :: cos. $\overline{a+x}$: rad. and $\sqrt{Sp} : 1$ :: rad. : cos. $\overline{a-x}$; hence $\sqrt{Sp} : \sqrt{SP}$ :: cos. $\overline{a+x}$: cos. $\overline{a-x}$.

Hence $SP = \frac{SA}{\overline{\text{cos. } \frac{1}{2} \text{ true anom.}}^2}$, radius being unity; therefore from log. S A subtract twice the log. cos. $\frac{1}{2}$ true anomaly, and the remainder is the log. of the distance of the comet from the sun.

Erect B D (*fig.* 28.) perpendicular to A B, take B C = A B, produce A C to E, and draw E D F perpendicular to A E, meeting A F parallel to B D in F, join A D, and draw D G, C H parallel to A B. Then, as E A F = 45°, E A = E F; also F G = G D = AB; hence A F = B D + B A, and G H = B D − B A; also, by similar triangles, A F or B D + B A : C D = G H or B D − B A :: E F or E A : E D :: rad. : tan. D A E; but A B : B D :: rad. : tan. B A D, from which subtract 45°, and we have B D + B A : B D − B A :: rad. : tan. of that difference. If $BD = \sqrt{SP}$, and $BA = \sqrt{Sp}$, then $\sqrt{SP} : \sqrt{Sp}$ :: rad. : tan. $BAD = \sqrt{\frac{Sp}{SP}}$; hence, to get that angle, take half the difference of the logarithms of S P and Sp, and add 10 to the index (because in the log. tangents, the index of log. tan. of 45°, or log. of rad. = 1, is 10, instead of 0,) and it gives the log. tangent of the angle; from which take 45°, and we have $\sqrt{SP} + \sqrt{Sp} : \sqrt{SP} - \sqrt{Sp}$ :: rad. : tang. of that difference.

Hence if we know two radii S P, Sp (*fig.* 25.) and the angle P Sp between, we can find the two anomalies. For let a be $\frac{1}{4}$ of A SP + A Sp, and x be $\frac{1}{4}$ of A S P − A Sp, then $\frac{1}{2}$ A S P $= a + x$, and $\frac{1}{2}$ A S$p = a - x$; hence $\sqrt{Sp} : \sqrt{SP}$ :: cos. $\overline{a+x}$: cos. $\overline{a-x}$ :: (by plane Trig.) cos. a × cos. x − sin. a × sin. x : cos. a × cos. x + sin. a × sin. x, therefore $\sqrt{SP} + \sqrt{Sp} : \sqrt{SP} - \sqrt{Sp}$ :: cos. a × cos. x : sin. a × sin. x :: $\frac{\text{cos. } a}{\text{sin. } a} : \frac{\text{sin. } x}{\text{cos. } x}$ :: cot. a : tan. x. Now the ratio of the two first terms is found from the last article, and as the angle P Sp is given, the value of x will be given, hence we find a, and consequently we know the sum and difference of A S P, A Sp, therefore we know the angles themselves. If p lie on the other side of A, then we know a, to find x.

Given two distances S P, Sp from the focus to the curve of a parabola, and the angle between them, to find the parabola (*fig.* 29.) With the centres P and p, and radii P S, p S, describe two circular arcs $r\,w\,t$, $m\,v\,n$, to which draw the tangent $a\,v\,w\,b$; draw S T perpendicular to $a\,b$, and bisect it in A, and it will be the vertex of the parabola; hence we may describe the parabola.

Having the Elements of the Orbit of a Comet, to compute its place at any time.

The elements of the orbit of a comet are, 1. The time when the comet passes the perihelion.—2. The place of the perihelion.—3. The distance of the perihelion from the sun.—4. The place of the ascending node.—5. The inclination of the orbit to the ecliptic. From these elements, the place at any time may be computed; and, for example, we shall take that given by M. de la Caille in his Astronomy. The comet in 1739, which was retrograde, passed its perihelion on June 17, at 10h. 9′ 30″ mean time; the place of the perihelion was in $3^s\ 12°\ 38'\ 40''$; the perihelion distance was 0.67358, the mean distance of the earth from the sun being unity; the ascending node was in $0^s\ 27°\ 25'\ 14''$, and the inclination of the orbit 55° 42′ 44″; to compute the place seen from the earth on August 17, at 14′ 20″ mean time.

Let W A V (*fig.* 30) be the parabolic orbit of the comet, N the ascending node, P the place of the comet, T the corresponding place of the earth, and draw P v perpendicular to the ecliptic; produce S N, S v, S P, S T to n, u, p and t the sphere of the fixed stars, and describe the great circles $n\,p$, $n\,u$ ♈ t and $p\,u$.

I. The interval of time from the perihelion to the given time is 61*d.* 4*h.* 10′ 30″ = 61.174, whose log. is 1.786567; also the log. of .67358 is 9.828388, $\frac{3}{2}$ of which log. (from the nature of logarithms) is 9.742582, which subtracted from 1.786567 leaves 2.043985, the log. of 110.6587 days, which, by the table, answers to $3^s\ 0°\ 21'\ 38''$ the true anomaly P S A at the given time.

II. Subtract $3^s\ 0°\ 21'\ 38''$ from $3^s\ 12°\ 38'\ 40''$ the place of the perihelion, because the comet was retrograde, and had passed the perihelion, and it leaves 12° 17′ 1″ for the heliocentric place p of the comet in its orbit.

III. The longitude of n is 27° 25′ 14″, also $p\,n$ = 27° 25′ 14″ − 12° 17′ 1″ = 15° 8′ 13″; hence rad. : cos. $p\,n\,u$ = 55° 42′ 44′ :: tan. $p\,n$ = 15° 8′ 13″ : tan. $u\,n$ = 8° 39′ 53″ the distance of the comet from the ascending node, measured upon the ecliptic.

IV. Subtract this value of $u\,n$ from the place of the node, and there remains 18° 45′ 21″ = ♈ u the true heliocentric place of the comet reduced to the ecliptic.

V. As rad. : sin. $p\,n$ = 15° 8′ 13″ :: sin. $p\,n\,u$ = 55° 42′ 44″ : sin. $p\,u$ = 12° 27′ 34″ the latitude seen from the sun, which is south.

VI. The true place T of the earth at the same time is $10^s\ 24°\ 34'\ 36''$; hence T S ♈ = 35° 25′ 24″; therefore T S ♈ + ♈ S u = T S v = $1^s\ 24°\ 10'\ 45''$. Also T S = 1.0115.

VII. By

VII. By a preceding article, $\overline{\text{coſ. } 45° \ 10' \ 49''}^2 : \overline{\text{rad.}}^2 :: .67358 : SP = 1.3557$.

VIII. As rad. : coſ. $PSv = 12° \ 27' \ 34'' :: SP = 1.3557 : Sv = 1.32377$.

IX. In the triangle TSv, we know TS, Sv and the included angle TSv; hence, by plain trignometry, we find the angle $STv = 77° \ 33' \ 38'' \frac{1}{2}$, which ſubtracted from $4^s \ 24° \ 34' \ 36''$, the place of the ſun, leaves $2^s \ 7° \ 0' \ 57'' \frac{1}{2}$ for the comet's true *geocentric longitude*.

X. Moreover, as ſin. $54° \ 10' \ 45''$: ſin. $77° \ 33' \ 38'' \frac{1}{2}$ :: tan. $PSv = 12° \ 27' \ 34''$: tan. $PTv = 14° \ 54' \ 4''$ the comet's true *geocentric latitude*.

To determine the Orbit of a Comet from Obſervation.

Sir I. Newton firſt reſolved this problem, which he called *Problema longe difficillimum.* The orbit of a comet may be computed from three obſervations; but although theſe data be ſufficient, the direct ſolution of the problem is impracticable. Aſtronomers therefore have ſolved this problem by indirect methods, firſt finding an orbit very near to the truth by mechanical and graphical operations, and then, by computation, correcting it, until ſuch a parabola was found as would ſatisfy the obſervations. Mr. Vince therefore begins, by ſhewing the methods by which the orbit may be nearly determined; and then explains the manner in which it may be corrected by calculation.

M. de la Lande propoſes the following mechanical method of finding the orbit nearly. Divide the diſtance of the earth from the ſun into ten equal parts, and deſcribe ten parabolas whoſe perihelion diſtances are, 1, 2, 3, &c. of theſe parts, and divide theſe parabolas into days from the perihelion, anſwering to the motion of a body in each. Let S (*fig.* 31.) be the ſun, a, b, c, the places of the earth at the times of three obſervations of the comet. Then take three geocentric latitudes and longitudes of the comet, and ſet off the elongations $Sa\alpha$, $Sb\beta$, $Sc\gamma$, in longitude. From a, b, c, extend three fine threads am, bn, ep, vertical to $a\alpha$, $b\beta$, $c\gamma$, making angles with them equal to the geocentric latitudes reſpectively. Then take any one of the parabolas, and placing its focus in S apply the edge to the threads, and obſerve whether you can make it touch them all, and whether the intervals of time cut off by the threads upon the parabola be equal to the reſpective intervals of the obſervations, or very nearly ſo; and if theſe circumſtances take place, you have then gotten the true parabola, or very nearly the true one. But if the parabola do not agree, try others, till you find one which does agree, or very nearly ſo, and you will then have got very nearly the true parabola, whoſe inclination, place of the node, and perihelion, are to be determined as accurately as poſſible from menſuration; alſo the projection upon the ecliptic. If none of theſe parabolas ſhould nearly anſwer, it ſhows, that the perihelion diſtance muſt be greater than the diſtance of the earth from the ſun, in which caſe, other parabolas muſt be conſtructed; but this does not very often happen. This method will determine the elements very nearly; but it would be extremely troubleſome to conſtruct and divide ſo many parabolas, if we only wanted to compute the elements of one comet; for thoſe who purpoſe to make many computations of this kind, it might be worth while to have a ſet of parabolas thus divided. To avoid this trouble therefore, Mr. Vince propoſes to do it in the following manner, by means of one parabola, without dividing it.

Take a firm board perfectly plane, and fix on paper for the projection; let a groove be cut near the edge, and five perpendiculars be moveable in it, ſo that they may be fixed at any diſtances. Let S (*fig.* 32.) repreſent the ſun, and deſcribe any number of circles about it. Compute five geocentric latitudes and longitudes of the comet, from which you will have the five elongations of the comet at the times of the reſpective obſervations. Draw SA, SB, SC, SD, SE, making the angles ASB, BSC, CSD, DSE, equal to the ſun's motion in the intervals of the obſervations; and on any one of the circles, make the angles $Sa\alpha$, $Sb\beta$, $Sc\gamma$, $Sd\delta$, $Se\varepsilon$, equal to the reſpective elongations in longitude, and fix the five perpendiculars, ſo that the edge of each may coincide with α, β, γ, δ, ε. From the points a, b, c, d, e, extend threads to the reſpective perpendiculars, making angles with the plane equal to the geocentric latitudes of the comet; then fix the focus of the parabola in S, and apply its edge to the threads, and if it can be made to touch them all, it will be the parabola required, correſponding to the mean diſtance Sa of the earth, which we here ſuppoſe to revolve in a circle, as it will be ſufficiently accurate for our purpoſe. If the parabola cannot be made to touch all the threads, change the points a, b, c, d, e, to ſuch of the other circles as you may judge, from your preſent trial, will be moſt likely to ſucceed, and try again; and by a few repetitions you will get ſuch a diſtance for the earth, that the parabola ſhall touch all the threads, in which poſition, find the inclination, obſerve the place of the node, and meaſure the perihelion diſtance, compared with the earth's diſtance, and you will get very nearly the elements of the orbit.

The next method of approximating to the orbit of a comet, which we ſhall explain, is that given by Boſcovich. Let S (*fig.* 33.) be the ſun, XZ the orbit of the earth, ſuppoſed to be a circle; T the place of the earth at the firſt obſervation, and t at the third; draw TC, tc to repreſent the obſerved longitudes of the comet; and let L, l, λ be the longitudes at the firſt, ſecond, and third obſervations; m and n the geocentric latitudes of the comet at the firſt and third obſervations; and t, T, the intervals of time between the firſt and ſecond, ſecond and third obſervations. Aſſume C for the place of the comet, at the firſt obſervation, reduced to the ecliptic; then to determine the point at the third obſervation, ſay $T \times \text{ſin.} \overline{\lambda - l} : t \times \text{ſin.} \overline{l - L} :: TC : tc$, and c will be nearly the place required; (See Boſcov. "Opuſcula," vol. iii. or ſir H. Englefield's valuable work upon comets, p. 27.) join Cc, and it will repreſent the path of the comet on the ecliptic, upon this aſſumption. Perpendicular to the ecliptic draw CK, ck, taking $CK : TC$ :: tan. m : radius, and $ck : tc$ :: tan. n : radius; join Kk, and it will repreſent the orbit of the comet, if the firſt aſſumption be true. Biſect Cc in x, and draw xy parallel to CK, and y will biſect Kk; join yS. Let $SX = 1$; then if v be the mean velocity of the earth in its orbit, the velocity of the comet at $y = \frac{\sqrt{2} \times v}{\sqrt{Sy}}$; taking therefore $v = Tt$, compute $\frac{\sqrt{2} \times v}{\sqrt{Sy}}$, and if this be equal to Kk, meaſured by the ſcale, the aſſumed point C was the true point. But if theſe quantities be not equal, aſſume a new point for C, in doing which, the error of the firſt aſſumption will direct you which way, from the firſt aſſumed point, it muſt be taken, and about how far from it; if, for inſtance, the computed value of Kk be greater than the true value, and the lines CK, ck, are diverging from each other, and receding from the ſun, the point C muſt be taken further from T; and how much further we muſt conjecture from the value of the error, and alſo from hence, that the velocity of the comet diminiſhes as it recedes from the ſun. Theſe conſi-

derations

derations will lead us to make a fecond affumption near to the truth. Having thus determined the true points C, c, very nearly, produce c C, k K to meet at N, join N S, and it will be the line of the nodes. Draw C r, $c\,z$ perpendicular to S N, and the angles K r C, $k\,z\,c$ will meafure the inclination of the orbit. From the two diftances S C, S c, and the angle between, the parabola may be conftructed, and applied as in the laft method, from which the time of paffing the perihelion may be found.

Another method by which we may readily get the orbit very nearly, is this. Let S (*fig.* 34.) be the fun, T, t, τ three places of the earth at the times of the three obfervations; extend three threads Tp, $t\,n$, $\tau\,m$, in the directions of the comet, as before directed. Affume a point y for the place of the comet at the fecond obfervation, and meafure Sy; then if S T = 1, and the velocity of the earth be v, the velocity of the comet at y will be $\frac{\sqrt{2} \times v}{\sqrt{Sy}}$; let v be reprefented by Tt, $t\tau$; and upon any ftraight edge P Q, fet off $c\,e = \frac{\sqrt{2} \times Tt}{\sqrt{Sy}}$, and $e\,d = \frac{\sqrt{2} \times t\tau}{\sqrt{Sy}}$; then apply the point e to y, and, by turning about the edge, try whether you can make the point c fall in Tp, and the point d in $\tau\,m$; if you find this can not be done, the error will direct you to affume another diftance; and by a very few trials you will find the point y where the points c and d will fall in T p, $\tau\,m$. This method is very eafy in practice, and fufficiently accurate to obtain a diftance Sy, from which you may begin to compute, in order to find the orbit more correctly, when the comet is not too near to the fun, as, fays Mr. Vince, I have found by experience.

Having determined the parabola nearly, we firft affume fome one quantity as known at the firft and fecond obfervations, and thence compute the place of the comet at thofe times, and alfo the time between; and if that time agree with the obferved interval, you have got a parabola which agrees with the two firft obfervations; if the times do not agree, alter one of the affumed quantities, and fee how it then agrees; and then, by the rule of falfe, you may correct the fuppofition which was altered, and get a parabola which will agree with the two firft obfervations. In like manner, by altering the other affumed quantity, you get another parabola agreeing with the two firft obfervations. Then fee how they agree with the third obfervation, and if they do not, a correction muft be made by proportion, and the three obfervations will be anfwered.

For further particulars we muft refer to Vince's Aftronomy, vol. i. p. 428, &c. See alfo "An account of the difcoveries concerning comets, with the way to find their orbits, and fome improvements in conftructing and calculating their places, to which are added new tables, fitted for thefe purpofes;" by Thomas Barker, Gent. Lond. 1757.

As the comets do not move in parabolas, but in very eccentric ellipfes, it is impoffible to find a parabola agreeing accurately to all the *data;* it will be fufficient, therefore, when it agrees very nearly. When great accuracy is required, we muft take into confideration the effect of aberration and parallax; the former may be computed in the manner ftated under the article Aberration, and the latter by taking the horizontal parallax to that of the fun = 8″,75 as the diftance of the fun is to the diftance of the comet; and then finding the parallax in latitude and longitude.

To afcertain the periodical time of a Comet, and the axes of its Orbit.

If comets, after having receded from the lower regions of the folar fyftem to vaft diftances beyond the orbits of the moft diftant planets, return again to the neighbourhood of the fun, the paths they defcribe muft be nearly elliptical; and then, if obfervations have been made fufficiently exact to be a bafis of the operations, the requifites of the problem may be determined in the following manner: Let A K B I (*fig.* 35.) be the trajectory of a comet, A B its major axis, I K the minor, S, F, the two foci, the former of which being the place of the fun, C the place of the comet, C S its diftance from the fun, C c the fpace it paffes over in a very fmall portion of time, D C E a tangent to the curve in the point C, S D, F E, perpendiculars demitted thereon from the foci: draw S G parallel to the tangent, and join F C. Alfo, let A L B be a circle, defcribed on the major axis A B; A P T B a rectangle about the ellipfis A I B, and A Q R B a fquare about the circle A L B. Laftly, let A N O be the elliptic orbit of any planet, S, f, its foci; put S C $=a$, S D $=b$, C $c=e$, the time in which it is defcribed f, the major axis of the cometary orbit A B $=x$, of the planetary orbit A O $=q$, the circumference of the circle A V O defcribed on the fame axis $=p$, the periodical time of the comet $=t$, and that of the planet $=n$.

The fpace C c defcribed, the diftance S C, and the angle S C D, being all determinable by obfervation, are given quantities. The mean diftance of the comet is A H = S K $=\frac{1}{2}x$, and of the planet is Ag = S N $=\frac{1}{2}q$; and, becaufe the fquares of the periodical times are as the cubes of the mean diftances, we have $\frac{1}{8}q^3 : \frac{1}{8}x^3 :: n^2 : t^2$; therefore $t^2 = \frac{\frac{1}{8}x^3 n^2}{\frac{1}{8}q^3}$, and $t = \frac{nx}{q}\sqrt{\frac{x}{q}}$.

But it is neceffary to find another expreffion for the periodical time t, which may be done thus: becaufe C c is a very minute portion of the orbit, it may be efteemed a right line, and the fector C S c as a rectilineal triangle, whofe area $\frac{1}{2}$ S D × C $c = \frac{1}{2}be$ is given: then, as the area $\frac{1}{2}be$, is to the whole area of the ellipfis A K B I = A; fo is the time f, to the whole periodical time t; wherefore $t = \frac{f}{\frac{1}{2}be} \times$ A.

Now, in order to determine the area A, we muft find the femiconjugate H K; and here, becaufe A B = S C + F C, we have F C $=x-a$; and by the fimilar triangles S D C, F E C, we have S C : S D :: F C : F E, that is, $a : b :: x - a : \frac{bx - ab}{a}$ = F E; confequently F G = F E − G E $= \frac{bx - 2ab}{a}$. Again, S C : C D :: F C : C E; or $a : \sqrt{a^2 - b^2} :: x - a : \frac{x-a}{a}\sqrt{a^2 - b^2}$: hence D E or S G = C E + C D $= \frac{x-a}{a}\sqrt{a^2-b^2} + \sqrt{a^2-b^2} = \frac{x}{a}\sqrt{a^2-b^2}$. But F G $= \frac{bx - 2ab}{a}$; therefore F S $= \sqrt{FG^2 + SG^2} = \sqrt{\frac{b^2x^2 - 4ab^2x + 4a^2b^2 + a^2x^2 - b^2x^2}{a^2}} = \sqrt{\frac{a^2x^2 - 4ab^2x + 4a^2b^2}{a^2}}$; and, of courfe, S H $= \frac{1}{2}$ F S $= \sqrt{\frac{a^2x^2 - 4ab^2x + 4a^2b^2}{4a^2}}$.

Moreover, fince S K = A H $= \frac{1}{2}x$, H K $= \sqrt{SK^2 - SH^2} = \sqrt{\frac{1}{4}x^2 - \frac{a^2x^2 - 4ab^2x + 4a^2b^2}{4a^2}} = \frac{b}{a}\sqrt{ax - a^2}$; therefore I K = 2 H K $= \frac{2b}{a}\sqrt{ax - a^2}$,

$\sqrt{a\,x-a^2}$, and $\frac{x\,b}{a}\sqrt{a\,x-a^2}$ = area of the rectangle A P T B. Let P be the periphery of the circle A L B, whoſe diameter is x, then its area will be $\frac{1}{2}$ L H $\times$ P $=$ $\frac{1}{4}x$ P, and we ſhall have $x^2 : \frac{1}{4}x\,\mathrm{P} :: \frac{1}{2}x^2 : \frac{1}{8}x\,\mathrm{P}$ :: A Q R B : A L B :: A P T B : A I B :: $q^2 : \frac{1}{4}q\,p$; that is $q^2 : \frac{1}{4}q\,p :: \frac{x\,b}{a}\sqrt{a\,x-a^2} : \frac{b\,p\,x}{4\,a\,q}\sqrt{a\,x-a^2}$ = A I B. But 2 A I B = A I K B = A $= \frac{b\,p\,x}{2\,a\,q}\sqrt{a\,x-a^2}$: therefore, ſubſtituting this value of A, in the preceding expreſſion, we have $t = \frac{f\,p\,x}{a\,e\,q}\sqrt{a\,x-a^2}$. Equate this value of t, with that already given, then $\frac{n\,x}{q}\sqrt{\frac{x}{q}} = \frac{f\,p\,x}{a\,e\,q}\sqrt{a\,x-a^2}$; which equation reduced, gives $x = \frac{a\,f^2\,p^2\,q}{f^2\,p^2\,q-a\,e^2\,n^2}$ = A B, the major axis of the comet's elliptical trajectory.

If we ſubſtitute this value of x, in the above equation, for t, we ſhall have $t = \frac{p^3\,f^3\,n^2\,a\,\frac{3}{2}}{q\,f^2\,p^2 - a\,e^2\,n^2)}\,\frac{3}{2}$ = the periodical time. Alſo, becauſe the conjugate I K $= \frac{2\,b}{a}\sqrt{a\,x-a^2} = c$, we have $x = \frac{c^2\,a^2+4\,b^2\,a^2}{4\,b^2\,a} = \frac{a\,f^2\,p^2\,q}{f^2\,p^2\,q-a\,e^2\,n^2}$, whence by reduction, we find $c = 2\,b\,e\,n\sqrt{\frac{a}{f^2\,p^2\,q-a\,e^2\,n^2}}$, the minor axis of the orbit.

From theſe equations, it obviouſly appears, that when the velocity of the comet is ſuch that $f^2\,p^2\,q = a\,e^2\,n^2$, the axis x will be infinite, and conſequently the trajectory will be a parabola; if $a\,e^2\,n^2$ be greater than $f^2\,p^2\,q$, the direction of the axis will be on the other ſide of the curve, which will be an hyperbola; in either of which caſes, the comet can never return: but in every inſtance where $f^2\,p^2\,q$ is greater than $a\,e^2\,n^2$, the comet will deſcribe an ellipſis; among theſe we may compriſe the circle, where $x = 2\,a = \frac{a\,f^2\,p^2\,q}{f^2\,p^2\,q-a\,e^2\,n}$ and $f^2\,p^2\,q = 2\,a\,e^2\,n^2$, whence e = C $c = \frac{f\,p}{a}\sqrt{\frac{q}{2\,a}}$, the arc of the circle deſcribed in one day, or one hour, according as the value of n is given in days, or hours.

Let the earth be the planet which we ſuppoſed to deſcribe the ellipſis A N O; then its mean diſtance $\frac{1}{2}q = 100000$, or $q = 200000$, and $p = 628318$; alſo the periodical time n = one year: then if C c be the portion of the comet's orbit deſcribed in one day, we have $f = \frac{1}{365.2565} = 0.0027378$. The other expreſſions will become as follow: for the principal axis, $x = \frac{591826599235 \times a}{591826599235 - a\,e^2}$, and for the periodical time $t = \frac{4750560000 \times a^{\frac{3}{2}}}{591826599235 - a\,e^2)^{\frac{3}{2}}}$.

It is extremely difficult to determine, from computation, the elliptic orbit of a comet, to any degree of accuracy; for when the orbit is very eccentric, a very ſmall error in the obſervation will change the computed orbit into a parabola, or hyperbola. Now, from the thickneſs and inequality of the atmoſphere with which the comet is ſurrounded, it is impoſſible to determine, with any great preciſion, when either the limb or centre of the comet paſs the wire at the time of obſervation. And this uncertainty in the obſervations will ſubject the computed orbit to a great error. Hence it happened, that M. Bouguer determined the orbit of the comet in 1729 to be an hyperbola. M. Euler firſt determined the ſame for the comet in 1744; but having received more accurate obſervations, he found it to be an ellipſe. The period of the comet in 1680 appears, from obſervation, to be 575 years, which M. Euler, by his computation, determined to be $166\frac{1}{2}$ years. The only ſafe way to get the period of comets, is to compare the elements of all thoſe which have been computed, and where you find they agree very well, you may conclude that they are elements of the *ſame* comet, it being ſo extremely improbable that the orbits of two different comets ſhould have the ſame inclination, the ſame perihelion diſtance, and the places of the perihelion and node the ſame. Thus, knowing the periodic time, we get the major axis of the ellipſe; and the perihelion diſtance being known, the minor axis will be known. When the elements of the orbits agree, the comets may be the ſame, although the periodic times ſhould vary a little; as that may ariſe from the attraction of the bodies in our ſyſtem, and which may alſo alter all the other elements a little. We have already obſerved, that the comet which appeared in 1759, had its periodic time increaſed conſiderably by the attraction of Jupiter and Saturn. This comet was ſeen in 1682, 1607, and 1531, all the elements agreeing, except a little variation of the periodic time. Dr. Halley ſuſpected the comet in 1680, to have been the ſame which appeared in 1106, 531, and 44 years before Chriſt, when Julius Cæſar was murdered; and that its period was five hundred and ſeventy-five years. Mr. Dunthorne, however, in the Phil. Tranſ. vol. xlvii., has endeavoured to ſhew from a MS. in Pembroke-hall library, that the comet of 1106 could not be the ſame with that of 1680. But M. de la Lande adopts the opinion of Dr. Halley. He alſo conjectured, in the firſt edition of his Synopſis, without repeating it in the ſecond edition, that the comet obſerved by Apian in 1532, was the ſame as that obſerved by Hevelius in 1661; if ſo, it ought to have returned in 1789, or 1790, but it has never been obſerved. The interval between the paſſages of the comet by the perihelion in 1532 and 1661 is 128 years, 89 days, 1 hour, 29 minutes, (32 of the years being biſſextile) which, added to the time of the perihelion in 1661, together with 11 days to reduce it from the Julian to the Gregorian ſtile, which we now uſe, brings out the time of the next perihelion, to be April 27th, 1ʰ 20′, in the year 1789. But M. Mechain having collected all the obſervations in 1532, and calculated the orbit again, found it to be ſenſibly different from that determined by Dr. Halley, which renders it very doubtful whether this was the comet which appeared in 1661; and this doubt is increaſed, by its not appearing in 1790. The comet in 1770, whoſe periodic time M. Lexell computed to be five years and ſeven months, has not been obſerved ſince. There can be no doubt but that the path of this comet, for the time it was obſerved, belonged to an orbit whoſe periodic time was that found by M. Lexell, as the computations for ſuch an orbit agreed ſo very well with the obſervations. But the revolution was probably longer before 1770: for as the comet paſſed very near to Jupiter in 1767, its periodic time might be ſenſibly increaſed by the action of that planet; and as it has not been obſerved ſince, we may conjecture, with M. Lexell, that having paſſed in 1772 again into the ſphere of ſenſible attraction of Jupiter, a new diſturbing force might probably take place and deſtroy the effect of the other. According to the above elements, the comet would be in conjunction with Jupiter on Auguſt

August 23, 1779, and its diſtance from Jupiter would be only $\frac{1}{491}$ of its diſtance from the ſun, conſequently the ſun's action would be only $\frac{1}{224}$ times that of Jupiter. What a change muſt this make in the orbit! If the comet returned to its perihelion in March 1776, it would then not be viſible. See M. Lexell's account in the Phil. Tranſ. 1779. The elements of the orbits of the comets in 1264 and 1556 were ſo nearly the ſame, that it is very probable it was the ſame comet; if ſo, it ought to appear again about the year 1848.

Mr. Cole, in his "Theory of Comets," advances an hypotheſis, which, in ſome caſes, may perhaps, be accurate. He ſuppoſes that the orbit of a comet is not an ellipſe; but that, when it paſſes its perihelion, it has acquired ſo great a velocity, that its centripetal force is overcome by its centrifugal, and that conſequently the comet continues to fly off in a parabola or hyperbola, till it come within the attraction of ſome fixed ſtar; that this attraction may give it a new direction, and increaſe its velocity till it come to an apſis below that ſtar, when it may again fly off either in a parabola or hyperbola, and proceed till it fall within the attraction of another ſtar; and thus viſit many different ſyſtems.

Dr. Halley has given us a table of the aſtronomical elements of twenty-four comets, on the ſuppoſition that they moved in parabolas; though he thought it extremely probable that they really moved in very eccentric ellipſes, and conſequently returned after long periods of time. This table commences with the year 1337, and cloſes with 1698. By means of this table, and others ſimilar to it, it may be determined whenever a new comet ſhall appear, by comparing it therewith, whether it be one of thoſe which have already appeared, and conſequently its period and the axis of its orbit be aſcertained, and its return foretold. See his Synopſis of the Aſtronomy of Comets, annexed to Gregory's Aſtronomy. This was firſt publiſhed in the Philoſophical Tranſactions in 1705, and republiſhed with his Aſtronomical Tables in 1749. M. de la Caille changed this table into another of a more convenient form, by putting the areas for the times.

Another table has ſince been computed, from the obſervations contained in the Philoſophical Tranſactions, De la Caille's Aſtronomy, and De la Lande's Hiſtoire de la Comete de 1759, and Connoiſſance des Movemens Celeſtes 1762 & 1764. In this table are ſeen the elements of twenty-five other comets, from the year 1264 to 1762. The moſt extenſive table for calculating the motions of comets, was computed by M. de Lambre; it is inſerted, as we have already mentioned, in Mr. Vince's Aſtronomy, vol. i. Another table on an extenſive ſcale, computed by Mr. Lee, an ingenious friend of the editor, an excellent aſtronomer, and an attentive obſerver of the heavens, is annexed to this article.

The number of comets that are ſtated in the moſt accurate accounts to have appeared, ſince the commencement of our æra, is about 500; and before that æra, about 100 others are recorded to have been ſeen, though it is probable that not more than half of them were comets.

The elements of the comet of 1770, and the trajectory of its path, may be found in the Tranſactions of the American Philoſophical Society, vol. i.

In Whiſton's Solar Syſtem, the orbits of ſeveral comets are delineated, and the periods of as many of them as were then known, expreſſed.

Comet, *To determine the place and courſe of a.* For this purpoſe, it will be adviſable to take the apparent diameter very frequently; as a judgment may thus be formed of its relative diſtance at different times; its degree of motion, its brightneſs, &c. muſt alſo be regarded; for when it moves with the greateſt velocity, or appears moſt bright, we may infer that it is near its perihelion. If the place of the comet can be obſerved when it has no latitude, the place and time of its being in one of its nodes will then be exactly known; but as this can ſeldom be actually obſerved, theſe elements are generally obtained by approximation from other obſervations. In order to obtain the proper courſe of a comet, obſerve its diſtance from two fixed ſtars, whoſe longitudes and latitudes are known: or, find its altitude when in the ſame azimuth with any two known fixed ſtars; from the diſtance or altitude thus found, calculate the place of the comet by trigonometry, after the manner delivered under Planet, or in the preceding article. By repeating the obſervations and operations for ſeveral days ſucceſſively, the courſe of the comet will be had.

Comet, *to determine the courſe of a, mechanically, and without any apparatus of inſtruments.* The following ingenious method, by a thread, we owe to Longomontanus: Obſerve four ſtars round the comet, ſuch, as that the comet may be in the interſection of the right lines that join the two oppoſite ſtars; which is eaſily found by means of a thread placed before the eye, and extended over-againſt the ſtars and comet.

Suppoſe, v. gr. the comet's place in the heavens A (*Pl.* IV. *Aſtronomy, fig.* 56.) between the four ſtars, B, C, D, E; where the line joining the ſtars B and D, paſſes through the body of the comet; and the like does the line paſſing through C and E.

On a globe, whereon theſe four ſtars are found, extend a thread through B and D, and another through C and E; the point of interſection will give the place of the comet. This practice being repeated for ſeveral days, the comet's courſe will be had on the globe; which courſe will be found to be a great circle: if this great circle, drawn through three diſtant places, and ſhewing its path among the ſtars, be continued till it interſect the ecliptic, it will ſhew nearly the place of the node, and the inclination of the orbit to the ecliptic. The plane of the node and inclination of the orbit being thus found from ſeveral triplets of places independent of each other, a medium of the reſults may be conſidered as tolerably accurate.

Comet, *to determine the parallax of a.* See Parallax.

Comet, *trajectory of a.* See Trajectory.

The

The Elements of Ninety Seven Comets.

No.	Paſſage through the Perihelion in Mean Time at Greenwich.	Longitude of the Perihelion on the Orbit of the Comet.	Perihelion Diſtance, that of the Earth being 1.	Longitude of the aſcending node.	Inclination of the Orbit.	Motion	Authors who have calculated the Orbit, and Remarks.
	Anno A. C.						
1	539 October 20 15^h 0^m 0^s	10^s $13°$ $30'$ $0''$	0.3412	1^s $28°$ or $7^s 28°$	$10°$ + or —	D	Burckhardt
	Anno Domini, Old Stile.						
2	837 March	9 19 3 0	0.5800	6^s $26°$ $33'$ $0''$	$10°$ or $12°$	R	Pingré
3	1097 September 21, 21 36 0	11 2 30 0	0.7385	6 27 30 0	$73°$ $30'$ $0''$	D	Burckhardt
4	1231 January 30, 7 12 40	4 14 48 0	0.9478	0 13 30 0	6 5 0	D	Pingré
5	1264 July 6, 8 0 0	9 21 0 0	0.445	5 19 0 0	36 30 0	D	Dunthorn, } ſuppoſed by ſome to be the ſame as No. 14
	July 17, 6 0 40	9 5 45 0	0.41081	5 28 45 0	30 25 0		Pingré,
6	1299 March 31 7 28 40	0 3 20 0	0.3179	3 17 8 0	68 57 0	R	Pingré
7	1301 October + or —	9^s or 10^s	0 457	0 $15°$ + or —	$70°$ + or —	R	Pingré
8	1337 June 2 6 25 0	1^s $7°$ $59'$ $0''$	0.40666	2^s $24°$ $21'$ $0''$	$32°$ $11'$ $0''$	R	Halley, nearly
	June 1 0 30 40	0 20 0 0	0.6445	2 6 22 0	32 11 0		Pingré
9	1351 November 26 12 0 0	2 9 0 0	1.0000			D	Burckhardt
10	1456 June 8 22 0 0	10 1 0 0	0.5855	1 18 30 0	17 56 0	R	Pingré, period $75\frac{1}{2}$ years
11	1472 February 28 22 23 0	1 15 33 30	0.54273	9 11 46 20	5 20 0	R	Halley, nearly
	1531 Auguſt 24 21 18 30	10 1 39 0	0.56700	1 19 25 0	17 56 0	D	Halley, nearly
12	1532 October 19 22 12 0	3 21 7 0	0.50910	2 20 27 0	32 36 0	D	Halley, nearly, who ſuppoſed it might be the ſame as No. 25
13	1533 June 16 19 30 0	4 27 16 0	0.20280	4 5 44 0	35 49 0	R	Douwes, nearly
14	1556 April 21 20 3 0	9 8 50 0	0.46390	5 25 42 0	32 6 30	D	Halley nearly, ſuppoſed by ſome to be the ſame as No. 5
15	1577 October 26 18 45 0	4 9 22 0	0.18342	0 25 52 0	74 32 45	R	Halley, nearly
16	1580 November 28 13 44 40	3 19 11 5	0.59553	0 19 7 37	64 51 50	D	Pingré
	15 0 0	3 19 5 50	0.59628	0 18 57 20	64 40 0		Halley
17	1582 May 7	8^s $5°$ or 9^s $11°$	0.23 or 0.04	7^s $5°$ or $21°$	$59°$ or $61°$	R	Pingré nearly
18	1585 September 27 19 20 0	0^s $8°$ $51'$ $0''$	1.09358	1^s $7°$ $42'$ $30''$	$6°$ $4'$ $0''$	D	Halley
19	1590 January 29 3 45 0	7 6 54 30	0.57661	5 15 30 40	29 40 40	R	Halley
20	1593 July 8 13 38 40	5 26 19 0	0.08911	5 14 15 0	87 58 0	D	De la Caille, nearly
21	1596 July 31 19 55 0	7 18 16 0	0.51293	10 12 12 30	55 12 0	R	Halley
	29 15 33 40	7 28 30 50	0.549415	10 15 36 50	52 9 45	R	Pingré
*10	1607 October 16 3 50 0	10 2 16 0	0.58680	1 20 21 0	17 2 0	R	Halley, vide Principia Newtoni, p. 524
22	1618 Auguſt 7 3 2 40	10 18 20 0	0.51298	9 23 25 0	21 28 0	D	Pingré, nearly
23	1618 October 29 12 23 0	0 2 14 0	0.37975	2 16 1 0	37 34 0	D	Halley
24	1652 November 2 15 40 0	0 28 18 40	0.84750	2 28 10 0	79 28 0	D	Halley
25	6661 January 16 23 41 0	3 25 58 40	0.44851	2 22 30 30	32 35 50	D	Halley, who ſuſpected it might be the ſame as No. 12
26	1664 November 24 11 52 0	4 10 41 25	1.025755	2 21 13 55	21 18 40	R	Halley, vide Principia Newtoni, p. 520
27	1665 April 14 5 15 30	2 11 54 30	0.10649	7 18 2 0	76 5 0	R	Halley

28	1672	February 20	8 37 0	1 16 59 30	0.69739	9 27 30 30	83 22 10	D	Halley
29	1677	April 26	0 37 30	4 17 37 5	0.28059	7 26 49 10	79 3 15	R	Halley
30	1678	August 16	14 3 0	10 27 46 0	1.23801	5 11 40 0	3 4 20	D	Douwes, nearly
31	1680	December 8	0 1 2	8 22 40 10	0.006030	9 1 57 13	61 22 55	D	Pingré
		7	0 4 0	8 22 33 0		9 1 53 0	61 20 20		Halley, vide Principia Newtoni, p. 500
		7	23 9 0	8 22 44 25	0.006170	9 2 2 0	61 6 48		Halley, an elliptical orbit, major axis 138.2957, period 575 years, vide Principia Newtoni, p. 501
		7	20 38 39	8 23 26 48	0.006565	9 2 59 9	58 39 50		Euler, an elliptical orbit, vide Theoria motuum Planet^m. & Comet^m.
		8	0 4 0	8 27 43 0	0.005920	9 1 53 0	61 20 20		Newton, graphically determined, vide Principia, p. 500
*10	1682	September 4	7 39 0	10 2 52 50	0.58328	1 21 16 30	17 56 0	R	Halley, vide Principia Newtoni, p. 523
			21 31 0	10 1 36 0	0.58250	1 20 48 0	17 42 0		Halley, an elliptical orbit, major axis 1778, period 75½ years, vide Principia Newtoni, p. 524
32	1683	July 2	3 50 0	2 25 29 30	0.56020	5 23 23 0	83 11 0	R	Halley, vide Principia Newtoni, p. 522
33	1684	May 29	10 16 0	7 28 52 0	0.96015	8 28 15 0	65 48 40	D	Halley
34	1686	September 6	14 33 0	2 17 0 30	0.32500	11 20 34 40	31 21 40	D	Halley
35	1689	November 21	14 55 40	8 23 44 45	0.016889	10 23 45 20	69 17 0	R	Pingré, nearly
36	1698	October 8	16 57 0	9 0 51 15	0.69129	8 27 44 15	11 46 0	R	Halley
37	1699	January 3	8 22 19	7 2 31 6	0.74400	10 21 45 35	69 20 0	R	De la Caille, nearly
38	1702	March 2	14 12 19	4 18 41 3	0.64590	6 9 25 15	4 30 0	D	De la Caille
39	1706	January 19	4 22 39	2 12 29 10	0.42580	0 13 11 40	55 14 10	D	De la Caille
			4 56 4	2 12 36 25	0.426865	0 13 11 23	55 14 5	D	Struyck
40	1707	November 30	23 29 39	2 19 54 56	0.8597	1 22 46 35	88 36 0	D	De la Caille
			23 43 6	2 19 58 9	0.85904	1 22 50 29	88 37 40	D	Struyck
41	1718	January 3	23 38 39	4 1 30 0	1.02650	4 8 43 0	30 20 0	R	De la Caille
		4	1 14 55	4 1 26 36	1.02565	4 7 55 20	31 12 53		Douwes
42	1723	September 16	16 10 0	1 12 15 20	0.998651	0 14 16 0	49 59 0	R	Bradley, very accurate, vide Principia Newtoni, p. 523
43	1729	June 14	11 6 40	10 22 40 0	4.26140	10 10 32 37	76 58 4	D	De la Caille, vide Mem. de l'Acad. Roy. des Sciences 1763
		12	6 36 2	10 22 16 53	4.0698	10 10 35 15	77 1 58		Douwes
44	1737	January 19	8 20 0	10 25 55 0	0.22282	7 16 22 0	18 20 45	D	Bradley, very accurate
45	1739	June 6	9 59 40	3 12 38 40	0.67358	0 27 15 14	55 42 44	R	De la Caille
46	1742	January 28	4 38 40	7 7 35 13	0.76568	6 5 38 29	66 59 14	R	De la Caille
			4 20 50	7 7 33 44	0.765555	6 5 34 45	67 4 11		Struyck
		27	4 14 59	7 10 49 23	0.7521	6 9 32 7	61 43 44		Euler, vide Theoria motuum Planetarum & Comet^m. p. 188
47	1742	December 30	20 25 40	3 2 41 45	0.83501	2 8 21 15	2 19 33	D	De la Caille, nearly
			21 15 16	3 2 58 4	0.838115	2 8 10 48	2 15 50		Struyck
48	1743	September 9	21 16 18	8 6 33 52	0.52157	0 5 16 25	45 48 21	R	Klinkenberg
49	1744	February 19	8 27 0	6 17 12 55	0.22206	1 15 45 20	47 8 36	D	Betts, very accurate, vide Philos. Trans. vol. 43
50	1747	February 20	7 10 40	9 7 2 0	2.19851	4 27 18 50	79 6 20	R	De la Caille, vide Mem. de l'Acad. 1757
		17	11 44 38	9 10 5 41	2.29388	4 26 58 27	77 56 55		Chezeaux
51	1748	April 17	19 25 0	7 5 0 50	0.84067	7 22 52 16	85 26 57	R	Maraldi
52	1748	June 7	1 24 15	9 6 9 24	0.65525	1 4 39 43	56 59 3	D	Struyck, nearly

	New Style.					
53	1757 October 21	9 46 40	4 2 49 0	0.33800	4 4 0	12 48 0	D	Pingré, vide Mem. de l'Acad. 1757
54	1758 June 11	3 17 40	8 27 38 0	0.21535	7 20 50 0	68 19 0	D	Pingré, vide Mem. de l'Acad. 1759
*10	1759 March 12	13 31 40	10 3 16 0	0.58349	1 23 49 0	17 39 0	R	De la Caille
		13 50 4	10 3 8 10	0.58490	1 23 45 35	17 40 14		De la La de
		13 48 16	10 3 16 20	0.58360	1 23 49 21	17 35 20		Maraldi, vide Mem. de l'Acad. 1759
55	1759 November 27	0 2 37	1 23 34 19	0.80139	4 19 39 41	79 6 38	D	Pingré
56	1759 December 16	21 3 40	4 18 24 35	0.96599	2 19 50 45	4 51 32	R	De la Caille
57	1762 May 28	15 17 40	3 15 15 0	1.0124	11 19 20 0	84 45 0	D	De la Lande, vide Mem. de l'Acad. 1762 and 1763
		6 51 29	3 14 29 46	1.009856	11 19 2 22	85 3 2		Struyck
	29	0 18 28	3 15 22 23	1.01415	11 18 55 31	85 22 21		Maraldi
58	1763 November 1	19 43 18	2 24 51 54	0.49876	11 26 23 26	72 40 40	D	Pingré, vide Mem. de l'Acad. 1774
		20 58 14	2 25 1 6	0.49820	11 26 27 0	72 28 0		Burckhardt
59	1764 February 12	13 42 16	0 15 14 52	0.55522	4 0 4 33	52 53 31	R	Pingré, vide Mem. de l'Acad. 1771
60	1760 February 17	8 40 40	4 23 15 25	0.50533	8 4 10 50	40 50 20	R	Pingré, nearly, vide Mem. de l'Acad. 1766
61	1766 April 22	20 46 20	8 2 17 53	0.33274	2 14 22 50	11 8 4	D	Pingré, vide Mem. de l'Acad. 1773
62	1769 October 7	12 20 40	4 24 5 54	0.12376	5 25 0 43	40 37 33	D	De la Lande, vide Mem. de l'Acad. 1769 and 1775
		13 36 53	4 24 11 7	0.12272	5 25 6 33	40 48 49		Prosperin
		14 56 39	4 24 16 0	0.12265	5 25 3 0	40 50 0		Euler, an elliptical orbit
		15 28 16	4 24 10 51	0.1227	5 25 4 41	40 49 33		Lexell, an elliptical orbit, vide Mem. de l'Acad. 1775 p. 430
		12 34 9	4 24 11 8	0.1232852	5 25 2 24	40 48 29		Sir Henry Englefield
		15 42 2	4 24 15 53	0.12275	5 25 6 4	40 46 42		Pingré, an elliptical orbit, vide Mem. de l'Acad. 1771
		12 44 38	4 24 11 32	0.12327	5 25 3 40	40 47 56		Legendre, vide Nou. Met. pour la Del^{n}. des Orb. des Cometes
63	1770 August 14	0 4 4	11 26 26 13	0.676893	4 12 17 3	1 34 30	D	Pingré, an elliptical orbit, major, semi axis, 3.08891, period 5.42886 years
	13	12 55 40	11 26 16 26	0.6743815	4 12 0 0	1 33 40		Lexell, an elliptical orbit, major, semi-axis 3.14786, period 5.585 years, vide Phil. Tranf. vol. 69
	13	12 37 35	11 26 15 0	0.67435	4 11 54 50	1 34 31		Burckhardt elliptical orbit, major, semi-axis 3.1435, period 2035 days
64	1770 November 22	5 38 40	6 28 22 44	0.52824	3 18 42 10	31 25 55	R	Pingré
65	1771 April 18	22 5 7	3 13 28 13	0.90576	0 27 51 0	11 15 20	D	Pingré
	19	5 1 21	3 14 2 54	0.90340	0 27 50 27	11 16 0		Burckhardt, an hyperbolic orbit
66	1772 February 18	20 41 15	3 18 6 22	1.01815	8 12 43 5	18 59 40	D	De la Lande
67	1773 September 5	11 9 25	2 15 35 43	1.13390	4 1 15 37	61 25 21	D	Pingré, an elliptical orbit, vide Mem. l'Acad. 1774 and 1777
		14 33 48	2 15 10 58	0 10120	4 1 5 30	61 14 7		Burckhardt
68	1774 August 15	10 46 15	10 17 22 4	1.4286	6 0 49 48	83 0 25	D	Mechain
69	1779 January 4	2 2 40	2 27 13 11	0.71312	0 25 5 51	32 24 0	D	Mechain
		2 15 10	2 27 13 40	0.7132	0 25 3 57	32 25 30		Chev. d'Angos
70	1780 September 30	18 3 30	8 6 21 18	0.09925	4 4 9 19	53 48 5	R	Mechain
71	1781 July 7	4 32 0	7 29 11 25	0.775861	2 23 0 38	81 43 26	D	Mechain
72	1781 November 29	12 32 26	0 16 3 28	0.96101	2 17 22 52	27 13 8	R	Mechain
		12 33 25	0 16 3 7	0.960995	2 17 22 55	27 12 4		Legendre, vide Nouvelle Methodes pour la determ. des Orbites des Cometes

73	1783 November 15	5 44 3	1 15 24 46	1.5653	1 24 13 50	53 9 9	D	Mechain, nearly
74	1784 January 21	4 47 40	2 20 44 24	0.70786	1 26 49 21	51 9 12	R	Mechain
75	1784 April 9	21 7 26	10 28 54 57	0.650531	2 26 52 9	47 55 8	R.	Chev. d'Angos
76	1785 January 27	7 48 44	3 19 51 56	1.143398	8 24 12 15	70 14 12	D	Mechain
77	1785 April 8	8 58 52	9 27 29 33	0.427300	2 4 33 36	87 31 54	R	Mechain
78	1786 July 7	21 50 52	5 9 25 36	0.41010	6 14 22 40	50 54 28	D	Mechain, vide Mem. de l'Acad. 1786
79	1787 May 10	19 48 40	0 7 44 9	0.34891	3 16 51 36	48 15 51	R	P. de Saron, vide Mem. de l'Acad. 1787
80	1788 November 10	7 25 40	3 9 8 27	1.06301	5 7 10 38	12 28 20	R	Mechain, vide Mem. de l'Acad. 1788
81	1788 November 20	9 4 25	0 23 12 22	0.766911	11 21 42 15	64 52 32	D	Mechain
82	1790 January 15	5 5 39	2 0 14 32	0.7581	5 26 11 46	31 54 15	R	De Saron, vide Connoiſſance des Tems
83	1790 January 28	7 36 13	3 21 44 37	1.063286	8 27 8 37	56 58 13	D	Mechain
84	1790 May 21	5 46 54	9 3 43 27	0.79796	1 3 11 2	63 52 27	R	La Lande
85	1792 January 13	13 35 9	1 6 29 42	1.293	6 10 46 15	39 46 55	D	
86	1795 December 14	23 17 53	5 13 37 0	0.227	11 29 11 0	24 17 0	D	Zach
	15	15 6 18	5 7 37 0	0.258	11 13 23 0	20 3 0		Bouvard
	14	18 43 0	5 15 34 0	0.215	0 1 7 0	24 42 0		Proſperin
87	1796 April 2	19 47 51	6 12 44 0	1.578	0 17 2 0	64 55 0	R	Olbers
88	1797 July 9	2 44 31	1 19 34 48	0.52545	10 29 16 35	50 35 50	R	Bouvard
89	1797 April 4	11 32 21	3 14 59 0	0.48476	4 2 9 0	43 52 16	D	Burckhardt
90	1798 December 31	12 58 57	1 4 29 48	0.77968	8 9 30 44	42 23 25		Burckhardt
91	1799 September 7	5 49 48	0 3 39 12	0.839865	3 9 31 59	50 55 37	R	Mechain } vide Connoiſſance des Tems, an. 12.
		5 34 4	0 3 39 10	0.840178	3 9 27 19	50 57 30		Von Zach
		4 24 39	0 3 36 0		3 9 34 0	50 52 30		Burckhardt
92	1799 December 25	21 30 49	6 10 20 12	0.625810	10 26 49 11	77 1 38	R	Mechain. De la Lande thinks it may be the ſame as No. 37
93	1801 Auguſt 8	13 22 39	6 3 49 0	0.2617	1 14 28 0	21 20 0	R	Burckhardt
94	1803 September 9	20 33 54	11 2 8 0	1.0942	10 10 17 0	57 0 0	D	Mechain, vide Conn. des Tems, an. 14
95	1804 Februay 13	13 31 7	4 28 44 51	1.07117	5 26 47 58	56 28 40	D	Gauſs, vide Connoiſſance des Tems, an. 15
	13	15 30 39	4 28 53 32	1.072277	5 26 49 47	56 44 20	D	vide Connoiſſance des Tems, an. 1808
96	1805 November 18	0 15 39	4 29 0 28	0.37567	11 15 6 51	15 58 12	D	Legendre, } vide Nou. Meth. pour la Del^{n}. des Orbites des Cometes.
97	1805 December 31	6 1 36	3 19 23 40	0.89159	8 10 35 24	16 25 25	D	Legendre.

On the subject of *Comets*, see Newton's Principia, lib. iii. Halley's Synopsis of Comets; Sejour Essai sur les Cometes, 1775; M. Pingre's Cometographie, 2 vols. 4to. 1781, Sir H. Englefield's work "On the determination of the Orbits of Comets;" M. Bode's General Considerations on the situations of the Orbits of all the Planets and Comets which have hitherto been calculated, inserted in the Memoirs of the Academy of Sciences of Berlin; Dr. Gregory's Astronomy; O. Gregory's Treatise on Astronomy, 1803; De la Lande, Theorie des Cometes, 1759; and Astronomie, vol. iii.; An Account of the Discoveries concerning Comets, with the way to find their Orbits, &c. by Thomas Barker, 1757; Vince's Astronomy, &c. &c.

COMETARIUM, or COMETARIAN, in *Mechanics*, is the name of a machine, contrived by Dr. Desaguliers, for the purpose of exhibiting and explaining the eccentric motion of a comet, agreeably to that law, of planetary motion, by which equal areas are described by the radius vector in equal times. Ben. Martin has given an account of this machine, in his "Young Gentleman and Lady's Philosophy," and Mr. Ferguson has described it still more particularly in his "Astronomy," but as those authors have not given a perspective view of the parts of action, we have thought it necessary to give a new drawing, such as we conceive will render the mechanism clearly intelligible to every reader. In *Plate* I. of *Planetary Machines*, *fig.* 1. represents the cover of the cometarium, taken from the box which contains the wheel-work, and *fig.* 2. shews the box and its contents, with the exception of the cover, and one side, the latter of which is supposed to be removed, in order to disclose more fully the disposition of all the contained parts. A B in *fig.* 2. is the bottom of the box, which supports the lower pivots of the three vertical arbors; C D is a longitudinal bar inserted into the ends of the box, and bearing the upper pivots of the said arbors, as may be clearly seen in the figure; E is the handle put on the end of the horizontal arbor E F, which arbor is pivoted into the front and back sides of the box; on this horizontal arbor, under the letter C, is an endless screw actuating the wheel G, with teeth not rounded but cut a little obliquely; the number of which teeth may be assumed at option, to correspond to an aliquot part of a circle, suppose 72, in which case one tooth, or revolution of the handle, will correspond to 5°; at the inferior end of the arbor of wheel G, is fixed another wheel H, of the same number of teeth, that actuates a similar wheel I, on the second vertical arbor; so that these two wheels, H and I, also revolve each in $\frac{1}{72}$d part of a circle, or 5°, at each revolution of the handle. Mr. Ferguson has placed the endless screw as in *fig.* 2. of *Plate* II., between the wheels H and I in such a way, as to impel them both in contrary directions at the same time, which construction is still more simple, as it dispenses altogether with the wheel G, and requires no rounding of the teeth; to the arbor of wheel I a solid plate K, in the form of an ellipse, is fixed fast at a point out of the centre, and has a groove round its edge to admit a cord to pass round it; and a second elliptic plate L, every way similar to plate K, is attached, at a point equally distant from the centre, to the third vertical arbor, but in such a way, that, when an endless cord is made to embrace the grooves of both, after crossing between them, the long radius of one is always directed towards the short radius of the other reciprocally, so that as the radius of plate K continues to lengthen in revolving half round, the radius of L continues to shorten, and *vice versâ* during the other half of the revolution; this alteration of gradual lengthening and shortening of the radii, of the equably moving elliptic plate K, produces an alternate acceleration and retardation of motion in the plate L, such as corresponds with the equated motion of a heavenly body, describing equal areas in equal times; and the quantity of eccentricity given to the elliptic plates determines the quantum of the greatest equation in the orbit to be represented. Above the cross-bar CD is fixed an elliptic plate M, by two screws, seen in both the figures, round which the comet O is confined to move in its motion round N, the sun, which is a ball attached to the superior end of the arbor of the plate L of unequable motion; to the ball N, the arm or radius vector N O is attached, which therefore also moves with alternate accelerations and retardations of motion along with plate L; and as the comet O has liberty to slide along the radius vector, while a stud under it penetrates the black elliptic groove, made in the cover round the plate M, the variation of distances is thereby effected as the comet is carried round: the point of the greatest distance, where the motion is slowest, is called the *aphelion*, from ἀπὸ, *from*, and ἥλιον, the *sun*, and the point of nearest distance, where the motion is quickest, is called the *perihelion*, from περὶ, *round*, and ἥλιον, the *sun*. The two circles of signs, and also the graduated ellipse, are marked on the cover of the machine, and the arm G, in *fig.* 1, is placed on the equably moving arbor of wheel G, in *fig.* 2, so that when the arm G moves through the signs in the small circle, by equal arcs in equal times, the arm N O moveable round the point N, passes through corresponding unequal arcs in the larger circle of signs, while the difference between the places of the two said arms shews the quantity of prosthaphæresis, or equation in any situation in the large graduated circle, which is assumed to be parallel to the comet's orbit. In order that the nature of the comet's motion may be the more apparent to the eye of a spectator, when referred to its own orbit, the small ellipse, beyond the darkened aperture that regulates the distances, is also divided into signs, but in such a way, that the angles subtended by each sign, when referred to the point N, or centre of motion, are unequal among themselves throughout each six successive signs, and if lines were drawn from each point where the comet is found at the end of each day or week, to the point N, they would include equal areas, or plane surfaces taken geometrically; in some of the machines indeed, those lines are actually drawn, and the separate triangular areas corresponding to each equidistant period are painted alternately black and white, to render the doctrine of the celebrated Kepler still more evident to the senses. The principal objections to the construction of the machine before us is, that the comet O is apt to move by jerks in certain parts of the orbit, particularly when the eccentricity is great; and also the cord is liable to slide in some situations, without producing the corresponding motion in the elliptic plates K and L; the latter of which objections has been attempted to be obviated, by attaching forked pieces of metal to the plane of one of the elliptic plates near its end, and pins to the other, as in *fig.* 2. *Plate* II. to form a kind of teeth; but a better plan, and which has been adopted sometimes in practice, where the eccentricity is not very great, is to cut the elliptic plates themselves into toothed wheels, and to substitute them for the wheels H and I, in which case the cord may be dispensed with altogether, and the arm N O, we presume, will thus be less liable to jerks.—After all, however, this machine does not profess to represent the period of a revolution of any of the comets or planetary bodies, but is intended merely to explain the law of their motion, which it will do in a very satisfactory manner, when well made; and it is easy to see, that, as the plate M may be fixed more or less out of the centre, such a change of distances

diſtances may be produced, as ſhall correſpond to the changes of angular velocity; which is the chief difficulty to be overcome in the mechanical repreſentation of the orbit.

New Cometarium by Mr. Jones.

Subſequently to our writing the preceding account of the cometarium, Mr. W. Jones, optician in Holborn, has favoured us with a drawing and deſcription of a new conſtruction of the cometarium, which he ſays is free from the jerks that we have ſtated as an objection to the plan of Dr. Deſaguliers, and which, therefore, we lay before the public as nearly in the author's own words as our arrangement and obſervations on it will admit.

Fig. 1. of *Plate* II. of *Planetary Machines* is a repreſentation of the external part of the machine, which is not confined to any particular dimenſions, but has generally been made as follows; *viz.* A B C D is a mahogany box, about 12 inches long, 9 wide, and 4½ deep, containing the wheelwork that gives motion to the comet *x*; the dark elliptical ſpace is a groove repreſenting the orbit of the comet, which is carried round in the direction of the alphabetical order of the letters. The point *a* is the perihelion, and the point *g* the aphelion; and the triangular ſpaces or areas, *a* S *b*, *b* S *c*, &c. are all reſpectively equal to each other: in one turn of the handle N, the comet *x* is moved over one of theſe areas; conſequently, in the ſame time that it moves from *f* to *g*, or from *g* to *h*, it moves from *m* to *a*, or from *a* to *b*, and in like manner through each ſucceeding area, the quickeſt motion being at *a*, and the ſloweſt at *g*; thus ſhowing that the velocity of a comet in its orbit continually and gradually decreaſes from the perihelion *a* to the aphelion *g*, and increaſes in the ſame proportion from the aphelion to the perihelion. The elliptical orbit is divided into twelve ſigns with their reſpective degrees, and in a ſimilar manner is the circle *n o p s t*, which repreſents a great circle in the heavens, and to which the motion of the comet is referred by the extremity of the wire W, moveable at S, and actuated by the ſtem of the comet, which ſlides againſt it, in and out alternately, in its progreſs in the orbit. During the comet's motion in its orbit from *f* to *g*, its apparent motion is only about five degrees in this circle, as pointed out by the end of the wire; but in the ſame time as the comet moves from *m* to *a*, or from *a* to *b*, it appears to deſcribe the large angular ſpace *i n*, or *n o* in the heavens, each of which arcs contains about 120°, or four ſigns; and if the eccentricity of the orbit were ſtill greater, the greater would be the difference between the two extreme velocities. The figures 1, 2, 3, 4, &c. to 12, repreſent a ſmall comparative circular orbit, for ſhewing the equable motion of a body, ſuppoſed to move concentrically round the ſun S, and to deſcribe equal arcs, as well as equal areas, 1 S 2, 2 S 3, &c. in equal times with thoſe of the comet *x* in its elliptic orbit before mentioned. Suppoſe now the bodies *x* and *o* to commence their motions at the ſame inſtant from the points *a* and 1, and to arrive at the ſame reſpective points again, after a revolution of each, at the ſame inſtant, it will be obſerved, during their progreſs, that the body *x* will be more forward than the body *o* in the firſt ſix ſigns from *a* to *g*, but more backward in the next ſigns from *g* to *a*, and the difference between the places of the two bodies, in any part of the ſmall or equable orbit, will be the *equation* of the centre in that particular part. At the points *a*, 1, and *g*, 7, the bodies are together, and conſequently the equation vaniſhes, and from thence begins to take an oppoſite character, changing from plus to minus, and *vice verſâ* at the reſpective points; alſo, the diſtance from the aphelion point, in the ſmall orbit, is called the *mean anomaly*, reckoned in ſigns and degrees; and the diſtance from *a*, in the large circle, reckoned in a ſimilar manner, is called the *true* or *equated anomaly*. Thus the reaſon appears evident, why, in aſtronomical calculations taken from the tables of Dr. Halley, or la Lande, the grand equation of a body moving in an elliptic orbit is *additive* in the firſt ſix ſigns, and *ſubtractive* in the ſecond ſix, with reſpect to the place aſcertained by an aſſumption of mean motion; and the ſame application of the grand equation, after ſome modification of its varying quantity, is uſed from the apogee to the perigee, and back again from the perigee to the apogee of the lunar orbit.

The mechaniſm, by means of which theſe motions are produced in the original cometarium, has been already explained above, from which that of Mr. Jones is very different, and is thus explained by him.

From the circumſtance of its being conſidered as impracticable to obtain an eaſy and uniformly ſteady motion of a comet, by Dr. Deſagulier's mechaniſm, Mr Jones has adopted the plan of uſing only one great wheel revolving on an arbor placed out of the centre, agreeably to the drawing exhibited in *fig.* 3. of *Plate* II. near the point H, and under the cock attached to the plane of the wheel, by three viſible ſcrews. The different parts and action of the mechaniſm are theſe; A B repreſents the inſide bottom of the box, ſeen in *fig.* 1. of the ſame plate; C D is an oblong piece of mahogany, fitted ſo as to ſlide eaſily but ſteadily in the grooves of two parallel ſide-pieces of the ſame wood, made faſt to the bottom, and denoted by the letters E and F; G is the large braſs wheel, about five inches diameter, which we have ſaid revolves on an eccentric arbor, near the point H; over this point is placed the cock, or bent arm, H I, with an oblong ſlit through it, to receive the ſliding piece *a*, which piece ſupports the low end of the ſtem that carries the comet X in *fig.* 1. K and L are two wheels pivoted above into a bridge P, ſhaped like a croſs, and have equal numbers of teeth, the latter of which wheels is actuated by the contrate wheel M, inſerted on the axis B, of the handle N; on the ſame arbor with K, and cloſe under the bridge P, is a ſmall wheel (ſeen in the figure) that impels the large wheel G, round its eccentric arbor; it will not perhaps appear evident to an ordinary mechanic, how the action of the ſmall and large eccentric wheel is rendered continual, and the pitching of the teeth made good all round the great wheel, notwithſtanding the conſtant variation of the diſtances from the eccentric point, which is the centre of its motion, and the ſucceſſive points of its circumference; to effect this apparently difficult purpoſe, conſiderable ingenuity was neceſſary; by examining the croſſes and rim of the large wheel, it will be ſeen, that the thickneſs of the croſſes, and of the teeth, is leſs than of the rim, ſo that the rim may be ſaid to have a circular edge-bar on its plane projecting upwards; this edge-bar is embraced by two rollers, the larger one moving round on the arbor of wheel K, above the ſmall wheel, and the ſmaller one carried by a cock O, faſt to the croſſed bridge P; ſo that, as the great wheel is urged round by the ſmall one, theſe two rollers give motion to the ſliding piece of wood C D, alternately in and out, and conſequently bring the teeth of the wheel borne by this ſliding piece, into a proper depth to act with its ſmall impelling wheel, in every part of the revolution of the former, which therefore acts as well, when the teeth are directed towards the centre of motion, as if the arbor had been in the centre of the wheel, and placed on a ſtationary bar. The wheel, however, has many more teeth coming ſucceſſively into action during one half of its revolution, round the eccentric point of its motion, than it has during the other; and on this circumſtance depends the variable velocity of the comet attached

to its arm I, as it regards the faid centre of motion. We fhall have occafion to fhew, in another place, that the equation, produced by this caufe only, would be juft one half of the proper equation of the centre, or very nearly fo, provided the fun were placed exactly over the centre of motion, or eccentric point of the wheel: it is alfo not difficult to fhew, that if the wheel had no eccentric motion, but had the fun placed at a fimilar diftance out of its centre of motion, one half of the due equation would alfo, in that cafe, be effected, fuppofing the circle of figns, pointed to by the wire, to be eccentric with regard to the wheel, and fuppofing the fun to be in its centre; now, in the inftrument before us, thefe two caufes operate together to produce the total equation due to the orbit, where the eccentricity of the wheel is to its radius, and alfo the eccentricity of the fun's pofition, at the oppofite fide of the wheel's centre, to the fame, as the eccentricity of the comet is to the radius of its orbit. It muft, however, be acknowledged, that the joint agency of the two faid caufes of the equation, fuppofes the fliding bar C D to be ftationary, in which cafe the action of the wheels would foon be impeded; confequently, that part of the equation which depends on the fun's eccentric pofition, as it regards the wheel's arbor, is variable, and in fome meafure muft derange the fcale of equations, as it would have been, if the wheel's arbor had been ftationary; the remedy for this fmall deviation from perfect accuracy in the fcale of equations thus produced by the joint agency of three caufes, is beft effected by making the ftraight lines, that form the triangular areas, to correfpond, not to a geometrical meafurement, but to the actual turns of the handle, one of which will correfpond to each triangular area, when the contrate wheel M, and alfo the fmall wheel over K, have each one twelfth part of the number of teeth that the great wheel has, which wheel, in that cafe, may have any optional number that is divifible by twelve. When the centre of the large wheel lies exactly in a line joining the centre of motion H, and the arbor of K, the fliding board C D is the moft pufhed out, and the comet is at the aphelion *g*, *fig*. 1. moving flowly; but when the centre of the wheel's motion lies between the central point of it and of wheel K, then the comet is at the perihelion *a*, moving quickly. The cock *y*, in *fig*. 1., holds the elliptic plate, with the triangular areas marked on it, and bearing on it the fun, in fuch a fituation, that the groove round its edge, in which the ftem of the comet moves, limits the diftance at all times of this body, as it refpects the fun, which is done by making the fliding piece in *fig* 3. move in or out in the flit of the arm I, already defcribed. Thus the jerks of the old cometarium are avoided, and all its apparent properties are preferved, except that a portion of the large graduated celeftial circle is unavoidably concealed by the fuperior elliptic plate of triangular areas.

COMETES, in *Botany*, (κομητης, *crinitus*, fo called on account of the remarkably hifpid involucres,) Linn. Mant. 39. Schreb. 211. Willd. 211. Lam. Ill. 203. Juff. 437. Clafs and order, *tetrandria monogynia*. Nat. Ord. *Tricoccæ*.

Gen. Ch. *Calyx common*. Involucre four-leaved, inclofing three feffile flowers, oblong, equal, ciliate-hifpid. *Calyx proper*. Perianth four-leaved; leaflets oblong, equal the length of the involucre. *Cor*. none. *Stam*. Filaments four, capillary, the length of the involucre; anthers roundifh. *Pift*. Germ fuperior, roundifh; ftyle filiform; ftigma trifid. *Peric*. Capfule tricoccous. *Seeds* folitary.

Eff. Ch. Involucre four-leaved, three-flowered. Calyx proper, four-leaved. Corolla none. Capfule tricoccous.

Sp. C. *alternifolia*. Linn. Syft. Nat. Mart. Willd. Burm. Ind. 39. tab. 15. fig. 5. (Clinopodium parvum finicum; Pluk. Alm. 61. tab. 389. fig. 4.) *Root* annual. *Stem* a foot high, herbaceous. *Leaves* oppofite, narrowing into a petiole, inverfely egg-fhaped, acuminate, quite entire. *Peduncles* in pairs, terminal and axillary. A native of Surat.

COMETITES, in *Natural Hiftory*, a name given by fome writers to a kind of aftroites, which has ftars much larger than thofe of the common kind, and therefore called *comets*.

COMEUS, in *Mythology*, a furname of Apollo, under which title he was worfhipped at Seleucia, whence his ftatue was carried to Rome, and placed in the temple of Apollo Palatine.

COMFETS, Stony, in *Natural Hiftory*, drop-ftones or confetts. Thefe are ftalactites, broken into fhort pieces, fomewhat refembling comfets, and certain kinds of fugar-plums, and which in Italy and other places are fometimes put up in boxes and labelled, fo as to deceive ftrangers at firft fight, in fuppofing them to be real comfets.

COMFLOENTA, in *Ancient Geography*, a town of Spain, in the Tarragonenfian territory, placed by Ptolemy in the country of the Arevaci.

COMFORT, Point, in *Geography*, is the fouth eafternmoft part of Elizabeth-city county, in Virginia, formed by James river, at its mouth in Chefapeak bay; 19 miles W. by N. of Cape Henry.

COMFREY, or Comphry, in *Botany*. See Symphytum.

COMHOLA, in *Geography*, a river of Ireland, which runs into Bantry bay; 3 miles N. of Bantry.

COMI, in *Ancient Geography*, a people of Afia, in Bactriana, faid by Ptolemy to have dwelled in the vicinity of the *Chomari*.

COMIDAVA, a town of Dacia, according to Ptolemy.

COMILLAH, in *Geography*, a town of Hindooftan, in the province of Bengal; 160 miles E. N. E. of Calcutta, and 176 E. S. E. of Moorfhedabad. N. lat. 23° 25′. E. long. 91° 15′.

COMIN and Cominot, two fmall iflands in the Mediterranean, lying between Malta and Gofa or Gozo; the former fuppofed to be the Hepheftia, or ifle of Vulcan of the ancients. They were formerly uninhabited; but by the care of Vingnacourt, a fort having been built upon each of them for their fafety, they have been fince partly inhabited, and that of Comin, which is about 4 or 5 miles in circuit, breeds a large quantity of cattle. See Malta.

COMINES, a town of Flanders, fituated on the Lis, which divides it into two parts; formerly a confiderable place, but reduced by war and various accidents; 25 miles S. of Bruges, and 7 N. of Lille.

COMINGE, in *Military Language*, a fhell of uncommon magnitude, which takes its name from the perfon who invented it.

COMING-TO, in *Sea Language*, denotes the approach of a fhip's head to the direction of the wind.

COMINIUM, in *Ancient Geography*, a town of Italy in Samnium, which did not fubfift in the time of Pliny.

COMIOLA, in *Botany*, a name given by fome of the old Roman authors, to the plant commonly called Luteola, or dyers' weed.

COMITATU *commiffo*, in *Law*, a writ or commiffion, by which a fheriff is authorifed to take upon him the charge of the county.

Comitatu *et caftro commiffo*, a writ by which the charge of a county, together with the keeping of a caftle, is committed to the fheriff.

COMI-

COMITATUS, in *Law*, a county. Ingulphus tells us, that England was firft divided into counties by king Alfred; and the counties into hundreds, and thefe again into tythings; and Fortefcue writes, that *regnum Angliæ per* comitatus, *ut regnum Franciæ per ballivatus, diftinguitur.* Sometimes it is taken for a territory or jurifdiction of a particular place; as in Mat. Paris, anno 1234. See COUNTY.

COMITATUS *poffe.* See POSSE.

COMITIA, an affembly of the Roman people, either in the Comitium, or Campus Martius, i. e. *Field of Mars;* meeting for the election of magiftrates, or for confulting on the important affairs of the republic.

The word comes from the verb *coeo*, or *comeo*, *to go together.*

There were certain days fixed for thefe affemblies, called *dies comitiales;* marked with a C in the calendar of Julius Cæfar. Comitial affemblies, held for the election of confuls, were called *confular comitia:* in like manner, the other comitia took names from the officer to be created; whether a tribune, a pontiff, ædile, or the like.

There were three kinds of thefe comitia, viz. *curiata*, *centuriata*, and *tributa;* fo diftinguifhed from the manner wherein the people voted, and gave their fuffrages, *viz.* by curiæ or parifhes, tribes, or centuries.

The power of calling thefe affemblies pertained to moft of the chief magiftrates, and fometimes to the fovereign pontiff.

Authors make the difference between *comitia* and *concilia*, to confift in this; that in the former the whole people were called together, in the latter only a part.

COMITIA *curiata.* Romulus inftituted the *comitia curiata*, or the public affemblies of the people, called to vote in their feveral curiæ: and it is agreed by all that the matters fubjected to their decifion, were the choice of all the magiftrates, and the right of making laws, war, and peace: an ample jurifdiction, comprehending the moft important articles of government, yet not wholly abfolute, according to Dionyfius, unlefs the fenate concurred with them. This method of tranfacting all the greater affairs by the people, affembled in their curiæ, after it had fubfifted through five fucceffive reigns, was found to be inconvenient.

Servius Tullius, the fixth king of Rome, in order to correct the inconvenience of the *comitia curiata*, inftituted a new divifion of the people into fix claffes, according to a cenfus, or valuation of their eftates; whence proceed the *comitia centuriata:* then he fubdivided thefe claffes into one hundred and ninety-three centuries, and contrived to throw a majority of thefe centuries, that is, ninety-eight of them, into the firft clafs of the richeft citizens. By which regulation, though every man voted now in his century, as before, in his curia; yet, as all matters were decided by a majority of the centuries, fo the balance of power was wholly transferred into the hands of the rich; and the poorer fort deprived of their former weight and influence in the affairs of ftate: which wife inftitution was ever after obferved, through all fucceeding ages, in the elections of the principal magiftrates, and the determination of all the principal tranfactions of the republic.

COMITIAL *days.* Paulus Manutius is of opinion, that there were certain days on which the Roman fenate might regularly be affembled; and others on which it could not: and that thefe laft were called comitial days, and marked under that name in the calendars, as days wholly deftined, and fet apart by law, for the affemblies of the people. But Sigonius contends, that the fenate might meet on any of thofe days, unlefs when the people were actually affembled, and tranfacting bufinefs on them; and confequently that the title of comitial denoted fuch days only, on which the people might be legally affembled, not fuch on which they were of courfe to be affembled. Middlet. of Rom. Senat. p. 138, feq.

The truth of the matter feems to be this, that though the days called comitial were regularly deftined to the affemblies of the people, yet the fenate alfo might not only be convened on the fame, after the popular affemblies were diffolved; but had the power likewife, whenever they found it expedient, to fuperfede and poftpone the affemblies of the people to another day; and, by a particular decree, to authorife their own meetings upon them, for the difpatch of fome important affair therein fpecified.

COMITIALIS *morbus*, in *Medicine*, an ancient term for the *epilepfy*, or falling ficknefs; fo called, becaufe if any perfon was feized with it in the Roman comitia, the affembly was immediately diffolved; this being efteemed an unlucky omen; or, rather, becaufe thofe liable to it were chiefly feized in the comitia, or great affemblies. See EPILEPSY.

COMITIUM, the place where the comitia were ordinarily held, which was a large hall in the Roman Forum: it was a long time open at top; on which account the affemblies were often interrupted by bad weather: it was firft covered over in the time of the fecond Punic war. See FORUM.

Rofinus obferves, that the confuls and tribunes were not created in the *comitium*, but in the Campus Martius.

It was in this place that the roftra were placed. See COMITIA.

COMITLAN, in *Geography*, a town of North America, in Mexico, and province of Chiapa.

COMITOLO, PAUL, in *Biography*, one of the ableft of the fociety of Jefuits, acquired great reputation by his inftructions in morality and theology at the commencement of the feventeenth century. He died in 1626, at the age of eighty years. His publications are "Catena illuftrium authorum in Librum Job," tranflated from the Greek into the Latin language;— "Concilia feu refponfa moralia:" "Doctrina de contractu univerfo." Nouv. Dict. Hift.

COMMA, in *Grammar*, a point, or character, formed thus [,]; ferving to mark a fhort ftop, or paufe; and to divide the members of a period.

The word is formed of κοπτω, *feco*, *I cut.*

It is very difficult to fix the precife ufe of the comma; different authors define and ufe it differently: the ordinary doctrine is, that the comma ferves to diftinguifh nouns, verbs, adverbs, and the feveral parts of a period that are not neceffarily joined together. But this conveys no clear, precife idea; for what is it to diftinguifh the parts of a period not neceffarily joined together? F. Buffier has carried the doctrine of the comma farther: according to him, the comma ferves to diftinguifh thofe members of a period, in each whereof is a verb, and the nominative cafe of the verb. Thus, "That fo many people are pleafed with trifles is owing to a weaknefs of mind, which makes them love things eafy to be comprehended."

Befides this, the comma is ufed to diftinguifh, in the fame member of a period, feveral nouns fubftantives, or nouns adjectives, or verbs, not united by a conjunction. Thus, "Virtue, wit, knowledge, are the chief advantages of a man:" or, "A man never becomes learned without ftudying conftantly, methodically, with a juft application, &c."

If thofe words be united in the fame phrafe by a conjunction, the comma is omitted: thus, "The imagination and the judgment do not always agree." The comma may alfo be omitted between the phrafes that are very fhort, efpecially

if they depend upon the fame regimen, and are united by a conjunction: thus, "Alexander conquered Afia and eftablifhed the monarchy of the Greeks."

The ingenious author of the tract "De Ratione Interpungendi," printed with Voffius's Element. Rhetor. Lond. 1724, lays down the ufe of a comma to be, to diftinguifh the fimple members of a period, or fentence; i. e. fuch as only confift of one fubject, and one definite verb. Thus Cicero, "Venio nunc ad voluptates agricolarum, quibus ego incredibiliter delector, quæ nec ulla impediuntur fenectute, & mihi ad fapientis vitam proxime accedere videntur." See SENTENCE.

But this rule does not go throughout; the fame author inftancing many particular cafes, not included herein, where yet the comma is advifable.

Sometimes, *e. gr.* a propofition includes another, which may be called *partitive*, as being only a part of the entire phrafe; in which cafe, the two are to be divided from each other by commas. Thus, "He always fays, as he tells us, the fineft things in the world."

The points, or paufes in difcourfe, it is obferved, are in a kind of mufical proportion: the comma ftops the reader's voice while he may privately tell one; the femicolon, two; the colon, three; and the period, or full-ftop, four. Others make the ftop at the colon four: and the period fix. Profeffor Ward obferves, that the fufpenfion of the voice fhould be twice as long for a comma, as between words feparated by no mark of diftinction; thrice for the femicolon; and fo in the fame proportion. Bifhop Lowth affigns to the period a paufe in duration double to the colon: to the colon, double of the femi-colon; and to the femicolon, double of the comma: fo that they are in the fame proportion to one another as the femibreve, the minim, the crotchet, and the quaver in mufic. But whatever be the duration of the feveral paufes, the proportion between them would be ever invariable, if the doctrine of punctuation were exact. Introd. to Englifh Grammar, ed. 1772. p. 197.

The ancients only made ufe of two kinds of points, or paufes, in a period; the larger they call *members*, the Greeks *cola*, marked thus [:]; the fmaller *incifa*, the Greeks *commata*, thus [,].

The moderns, refining on their predeceffors, have fubdivided the firft into a colon, and femi-colon; fome fay, without any good foundation in nature; though others maintain the ufefulnefs of the divifion.

As the member, or colon, divides the period into two parts, each containing a fenfe, though that imperfect: thus, "Antequam de republica, patres confcripti, dicam ea quæ dicenda hoc tempore arbitror;" where the fenfe does not reft, nor is the period or fentence perfect, without the addition of "exponam vobis breviter & profectionis & reverfionis meæ:" the comma fubdivides each member into intermediate divifions, which, of themfelves, have no precife meaning at all: *v. gr.* "Nihil eft, mihi crede, virtute formofius, nihil pulchrius, nihil amabilius."

Frequent commas, as on other occafions they promote perfpicuity and diftinctnefs, and eafe the reader, both in the rehearfal and comprehenfion of his author; fo, in oratory, are of efpecial ufe and effect; particularly where an adverfary is to be clofely and pointedly attacked, upbraided, reprehended, wounded, &c. Witnefs that of Cicero againft Verres: "Non enim nos color ifte fervilis, non pilofæ genæ, non dentes putridi deceperunt: oculi, fupercilia, frons, vultus denique totus, qui fermo quidam tacitus mentis eft, hic in fraudem, homines impulit: hic, eos, quibus erat ignotus, decepit, fefellit, in fraudem induxit: pauci tua ifta lutulenta vitia novimus; pauci tarditatem ingenii, ftuporem, debilitatemque linguæ," &c. On the ufe of commas, fee Murray's Englifh Grammar, ed. 8. p. 224, &c.

COMMA, in *Mufic.* By this term, theoretic writers on mufic have denominated feveral different fmall intervals in the mufical fcale, which makes it neceffary that we fhould here enter rather minutely into the fubject. We fhall begin with that very effential interval in almoft all mufical calculations which is for the moft part implied by the word comma without further addition, otherwife the

COMMA *Major*, *Greater Syntonic* or *Elementary* of various writers, being alfo the *fchifm* or *fchifma* of Des Cartes, Holder, and others. This interval feems firft to have been noticed by the Greek writers, as the quantity by which the major tone T ($\frac{8}{9}$) exceeds the minor tone *t* ($\frac{9}{10}$); its ratio is $\frac{80}{81}$ and its value in the common or Briggs's logarithms is .9946049,6811, or when reckoned downwards .0053950,3189; and in the logarithms of Euler .017920; this laft being, in fact, its decimal value, compared with the octave = 1. This comma is ufually marked C, and is equal to 11.0078631 times the *fchifma* (Σ) = to 73.55198 times the leffer fraction *(f)* = to 1400.0913 times the minute (m), and = to $\frac{1}{55.8}$ of the octave nearly.

It is equal to the fum of 11 fchifmas and a minute, ($11\,\Sigma + m$), or of a minor comma and a fchifma: it alfo refults as the difference or remainder, after fubtracting the following intervals from each other, *viz.* a fchifma from a diafchifma, a minor comma from an enharmonic diefis, a femitone minor from a femitone medius, a femitone medius from an apotome, (here obferving that $\frac{2187}{2043}$ is the apotome and not $\frac{2127}{2043}$, erroneoufly printed in our article), an enharmonic diefis from a femitone minimum, a limma from a femitone major, a femitone major from a femitone maximum, a femitone fubminimum from a femitone minor, &c. The comma major is equal to the following additions of intervals, in triples, *viz.* two fchifmas, a medius refidual and a major refidual; three fchifmas, a minor refidual and a major refidual; five fchifmas, a leffer fraction and a major refidual; ten fchifmas, a leffer fraction and a greater fraction; ten fchifmas, three leffer fractions and a medius fraction, &c. See thefe feveral articles.

The curious, and thofe concerned in thefe kinds of calculations, will find a great variety of other relations, in which the comma major ftands, to the mufical intervals, both great and fmall, in the elaborate manufcript treatifes on mufic by the late Marmaduke Overend, organift of Ifleworth, and by the late Dr. Boyce, which Dr. Callcott lately prefented to the library of the Royal Inftitution in Albemarle-ftreet, after kindly permitting the writer of this article to perufe and extract from them for the ufe of this work. The ratio of the major comma may be refolved into the component primes $\frac{3}{2}, \frac{3}{2}, \frac{3}{2}, \frac{3}{2}, \frac{3}{5}$, and then, according to the method of Mr. Farey in the Philofophical Magazine, vol. xxvii. p. 193, (fee our articles *Mufical* PRIMES, and *Tuneable* INTERVALS) can be refolved into factors $\frac{3}{2}, \frac{3}{2}, \frac{3}{4}, \frac{3}{5}$ or two fifths (V) reverfed, a fourth (IV) and a major fixth (VI); whence it appears, that the interval of a major comma can be tuned on an inftrument, having a fufficient number of ftrings or pipes, by tuning two fifths downwards in fucceffion, and thence upwards a major fixth, and a minor fourth in fucceffion, or VI + 4 − 2 V; where it is obfervable, that two Vths might have been tuned upwards, and a V and 4th downwards, which would alfo produce the interval of a major comma, but *above* the firft or key note, inftead of *below* it, as in the firft cafe, where VI + 4 − 2 V is a negative quantity, as well as all the following. The fraction $\frac{3}{2}, \frac{3}{2}, \frac{3}{2}, \frac{3}{2}, \frac{3}{5}$, does not at firft appear capable of divifion into any other tuneable ratios, than

than the above: but, if we multiply the fame by $\frac{5}{5}$, it will then be refolvable into the factors $\frac{3}{5}, \frac{3}{5}, \frac{5}{4}, \frac{3}{2}, \frac{3}{2}$, and may be tuned thus, 2 VI — III — 2 V; or multiplying by $\frac{2}{2}$, we can obtain 2 fourths — V — 3; or if by $\frac{4}{4}$, we can get 2 fourths + III — 2 V; if by $\frac{2}{2} \times \frac{2}{2} \times \frac{2}{2}$, we may get 3 fourths — 6 — V; and if by $\frac{2}{2} \times \frac{2}{2} \times \frac{5}{5}$ we fhall have 2 fourths — III — 2 thirds: and thus, we have fix methods of exactly tuning a major comma, either above or below any given note, by help of perfect intervals only.

The method above explained, of analyfing mufical ratios or intervals, and expreffing them in different ways, by the ufe of tuneable intervals only, is calculated to inftruct the mufical ftudent, in the curious and important relations which the feveral concordant intervals bear to each other: hence we fee, for inftance, that if in any chant, or paffage in a melody, to be performed by voices, by violins, or other perfect inftruments, any one of the above fix fucceffions of notes were to occur, and the intervals were all to be performed perfect, or without temperament in the melody, the conclufion would not be in the key-note, or that fet out from, but a comma different in pitch, which property of the mufical fcale is called *divergency of tune;* fee that article.

It is obfervable, that all of the above fix expreffions or paffages in melody, which diverge a comma, contain two *fifths* or two *fourths*, each moving the fame way, and to which the divergency feems attributable, when the fame is not counteracted by a proper fucceffion of other intervals. Mr. Maxwell in his "Reformed or Complete Diatonic Scales for the Organ and Violin," &c. in his "Effay on Tune," (and fo does Overend in his manufcripts) propofes to mark the rife of a comma by the acute accent (′), and the fall of the fame by the grave accent (‵), and that when either of thefe are required to be taken off, this mark (°) is to be ufed, in the writing of mufic, in the fame way as the mufical mark ♮ is ufed, to take off or deftroy the effect of a ✕ or ♭, which has gone before, either accidentally, or in the fignature of the ftaff. Mr. Maxwell fhews, how a violin performer may practically tune a *comma* upon his inftrument, in a variety of ways.

Modern writers on the temperament of the mufical fcale, ufually refer their temperaments, or fmall corrections, to be applied to the concords, to this major *comma* as a unit or ftandard, on which account we fhall prefent our readers with fome further particulars relating to this fmall interval of the fcale. Dr. Robert Smith, in his "Harmonics," Lemma to the 9th propofition, cor. 4, has demonftrated, that if any part or parts of a comma c, denoted by $\frac{q}{p}c$, be the interval of imperfect unifons (or temperament), the ratios of the times of their fingle vibrations will be $161\,\underline{p} - \underline{q}$ to $161\,\underline{p} + \underline{q}$, extremely near: for example, if we want a finite or approximate ratio for a $\frac{1}{4}$ of a comma, we have $q = 1$, $p = 4$, and $\frac{161 \times 4 - 1}{161 \times 4 + 1} = \frac{643}{645}$ is the ratio, the complement arithmetical of its logarithm being 13487, which is true to the laft of 7 places of figures: in like manner, $\frac{161 \times 3 - 1}{161 \times 3 + 1} = \frac{482}{484}$ or $\frac{241}{242}$ is the ratio anfwering to $\frac{1}{3}c$, or $\sqrt[3]{\frac{80}{81}}$, which is alfo true to the laft of 7 places in the logarithm, and is fufficiently accurate for all purpofes: but it muft be noticed that thefe are not compofed of mufical primes.

It may be of ufe here to enquire, what proportion the major *comma*, or ratio of $\frac{80}{81}$, bears, to the hemitone or ratio of $\frac{15}{16}$; for which purpofe we have the logarithm of the latter divided by the logarithm of the former, or $\frac{280287}{539501} = 5.195282$, the number of major commas in one hemitone (or H) very nearly: and as it may be ufeful on many occafions for the ftudent to know, how many major commas make up any interval, we have fubjoined a fhort table, fhewing very exactly how many major commas make up the different concords within the octave, and alfo fome of the fmaller difcords.

Intervals.	Ratios.	N°. of Commas.
VIII	$\frac{1}{2}$	55.797636
VI	$\frac{3}{5}$	41.120938
6th.	$\frac{5}{8}$	37.834808
V	$\frac{2}{3}$	32.639526
4th.	$\frac{3}{4}$	23.158110
III	$\frac{4}{5}$	17.962828
3rd.	$\frac{5}{6}$	14.676696
II	$\frac{8}{9}$	9.481414
II‵	$\frac{9}{10}$	8.481414
2nd.	$\frac{15}{16}$	5.195282
comma	$\frac{80}{81}$	1.000000
Key.	$\frac{1}{1}$	0.000000

From the above table it appears, that the octave, whofe ratio is $\frac{1}{2}$, contains fomething more than $55\frac{3}{4}$ major commas, the VI. a little more than 41 commas, &c. We fhall next confider the

COMMA *Minor*, or *Leffer*, of Rameau, Overend, &c., being alfo the *apotome* minor of Salomon de Caus, Boetius, &c. the *diafchifma* of Euler, and the major *diefis* of Maxwell. This interval feems firft to have been noticed by the Greek writers, as the quantity by which two *femitones* major 2 S $\left(\frac{15}{16} \times \frac{15}{16}\right)$ exceeded the *tone* major T $\left(\frac{8}{9}\right)$. Its ratio is $\frac{2025}{2048}$, and its value in Briggs's logarithms .9950950,7525, which reckoned downwards, by its arithmetical complement, is .0049049,2475; and its value in Euler's logarithms is .016295, being that decimal part of an octave. The minor comma is marked by Overend, Dr. Boyce, Dr. Callcott, and others, with a dafhed c, (ɛ), fimilar to the mark for fcruple in apothecaries weight, but reverfed. (See Philofophical Magazine, vol. xxviii.) It is equal to 10.007863 times the fchifma (Σ) = to .909170 times, or nearly $\frac{10}{11}$ths of the major comma. It is equal to the fum of ten fchifmas and one minute ($10\ \Sigma + m$). And it refults as the difference when a fchifma is taken from a major comma, a diafchifma from two major commas, two major commas from a femitone minimum, a major comma from an enharmonic diefis, a femitone minor from a limma, an apotome from a femitone maximum, a femitone minimum from two enharmonic diefes, a femitone medius from a femitone major, a leffer fraction from a prifma, two

fchifmas

fchifmas from a diafchifma, a hyperoche from a femitone fubminimus, two femitones medii from a tone major, &c. The comma minor is equal to the following additions of intervals in triples, viz. a fchifma, a major refidual and a medius refidual; two fchifmas, a major refidual and a minor refidual; four fchifmas, a major refidual and a leffer fraction; fix fchifmas, a greater fraction and a medius refidual; nine fchifmas, a greater fraction and a leffer fraction; nine fchifmas, a medius fraction and two leffer fractions, &c. (See Overend's MS. before quoted.)

The ratio of this interval is compofed of thefe primes, $\frac{3^4 5^2}{2^{11}}$, which refolved as fhewn above, give ^{3}4ths — V — ^{2}III, and ^{3}4ths — ^{2}III — 3, as different methods of practically tuning the minor comma upon an organ, piano-forte, &c.

COMMA *Maximum*, of Pythagoras, Boetius, &c. or ancient comma; this interval, whofe ratio is $\frac{524,288}{531,441} = 12\,\Sigma + m$, is now called the DIASCHISMA; fee that article.

COMMA, *Greater*, has erroneoufly been applied by fome to the ratio $\frac{125}{138} = 21\,\Sigma + 2\,m$, which is the *Enharmonic* DIESIS; fee that article.

COMMA *Minimum*, according to fome former writers, expreffes the ratio $\frac{32768}{32805} = \Sigma$, which is now called the SCHISMA; fee that article.

COMMA, *Ancient*, according to Galileo, had a ratio of $\frac{625}{648} = 32\,\Sigma + 3\,m$, which is now called the SEMITONE *Minimus*, which fee.

COMMA *of Philolaus*, is the ratio of $\frac{229}{230}$, intended as an approximation for $\frac{1}{27}$th part of a tone major, but which it exceeds confiderably; befides, the fraction $\frac{229}{230}$ is not compofed of the fmall or mufical primes 2, 3, and 5, and cannot therefore be admitted into mufical computations.

COMMA *of Boetius*, according to Glareanus, alfo of D. Nicola was $\frac{1}{9}$th part of the tone major, or $11\frac{5}{9}\,\Sigma + \frac{2}{9}f + m$, whereof 5 made their femitone majus or apotome, and 4 made their femitone minus or limma: this interval was anciently fuppofed by fome to be the fame with the modern diafchifma $(12\,\Sigma + m)$, but from which it differs, $\frac{4}{9}\,\Sigma - \frac{2}{9}f = \cdot 477702 \times \Sigma$, or nearly half a fchifma.

The ancients mention another comma, $\frac{1}{8}$ of the tone minor, or $11\frac{5}{8}\,\Sigma + \frac{1}{4}\,f + m$. (See Dr. Callcott's "Mufical Grammar," pages 119 and 49.

COMMA, *Artificial*, of Nicholas Mercator, is the $\frac{1}{53}$ part of the octave, or $11\frac{29}{53}\,\Sigma + \frac{12}{53}\,f + m$. (See Mercator's "Temperament of the Mufical Scale").

COMMA of *Merfennus*. According to Holder's "Treatife on Harmony," page 104, Merfennus divided the octave into about $58\frac{1}{2}$ parts, and called one of thefe a comma.

COMMA of *Galileo*. The interval $\frac{521441}{524288}$, called a comma in the writings of this author, was intended to have been the diafchifma or $\frac{524288}{531441}$, as Mr. Overend has fhewn, vol. i. p. 140, of his MS. before referred to; the error originated in an erroneous multiplication, in the fecond figure of Galileo's numerator, by which it was rendered unfit for the mufical fcale. (See fir John Hawkins Hift. Muf. vol. i. p. 321.)

COMMA *and half* of *Galileo*, has a ratio of $\frac{625}{648} = 32\,\Sigma + 3\,m$, which is the SEMITONE *minimum*; fee that article.

COMMA *and half* of *Rameau*. This interval refults from the addition of a major comma and a major refidual, and is alfo the difference between a femitone fubminimus and a hyperoche; its ratio is $\frac{1953125}{1990625}$, its common logarithm is $\cdot 9917338,2179$ and Euler's log. $0.027456 = 17\,\Sigma - f + 2\,m$. The component primes of this ratio are $\frac{5^9}{2^{13}3^5}$, whence it appears, from the procefs before explained, that ^{5}3 — ^{4}III, or five minor thirds upwards, and four major thirds downwards, furnifh a practical method of tuning this interval above any note, and the reverfe of this procefs or ^{4}III — ^{5}3 would tune the fame below any given note.

COMMA, *Semi*. See SEMI-COMMA.

COMMA *Redundant*, or *fuperfluous*, or *deficient*, or *diminifhed*; thefe terms are applied to fuch intervals, whether concords or difcords, as exceed or fall fhort of the true ratio of that interval by a major comma, as a comma redundant fifth, a comma deficient third, &c. Sometimes the term comma is omitted in naming thefe intervals, as a redundant fifth, a deficient third, &c. See FIFTH, THIRD, &c.

COMMAGENE, or COMAGENE, *Kamafh*, in *Ancient Geography*, a country of Syria, bounded on the weft by mount Amanus, on the north by part of mount Taurus, on the eaft wafhed by the Euphrates; and with regard to its fouthern boundaries, it is uncertain whether it is contiguous to Seleucia, Cyrrheftica, or both. It is near the north corner of Syria. This country is mentioned by Strabo, Ptolemy, Pliny, and Ammianus Marcellinus, but they affign to it different extents. Its chief cities were Samofata upon the Euphrates, its capital, Antiochia ad Taurum, Germanicia, Singa, Chaonia, and feveral other cities, once of great note, but long fince utterly deftroyed. In the time of Antiochus the Great, Commagene was fubject to the Syrians, and left to him by the treaty of peace which he concluded with Rome, after the famous battle of Magnefia; and hence it is probable, that it was feized by fome of the princes of the Seleucian family, during their inteftine wars, as no mention of the kings of Commagene occurs till the time of Pompey, and the names of thofe, who afterwards reigned there, are altogether Syrian. The firft that is mentioned is Antiochus, who joined with Darius king of Media, in oppofing the entrance of Pompey into Syria, after the defeat of Tigranes; but, being overcome in battle, he fubmitted to the conqueror, and was not only confirmed in his kingdom, but rewarded with part of Mefopotamia. In the civil war between Cæfar and Pompey, he fent large fupplies to the latter. Antiochus having been put to death by order of Auguftus, for the affaffination of the Roman ambaffador, was fucceeded by Mithridates, on whom Auguftus beftowed the kingdom of Commagene, in recompence of his fervices during the war with Antony and Cleopatra. Upon the death of Mithridates, Antiochus II., the fon of Antiochus I., was permitted by Auguftus to take poffef-

fion

ſion of the kingdom. This prince died in the reign of Tiberius; and Commagene became a Roman province, and at the requeſt of the nobles, it was governed by a prætor. But Caligula reſtored the kingdom to Antiochus III., the ſon of Antiochus II., adding to it the maritime parts of Cilicia. He was ſucceeded by his ſon Antiochus IV., ſurnamed Epiphanes, who diſtinguiſhed himſelf under Veſpaſian in his war with the Jews, and particularly at the ſiege of Jeruſalem. Veſpaſian, however, having reduced Commagene to the form of a Roman province, would not allow any of the ſons of Antiochus to ſucceed him. This country was afterwards made part of the province called Auguſtophratenſis, or as Ammianus has it, Euphratenſis, and was commonly known by the name of Euphratenſia.

COMMAND, in French *Commandement*, in *Military Language*; the act or action of him who commands; a thing commanded; the right of commanding and making one's ſelf obeyed. The movements of a battalion at exerciſe, are performed by the words which the major or commanding officer pronounces. Hence, *the word of command* is a phraſe in common uſe among military people.

COMMAND denotes alſo authority. Every command falls to the eldeſt officer in the ſame circumſtances, whether he belong to the horſe dragoons, artillery, engineers, foot, or marines. In our ſervice when the commiſſions of two officers are of the ſame date, a retroſpection of former commiſſions takes place, or length of ſervice is examined into, and the diſpute, if any ariſes, is determined according to precedents, and the rules of war.

COMMAND, in the *Royal Navy*, implies the rank or power of an officer, who has the management of a ſhip of war of any kind under twenty guns. He ranks with a major in the army.

COMMANDANT, or COMMANDER, the perſon who commands an army, a brigade, a garriſon, a fort, caſtle, regiment, company, &c.

COMMANDE, a rope made uſe of for boats and pontoons.

COMMANDER, is a name given to a large wooden mallet uſed in a ſhip.

COMMANDERY. See COMMANDRY.

COMMAND *in front*, in *Fortification*, a height, or an eminence, which is directly oppoſite to, or faces the work, that it commands.

COMMAND *in rear*, an eminence or a height, which is directly behind the work that it commands.

COMMAND *in flank*, or *by enfilade*, a height or an eminence on the flank, or prolongation of any part of a work, which it ſees and looks along.

COMMANDEMENT, *Fr.* A commanding ground, an eminence or elevation, which overlooks a poſt or ſtrong place. There are three ſorts of *commandemens;* namely the *commandement in front*, which faces a work, and batters or fires on it in front; the *commandement en revers*, or *in reverſe*, which is behind a work or place, and fires on its rear either directly or obliquely; and the *commandement de courtine or in enfilade*, which is on the flank of a work, and fires along the whole extent of a rectilinear part of it. Nine feet in perpendicular height, conſtitute a ſimple command or *commandement;* 18 feet a double one; 27 feet a triple one; and ſo on.

COMMANDEMENT, *Order of, among the officers of infantry and cavalry.* In France it was cuſtomary in a place of war, and every incloſed city, for the officers of infantry to have the command over thoſe of the cavalry, and on the other hand to be commanded by them in the open field.

COMMANDEUR, Fr. The commander of an order of knights. In ſome orders of chivalry it is the title, which a profeſſed knight takes the moment he pronounces the vows, that ſubjected him to celibacy without his ceaſing on that account to be military. There are, however, in Spain orders of chivalry, that do not require celibacy on the part of the commanders.

COMMANDEUR, in *Ornithology*, the French name of *Oriolus Phoeniceus*, which ſee.

COMMANDINUS, FREDERICK, in *Biography*, was born at Urbino, in Italy, 1509. He was deſcended from a noble family, and celebrated for his great claſſical learning, and for his extenſive acquaintance with the mathematical ſciences. He was patronized by Francis Moria, duke of Urbino, and by his liberality enabled to publiſh tranſlations of various parts of the works of Archimedes: the Conics of Apollonius; the Elements of Euclid, and many other works of high reputation. He was alſo author of a book entitled, "De Centro Gravitatis Solidorum." Bologn. 1565; and of another entitled, "Horologiorum Deſcriptio" Romæ, 1562. He died in 1575; a funeral oration was delivered in his praiſe, by Antonio Toroneo. Gen. Biog.

COMMANDMENT, in a *Legal Senſe*, has various uſes: as, *Commandment of the king*, when on his own mere motion, and from his own mouth, he caſts a man into priſon.

Commandment of the juſtices, is either *abſolute* or *ordinary; abſolute*, as when, on their own authority, and their own diſcretion, they commit a man for contempt, &c. to priſon, as a puniſhment. *Ordinary*, as when they commit him rather for ſafe cuſtody, than puniſhment.—A man committed by an ordinary commandment is repleviable. Perſons committed to priſon by the ſpecial command of the king were not formerly bailable by the court of king's bench; but at this day, the law is otherwiſe. 2. Hawk. P. C. c. 15. § 36.

COMMANDMENT, is alſo uſed for the offence of him who directs or wills another to tranſgreſs the law; as by murder, theft, and the like. See ACCESSORY.

He that commandeth any one to do an unlawful act, is acceſſory to it and all the conſequences, if it be executed in the ſame manner as commanded: but if the commander revoke the command; or if the execution varies from it, or in the nature of the offence; in ſuch caſe he will not be acceſſory. 3 Inſt. 51, 57. 2 Inſt. 182.

In another ſenſe of this word, magiſtrates may command others to aſſiſt them in the execution of their offices, for the doing of juſtice; and ſo may a juſtice of peace, to ſuppreſs riots, apprehend felons; or any officer to keep the king's peace, &c. Bro. 3.

A maſter may command his ſervant to drive another man's cattle out of his ground, to enter into lands, to ſeize goods, to diſtrain for rent, or to do other things; if the thing be not a treſpaſs to others. The commandment of a thing is good; where he that commands hath power to do it; and a verbal command is in moſt caſes ſufficient; unleſs it be, where it is given by a corporation, or when a ſheriff's warrant is to a bailiff to arreſt, &c. Bro. 288. Dyer, 202.

In treſpaſs, &c. the maſter ſhall be accountable for the act of the ſervant done by his command; but ſervants ſhall not be excuſed for committing any crime, when they act by command of their maſter, who have no authority to give ſuch commands. The commands of infants and feme coverts are void; but in forcible entries, &c. an infant or feme covert may be guilty in reſpect of actual violence done by them in perſon.

COMMANDMENTS, *Ten.* See DECALOGUE.

COMMANDRY, or COMMANDERY, a kind of benefice, or

or fixed revenue belonging to a military order, and conferred on ancient knights, who had done confiderable fervice to the order.

There are *ftrict*, or *regular* commandries, obtained in order, and by merit: there are others of *grace* or *favour*, conferred at the pleafure of the grand mafter.

There are alfo commandries for the religious in the orders of St. Bernard and St. Antony.—The kings of France have converted feveral of the hofpitals for lepers into commandries of the order of St. Lazarus.

The commandries of Malta are of different kinds; for as the order confifts of knights, chaplains, and brother fervitors, there are peculiar commandries, or revenues, attached to each.

The knight to whom one of thefe benefices or commandries is given, is called commander: which agrees pretty nearly with the *præpofitus* fet over the monks in places at a diftance from the monaftery, whofe adminiftration was called *obedientia:* becaufe depending entirely on the abbot who gave him his commiffion. Thus it is with the fimple commanders of Malta, who are rather farmers of the order than beneficiaries; paying a certain tribute, or rent, called *refponfio*, to the common treafure of the order.

The commandries belonging to the priory of St. John of Jerufalem in England, confifting of manors, lands, &c. fuch was that of New Eagle in Lincolnfhire, Selbach in Pembrokefhire, and Shengay in Cambridgefhire, were given to Henry VIII. by ftatute 32 Hen. VIII. c. 20.; fo that the name of commandries only remains, the power being long fince extinct.

COMMANI, in *Geography*. See Commendo.

COMMANIPULARIS, in *Ancient Military Language*, a Roman foldier, who could not fleep but with his own century, nor fight but under its ftandard.

COMMANOES, in *Geography*, one of the fmall Virgin ifles in the Weft Indies, fituated to the N.N.E. of Tortola. N. lat. 18° 25′. W. long. 63°.

COMMANTAWANA, a bay on the north coaft of the ifland of St. Vincent, about one mile eaft of Tarraty point.

COMMARCHIO, in *Antiquity*, the confines of the land; whence probably is derived the word *marches*. "Imprimis de noftris landimeris, *commarchionibus*." Du-Cange.

COMMARODES, in *Ancient Geography*, a place of Thrace, in the vicinity of Conftantinople.

COMMEATUS, in *Military Language*, a pafsport or permiffion granted to a Roman foldier to abfent himfelf from the army for a fixed or limited time. The fame name was alfo given to foldiers' provifions and their efcorts.

COMMELIN, John, a diftinguifhed botanift, was born at Amfterdam, July 23, 1629. He fucceeded his father as one of the magiftrates of the city, and while holding this office, was very active in forming a new botanical garden; the ground occupied by the old gardenhaving been taken into the city. The fecond and third volumes of the "Hortus Indicus Malabaricus," owe much of their value to his judicious notes and obfervations. He publifhed "Catalogus Plantarum indigenarum Hollandiæ," 1683, 12mo. It contains a lift of 776 plants; and, in 1789, "Catalogus Plantarum Horti Medici Amftelodami, pars prior." Thefe have been frequently reprinted. While preparing to complete this work, he died at Amfterdam in 1692.

Commelin, Gaspar, nephew to John Commelin. After taking his degree of doctor in medicine, he was appointed profeffor in botany, and director of the garden at Amfterdam, offices which he filled with diftinguifhed ability and attention. He completed the work begun by his uncle, which he publifhed in 1701. His next production was "Flora Malabarica, feu Horti Malabarici Catalogus," ferving as an index to the Hortus Malabaricus. This was followed by "Præludia Anatomica," 4to. 1703; and the fame year, "Præludia Botanica," with figures for the benefit of ftudents in thofe arts. In 1715, he publifhed, "Icones Plantarum, prefertim ex Indiis Collectarum," 4to.; and, in 1718, "Botanographia Malabarica, a Nominum Barbarifmis reftituta," Lugduni Bat. folio. All ufeful to ftudents in botany, but ferving rather to fhew the great induftry, than the genius of the writer. Haller. Bib. Botan. Eloy. Dict. Hift.

COMMELINA, in *Botany*, (fo named by Plumier from the two brothers, John and Gafpar Commelin, celebrated Dutch botanifts.) Plum. 38. Linn. Gen. 62. Schreb. 86. Willd. 104. Lam. Ill. 83. Gært. 56. Juff. 15. Vent. 2. 152. Clafs and order, *triandria monogynia*. Nat. Ord. *Enfatæ*. Linn. *Junci*, Juff. *Joncaceæ*, Vent.

Gen. Ch. *Cal. common*. Spathe heart-fhaped, converging, compreffed, very large, permanent. *Cal. proper*. Perianth, three leaved; leaves egg-fhaped, concave. *Cor.* Petals three, unguiculated, larger than the calyx, alternating with its leaves; one fometimes fmaller. *Stam.* Filaments two, three, or fix, awl-fhaped, reclined; anthers oblong, verfatile. *Nect.* three, often cruciform, fixed to the top of their proper filaments, rifing above the ftamens. *Pift.* Germ fuperior, roundifh; ftyle awl-fhaped, revolute, ftigma fimple. *Peric.* Capfule, fomewhat globular, two or three-celled, two or three-valved. *Seeds* few.

Eff. Ch. Calyx proper, three-leaved. Petals three, unguiculated. Nectaries three, on their proper filaments.

Obferv. Linnæus confiders the fpathe as the only calyx, and attributes fix petals to the flower; three exterior, fmall, refembling a perianth, and three interior, very large, coloured.

* *Two petals larger; one fmall.*

Sp. 1. C. *communis*. Linn. Sp. Pl. 1. Mart. 1. Lam. 1. Encyc. 598. Ill. Willd. 1. Dill. Elth. tab. 78. fig. 89. Gært. tab. 15. fig. 1. Lam. Ill. tab. 35. fig. 1. Koofcki. Kempf. Jap. 888. tab. 889. β. C. *polygama*; Roth. Catalect. Bot. 1. p. 1. "Leaves ovate-lanceolate, acute, ftem creeping, fmooth." *Root* annual. *Stems* feveral, two feet long, jointed, branched, leafy. *Leaves* alternate, nerved, fupported by a membranous fheath with fhort hairs at its edge. *Flowers* axillary, two or three together, on fhort peduncles; two of the petals blue, the third whitifh green. *Capfule* egg-fhaped, flightly compreffed on each fide, fomewhat two-edged, two-celled, two-valved; valves thin, membranous, with the longitudinal partition on their inner fide. *Seeds* two in each cell, affixed to the valves near the infertion of the partition, two adhering to each valve, gibbous and pitted on one fide, flat and furrowed, with a longitudinal line on the other, truncate at the end where they are oppofite to each other, umbilicated. A native of North America, Africa, and Japan. β. differs only in having polygamous diandrous flowers. In all other refpects it exactly correfponds with C. communis, of which it appears to be only a variety. Willd, 2. C. *africana*. Linn. Sp. Pl. 2. Mart. 2. Lam. 2. Ill. 599. Willd. 2. Gært. tab. 15. fig. 3. Lam. Ill. tab. 35. fig. 3. "Leaves lanceolate, fmooth; ftem decumbent." *Root* perennial. *Stems* about a foot long, branched, fmooth. *Leaves* narrower, with ciliated or bearded fheaths, and a fmaller one within the other. *Flowers* with two petals, yellow, unguiculated and roundifh, or kidney-fhaped; the third fmall, oval, feffile, and

and of a pale colour. *Capsule* egg-shaped, two-valved, three-celled. *Seeds* in the upper cells, two, three, or four, roundish, smooth, umbilicated; but always barren and destitute of albumen; in the lower cell solitary, fertile, adnate to the valve on its whole length. A native of Africa. 3. C. *mollis*. Willd. 7. Lam. Ill. 600. Jacq. Collect. 3. 253. ic. rar. 293. "Leaves egg-shaped, petioled, villous; stem creeping." A native of South America. 4. C *bengalensis*. Linn. Sp. Pl. 3. Mart. 3. Lam. 3. Ill. 601. Willd. 3. (Ephemerum benghalense repens; Pluk. Alm. 135. tab. 27. fig. 3.) "Leaves egg-shaped, obtuse; stem creeping." *Root* annual. *Stems* numerous, slightly villous, slender, branched. *Leaves* from an inch to an inch and half long, edged with very short hairs, petioled above the sheath; sheath ciliated, marked with lines, spotted with purple. *Spathe* terminal, cowled, somewhat triangular, marked with lines. *Peduncles* within the spathe, two; one slender, longer, with a single flower; the other thicker, channelled, bearing from two to four flowers, on jointed inflexed pedicels. *Petals* blue; smaller one paler. *Nectaries* yellow. A native of Bengal and Cochin-china. 5. C. *erecta*. Linn. Sp. Pl. 4. Mart. 4. Lam. 4. Ill. 602. Willd. 4. Dill. Elth. 91. tab. 77. fig. 88. "Leaves ovate-lanceolate; stem erect, scabrous, quite simple." *Root* perennial, fibrous. *Stems* a foot and half high, leafy. *Leaves* a little hirsute, but not hairy, except at the sheath. *Flowers* pale blue; smaller petal very narrow, whitish and pellucid. *Capsules* roundish, obtusely triangular, with three seeds. A native of Virginia.

** *Petals nearly equal.*

6. C. *virginica*. Linn. Sp. Pl. 5. Mart. 5. Lam. 5. Ill. 603. Willd. 5. (Ephemerum phalangoides; Pluk. Alm. 135. tab. 174 fig. 4.) "Leaves lanceolate, in short petioles; bearded at the edge; stems erect." Nearly allied to the preceding, and perhaps, only a variety. *Root* perennial. *Stems* two feet high, simple, slightly villous. *Leaves* scabrous on the upper surface when rubbed from the base, pubescent underneath, narrowed near the sheath. *Sheaths* nerved, somewhat pubescent, ciliated at the edge with reddish hairs. *Flowers* blue; the lower one on a short pedicel; petals heart-shaped, quite entire. A native of Virginia. 7. C. *longicaulis*. Willd. 6. Jacq. ic. rar. 2. tab. 294. Collect. 3. p. 234. "Leaves linear-lanceolate, sessile; sheaths ciliated; stem decumbent." *Root* perennial. *Leaves* smoothish. *Pedicels* in pairs, filiform, jointed. A native of Caracas. 8. C. *hexandra*. Lam. 6. Ill. 604. Aubl. Guian. tab. 12. "Flowers hexandrous, in racemes." *Root* perennial. *Stems* three feet high or more, sarmentous, climbing, bent at the joints. *Leaves* egg-shaped, acute, narrowed and petioled near the sheath; sheaths half an inch long, ciliated. *Flowers* blue; filaments short and not villous, as in Tradescantia. 9. C. *tuberosa*. Linn. Sp. 6. Mart. 6. Lam. 7. Ill. 605. Willd. 8. Dill. Elth. 94. tab. 79. fig. 90. Gært. tab. 15. fig. 2. Lam. tab. 35. fig. 2. "Leaves sessile, ovate-lanceolate, somewhat ciliated." *Root* perennial, consisting of several tubers somewhat like those of ranunculus, or of common orpine (sedum telephium), joining together at the top and forming a head, diminishing gradually downwards. *Stems* a foot high, weak, ascending, branched at their base. *Leaves* villous underneath, smooth above; sheath smooth, striated, reddish, simply ciliated at the edge. *Flowers* blue, growing several together on slender peduncles. *Capsule* ovate acuminate, somewhat depressed, two-valved, three-celled; upper valve, divided longitudinally into two cells; lower valve one-celled, a little concave above, convex below, closely adnate to the seed. *Seeds* in each of the upper cells two, tubercle wrinkled, ferruginous; in the lower cell, one, elliptical, smooth, lenticularly compressed, of a bay colour. Gært. A native of Mexico. 10. C. *barbata*. Lam. Ill. 606. "Leaves egg-shaped, sessile; sheaths bearded; stem creeping." A native of the island of Mauritius. 11. C. *longifolia*. Lam. Ill. 607. "Leaves lanceolate-linear; peduncles very long." A native of the island of Java. 12. C. *zanonia*. Linn. Sp. Pl. 7. Mart. 7. Lam. 8. Gært. tab. 15. fig. 4. Lam. Ill. tab. 35. fig. 4. (Zanonia; Plum. Gen. 38. Tradescantia zanonia; Willd. Swartz.) "Peduncles thickened; leaves lanceolate; sheaths hairy at the edge; bractes in pairs." *Root* perennial. *Stem* about two feet high, cylindrical, jointed, smooth, branched towards the top. *Leaves* four or five inches long, about two broad, green and smooth above, slightly pubescent underneath when young, with purple brown, or violet edges; sheaths whitish-green, large. *Flowers* white; Lam. Sky-blue; Miller. *Fruit* berried, in an egg-shaped terminal raceme: berries false, dark-purple, formed of the corolla changed into a fleshy succulent three-lobed substance which completely encloses the capsule; capsule cylindric-egg-shaped, crustaceous, dotted in rows, testaceous, three-celled, opening at the tip into three parts. *Seeds* two, or one in each cell; in the cells which have two, angular, a little wrinkled, cinereous, with a small pap on the side covering the embryo; in the cell which has only one, elliptical plano-convex, a little wrinkled about the edge, bearing the embryo on the middle of the back. Gært. A native of Cayenne, in South America. 13. C. *vaginata*. Linn. Mant. 177. Mart. 8. Lam. 9. Ill. 609. Willd. 9. "Leaves linear; flowers diandrous, sheathed with an involucre." *Root* annual. *Stems* ascending, numerous, somewhat scabrous. *Leaves* sessile, acute. *Peduncles* terminal and axillary, elongated, ending in a striated, lanceolate involucre, which is so convolute as to be almost cylindrical; calyx-leaves lanceolate, acute, coloured at the tip; petals oval, the length of the calyx; filaments of the nectary four, half the length of the stamens; nectaries linear; filaments of the stamens two, bearded, somewhat recurved, the length of the corolla; anthers yellow, marked with a black spot; style awl-shaped, somewhat recurved. Found by Koenig in the East Indies. 14. C. *nudiflora*. Linn. Mant. 177. Mart. 9. Lam. 10. Ill. 609. Willd. 10. "Peduncels capillary; leaves linear, without an involucre; flowers diandrous." *Root* annual. *Stem* about seven inches high, slender, nearly erect, decumbent at the base, somewhat scabrous. *Leaves* sessile, acute; sheath short, edged with a few lax hairs. *Peduncles* for the most part terminal, from two to four together, accompanied by a very short bracte. *Flowers* from four to six on each peduncle, naked, pedicelled; calyx-leaves ovate-lanceolate, acute, less than the corolla; petals three, egg-shaped, unequally distributed; the two lower ones most distant; filaments of the nectary three, half the length of the stamens, naked; nectaries deltoid; filaments of the stamens two, bearded, declining at the opening of the corolla; style declining. Found by Koenig in dry pastures of the East Indies. 15. C. *cucullata*. Linn. Mant. 176. Mart. 11. Lam. 11. Ill. 611. Willd. 11. (C. nervosa; Burm. ind. 18. tab. 7. fig. 3.) "Leaves egg-shaped; involucres cowled, turbinate." *Root* annual. *Stem* seven inches high, creeping at the base, and sending out filiform roots. *Leaves* nerved petioled; sheaths wider than the stem; ciliated at the edge with distant, spreading, bristle-shaped hairs; involucres terminal, truncated, many-flowered, entirely coalescent by the side. *Flowers* peduncled, minute. A native of the East Indies. 16. C. *japonica*. Thunb. in Linn. Trans. 2. 332. Mart. 12. Willd. 12. "Leaves ovate-lanceolate, undulated; stem erect, angular, hairy;

hairy; flowers panicled." *Stem* a foot high, furrowed, panicled at the top. *Leaves* alternate, sheathing, acute, smooth; lower ones three inches long; upper ones about an inch. A native of Japan. 17. C. *spirata*. Linn. Mant. II. 176. Hort. Kew. 77. (C. bracteolata; Lam.?) "Leaves lanceolate: flowers panicled." Linn. "Leaves lanceolate-linear, undulated, somewhat curled; peduncles panicled, furnished with small bractes, half-embracing the stem." Lam. *Root* annual. *Stem* creeping, ascending, somewhat scabrous; Linn. *Stem* six or seven inches long, very slender, bent at the joints, almost smooth, leafy, branched; Lam. *Leaves* lanceolate, sheathing, very minutely serrated; upper leaf cordate-lanceolate; sheaths ciliated at the edge. Linn. *Leaves* narrow; sheaths short, ciliated; Lam. *Flowers* small, bluish; Lam. *Panicle* terminal, divaricated, with small sheathing bractes; Linn. Lam. *Peduncles* capillary, compound; Lam. *Calyx* three-leaved; leaves ovate-lanceolate, concave; Lam. *Petals* three, equal, orbicular-egg-shaped; Linn. *Petals* three, egg-shaped, a little longer than the calyx. Lam. *Filaments* of the *stamens* three, bearded, naked above the middle. Linn. Almost entirely naked. Lam. *Filaments* of the *nectary* three, somewhat ciliated at the sides. Corpuscles cruciform, globular at the tips, whitish; Linn. corpuscles yellow; Lam. *Style* and *stigma* spirally convolved, and evolved variously; Linn. *Style* permanent, a little spirally twisted when the flower is past; Lam. Found by Koenig in moist ground, by the side of rivulets in the East Indies; communicated to La Marck from the East Indies by Sonnerat. La Marck seems to have no good reason to doubt the identity of his plant with that of Linnæus.

Obs. It is evident from the above descriptions, that this genus, as it now stands, is a very anomalous one. C. hexandra, if it had bearded filaments, would unquestionably be a tradescantia. C. vaginata, nudiflora, and spirata, approach that genus, by their partially bearded filaments, but differ in the number of stamens; the first two have the additional anomaly of being diandrous, without a corresponding diminution in the number of the other parts. Linnæus, when he took up these three species, in his second Mantissa, seems to have forgotten, or to have discarded, his original idea with respect to the flower; for he there attributes to it, not a six petalled corolla, but a three-petalled one, with a proper three-leaved calyx. Gærtner is of opinion that commelina and tradescantia are one truly natural genus.

COMMELINA *axillaris et cristata*. Linn. See TRADESCANTIA.

Propagation and Culture. All the species are propagated by seeds. If the seeds of C. communis, which is an annual, be sown upon a warm border of light earth in the autumn, they will come up early in the spring and ripen their fruit. The roots of C. africana send out offsets, by which the plant is easily propagated; but they will seldom live through the winter in the open air. The other species are tender, and must be sown in a moderate hot-bed in the spring; transplanted to a fresh hot-bed, when they are two inches high; and in June, again transplanted into a warm border of light earth. C. tuberosa may be preserved, if planted in pots, and placed in the bark-stove in autumn: or its roots may be taken out of the ground in the autumn, kept in a warm place during the winter, and planted again in the spring; they will be more forward and stronger if placed on a hot-bed.

COMMEMORATION, the remembrance of any one; or something done in honour of a person's memory.

Among the Romanists, it is a practice for dying persons to leave a legacy to the church, for the rehearsing so many masses in commemoration of them.

The eucharist is a commemoration of the sufferings of Jesus Christ.

COMMEMORATION is also the name of two religious feasts, otherwise called *all-saints* and *all-souls*. The occasion of their institution is variously related. See the articles.

COMMEMORATION *of Handel*, in *Music*. In order to record an event so honourable to a liberal art, we shall draw our information from the history of that art, and from the account itself of the commemoration written expressly at the time, and published in 4to. by the same author, an attentive auditor of all the performances, whose sensations and memory were more fresh then than at the distance of 22 years.

In the "History of Music," vol. iv. p. 518. it is said, that "The year 1784 was rendered a memorable æra in the annals of music, by the splendid and magnificent manner in which the birth, genius, and abilities of Handel, were celebrated in Westminster Abbey and the Pantheon, by five performances of pieces selected from his own works, and executed by a band of more than 500 voices and instruments in the presence and under the immediate auspices of their majesties and the first personages in the kingdom. This event so honourable to the art of music and an illustrious artist, and so worthy of a place here, having been minutely recorded already in a distinct work, *viz.* "Account of the musical performances in commemoration of Handel," by the author of this history, written and published for the benefit of the musical fund; an establishment which his majesty having since deigned to honour with his patronage, the members and guardians have been permitted to incorporate themselves under the title of Royal Society of Musicians: We shall only add, that this celebration has been since established into an annual musical festival for the benefit of the fund, in which the number of performers, and perfection of the performances, as well as favour of the public, have continued to increase. In 1785, the vocal and instrumental band amounted to six hundred and sixteen. In 1786, to seven hundred and forty-one; and in 1787, to eight hundred and six vocal and instrumental performers."

And in the same "History of Music," at the end of the same vol. the author tells us, that "The commemoration of Handel, in 1784, having been crowned with a success equally honourable to that great artist and to the nation, similar performances have since been annually repeated, to still more numerous audiences, for charitable purposes, in Westminster-Abbey, under the title of a "Grand Musical Festival." In 1787, the band of vocal and instrumental performers amounted to eight hundred and six musicians, exclusive of the principal singers, consisting of twenty-two, with Madame Mara, Rubinelli, Harrison, and Morelli at their head. And such is the state of practical music in this country, that the increase of performers, instead of producing confusion, as might have been expected, has constantly been attended with superior excellence of execution; as experience, the best of all teachers, has so guided the zeal of the directors, and the science of the conductor and leader of this great enterprize, that a certain road to full perfection in every department seems to have been attained.

Though this celebration happened so recently, and is so well known as scarcely to need being mentioned here for the information of the present race, among musical articles; yet as our plan extends to history and biography, as well as definitions and scientific explanations, a record of a musical event of such magnitude seems necessary for the information of distant times, if we may dare hope to reach them. The origin and progress of the plan, as related in the

the introduction to the printed narrative, dedicated by permiffion to the king, is the following.

"It was in the year 1783, that the idea of this great enterprize was conceived in a converfation between lord vifcount Fitzwilliam, the late fir Watkin Williams, and Joah Bates, late commiffioner of the victualling office, on obferving how much more London abounded with great muficians, vocal and inftrumental, foreigners and natives, than any other city in Europe: but fo difunited and difperfed at the operas, oratorios, theatres, and public and private concerts, that they can never be heard in the aggregate, nor can the effects which may be produced by fuch a united band as our capital could furnifh, ever be known, unlefs fome plan was formed of a public periodical occafion for collecting and confolidating them into one band; by which means a performance might be exhibited on fo grand and magnificent a fcale as no other part of the world could equal. The birth and death of Handel naturally occurred to three fuch enthufiaftic admirers of that great mafter, and it was immediately recollected, that the next (now the prefent) year, would be a proper time for the introduction of fuch a cuftom: as it formed a complete century fince his birth, and an exact quarter of a century fince his deceafe.

The plan was foon after communicated to the governors of the Mufical Fund, who approved it, and promifed thier affiftance. It was next fubmitted to the directors of the concert of Ancient Mufic, who, with an alacrity which does honour to their zeal for the memory of the great artift Handel, voluntarily undertook the trouble of managing and directing the celebrity. At length, the defign coming to the knowledge of the king, it was honoured with his majefty's fanction and patronage. Weftminfter Abbey, where the bones of the great mufician were depofited, was thought the propereft place for the performance; and application having been made to the bifhop of Rochefter for the ufe of it, his lordfhip, finding that the fcheme was honoured with the patronage of his majefty, readily confented; only requefting, as the performance would interfere with the annual benefit for the Weftminfter Infirmary, that part of the profits might be appropriated to that charity as an indemnification for the lofs it would fuftain. To this the projectors of the plan acceded; and it was afterwards fettled, that the profits of the firft day's performance fhould be equally divided between the mufical fund and the Weftminfter Infirmary; and thofe of the fubfequent days be folely applied to the ufe of that fund which Handel himfelf fo long helped to fuftain, and to which he not only bequeathed a 1000*l.*, but which almoft every mufician in the capital annually contributes his money, his performance, or both, to fupport.

Impreffed with a reverence for the memory of Handel, no fooner was the project known, but moft of the practical muficians in the kingdom eagerly manifefted their zeal for the enterprife; and many of the moft eminent profeffors, waving all claims to precedence in the band, offered to perform in any fubordinate ftation, in which their talents could be moft ufeful."

"By the latter end of February, the plan and neceffary arrangement were fo far digefted and advanced, that the directors ventured to infert in all the newfpapers, the following advertifement.

Under the Patronage of His Majefty,
In Commemoration of Handel, who was buried in
Weftminfter Abbey, on the 21ft of April, 1759.
On Wednefday the 21ft of April next, will be performed in
Weftminfter Abbey, under the management of the

Earl of Exeter	Lord Paget
Earl of Sandwich	Right Hon. H. Morrice
Vifcount Dudley Ward	Sir W. Williams Wynn, Bart.
Vifcount Fitzwilliam	Sir Richard Jebb, Bart.

Directors of the concert of Ancient Mufic;

Some of the moft approved pieces of facred mufic, of that great compofer.

The doors will be opened at 9 o'clock, and the performance will begin precifely at twelve.

And on the evening of the fame day, will be performed, at the Pantheon, a grand mifcellaneous concert of vocal and inftrumental mufic; confifting entirely of pieces felected from the works of Handel.

The doors will be opened at 6 o'clock, and the concert will begin exactly at eight.

And on Saturday morning, April 24th, will be performed, in Weftminfter Abbey, the facred oratorio of the Meffiah.

Such is the reverence for this illuftrious mafter, that moft of the performers in London, and a great many from different parts of the kingdom, have generoufly offered their affiftance; and the orcheftra will confift of at leaft 400 performers, a more numerous band than was ever known to be collected in any country, or on any occafion whatever. The profits arifing from the performances, will be applied to charitable purpofes.

In order to render the band as powerful and complete as poffible, the trombone, facbut, or double curtle, and double kettle drums, were fought and their ufe revived.

In preparing Weftminfter Abbey for the reception of their majefties and the royal family, as well as the archbifhops and bifhops, judges, great officers of ftate, and principal nobility and gentry in the kingdom, to the amount of three or four thoufand, Mr. James Wyatt, the admirable architect of the ill-fated Pantheon, furnifhed the elegant drawings for the orcheftra, throne, and galleries.

As this commemoration is not only the firft inftance of a band of fuch magnitude being affembled together, but of any band, at all numerous, performing in a fimilar fituation, without the affiftance of a manu-ductor, to regulate the meafure, the performances in Weftminfter Abbey may be fafely pronounced, no lefs remarkable for the multiplicity of voices and inftruments employed, than for accuracy and precifion. When all the wheels of that huge machine, the orcheftra, were in motion, the effect refembled clock-work in every thing, but want of feeling and expreffion.

And, as the power of gravity and attraction in bodies are proportioned to their mafs and denfity, fo it feems as if the magnitude of this band had commanded and impelled adhefion and obedience, beyond that of any other of inferior force. The pulfations in every limb, and ramifications of veins and arteries in an animal, could not be more reciprocal, ifochronous, and under the regulation of the heart, than the members of this body of muficians under that of the conductor and leader. The totality of found feemed to proceed from one voice, and one inftrument; and its powers produced, not only new and exquifite fenfations in judges, and lovers of the art, but were felt by thofe who never received pleafure from mufic before.

This celebration was at firft defigned to be extended to no more than two performances on the fame day: one at noon in Weftminfter Abbey, for facred mufic; and the other in the evening of the fame day at the Pantheon, for fecular compofitions, felected from the operas and mifcellaneous works of the hero whofe apotheofis was the efficient caufe of this extraordinary undertaking. But being countenanced by his majefty, the directors of the concert of ancient mufic,

the governors of the mufical fund, and eagerly patronized by the public in general, while the plan was digefting, it determined the projectors, at the inftigation of his majefty, to have three performances. The firft and third in the morning, at Weftminfter Abbey, and the fecond at the Pantheon.

Thefe performances having given fuch entire fatisfaction to all that were prefent, and becoming, of courfe, the general fubject of difcuffion and praife, excited a great defire in all lovers of mufic, and even of fplendid fpectacles, who were abfent, to be enabled to judge and fpeak of tranfactions fo memorable, from the conviction of their own fenfes. But even thefe were not more eager in wifhing there might be a repetition of the performances, than thofe who had already attended them. Luckily for all parties, the wifhes of their majefties coincided with thofe of their fubjects; and as the fcaffolding was ftill ftanding, and the band not yet difperfed, two more opportunities were given for the difplay of Handel's wonderful powers, and the gratification of public curiofity.

The fourth day was fupplied with a well chofen felection of Handel's moft grand and captivating compofitions, from his oratorios and anthems; and on the fifth, that fublime production, the Meffiah, was repeated; and though it had been performed in the Abbey but a week before, in fo perfect and magnificent a manner, that no rehearfal, previous to its repetition, was neceffary to the band; yet, to gratify the wifhes of many timid and infirm lovers of mufic, who dreaded the croud that was likely to be affembled at a public performance, as well as to raife money for charitable purpofes, another rehearfal would certainly have been announced, if it had not been prevented from taking place by the celebration of his majefty's birth-day, on which occafion there was a certainty that the chief part of the performers and company would be engaged.

Thofe who attended this day's commemoration at the Abbey were, feemingly, of a higher clafs than had yet appeared there; fo that though the croud was fomewhat lefs than at the preceding performance of the fame oratorio, the exhibition was more fplendid. Indeed, as a fpectacle, it was fo magnificent to the fight, and, as a mufical performance, fo mellifluous and grateful to the ear, that it will be difficult for the *mind's eye* of thofe who were abfent, to form an adequate idea of the fhow, or the *mental ear* of the found, from defcription. Every one prefent muft have found full employment for the two fenfes which afford us the moft refined pleafure; as it is from the eye and the ear that intellect is fed, and the mind furnifhed with its beft intelligence.

At the firft performance of the Meffiah, his majefty expreffed a defire to the earl of Sandwich of hearing the moft truly fublime of all choruffes, "Allelujah! for the Lord God omnipotent reigneth," a fecond time; and this gracious wifh was conveyed to the orcheftra, by the waving of his lordfhip's wand. At this fecond performance of that matchlefs oratorio, his majefty was pleafed to make the fignal himfelf, with a gentle motion of his right hand, in which was the printed book of the words, not only for the repetition of this, but of the final chorus, in the laft part, to the great gratification of all his happy fubjects prefent; and, perhaps, the fubjects of no fovereign prince on the globe were ever before fo delighted with the effects of a royal mandate.

Thus ended the fifth and laft of the performances for this memorable celebration; and fo great and perfect was the pleafure which the audience had received, that thofe who had attended all the five exhibitions feemed moft to regret this final clofe.

The whole receipts at the five performances of this moft fplendid and magnificent celebration amounted to 12,736*l.* 12*s.* 10*d.* Of which, after all difburfements for building, band, and other incidental expences, to the amount of 5736*l.* 12*s.* 10*d.*, 6000*l.* remained for the fund of the fociety of decayed muficians, and 1000*l.* for the Weftminfter hofpital.

At the end of the printed account of the firft year's *Commemoration of Handel*, is added in the Appendix, a "Hiftory of the Rife and Progrefs of the Fund for the Support of decayed Muficians and their Families, eftablifhed in 1738," which has been fince laudably imitated by other profeffions, and in other countries; and it appeared in 1784, after thefe performances, that by the great acceffion to the fund from the commemoration, its capital became a ferious and weighty concern, amounting to upwards of 22,000*l.*, in South-fea annuities and three per cents.; which realizes and afcertains an income of 678*l.* a year, exclufive of benefits or fubfcription.

The path therefore which the governors and court of affiftants have now to purfue, is perfectly plain and pleafant; the power of alleviating diftrefs and mifery, of feeding the hungry, clothing the naked, and adminiftering comfort to age and infirmities, is placed in their hands, without the trouble of providing the means.

COMMENASA, in *Ancient Geography*, a river of Afia, according to Arrian, who fays that it ran into the Indus.

COMMENDAM, in the *Canon Law*, expreffes the charge, truft, and adminiftration of the revenues of a benefice, given to a layman to enjoy, by way of depofitum, for the fpace of fix months, in order to its being repaired, &c. or to another bifhop, or ecclefiaftic, to perform the paftoral offices thereof, till fuch time as the benefice is provided of a regular incumbent. See Benefice.

Anciently, the adminiftration of vacant bifhoprics belonged to the neareft neighbouring bifhop; which continued to be practifed between the archbifhopric of Lyons, and the bifhopric of Autun: on this account they were called *commendatory bifhops.*

This cuftom appears to be very ancient: St. Athanafius fays of himfelf, according to Nicephorus, that there had been given him in *commendam*, i. e. in adminiftration, another church befides that of Alexandria, whereof he was ftated bifhop.

The care of churches, it feems, which had no paftor, was committed to a bifhop, till they were provided with an ordinary: the regifter of pope Gregory I. is full of thefe commiffions, or commendams, granted during the abfence or ficknefs of a bifhop, or the vacancy of a fee. Some fay, that pope Leo IV. firft fet the modern commendams on foot, in favour of ecclefiaftics who had been expelled their benefices by the Saracens; to whom the adminiftration of the vacant churches was committed for a time, in expectation of their being reftored: though St. Gregory is faid alfo to have ufed the fame, while the Lombards defolated Italy.

In a little time, the practice of commendams became exceedingly abufed; and the revenues of monafteries were given to laymen for their fubfiftence. The bifhops alfo procured feveral benefices, or even bifhoprics, in commendam, which ferved for a pretext for holding them all without directly violating the canons. Part of the abufe has been retrenched; but the ufe of commendams is ftill retained, as an expedient to take off the incompatibility of the perfon, by the nature of the benefice.

When

When a parfon is made bifhop, his parfonage becomes vacant; but if the king by fpecial difpenfation give him power to retain his benefice, notwithftanding his promotion, he fhall continue parfon, and is faid to hold it *in commendam;* but this muft be done before confecration, for afterwards it comes too late, becaufe the benefice is then abfolutely void. There are feveral forts of commendams founded on the ftat. 25 Hen. VIII. cap. 21. as a *commendam femeftris*, which is for the benefit of the church, without any regard to the commendatary, being only a provifional act of the ordinary, for fupplying the vacation of 6 months, in which time the patron is to prefent his clerk, and only implies a fequeftration of the cure and fruits till the clerk is prefented: *commendam retinere*, by means of which a bifhop retains benefices on his preferment, which has operated for a certain number of years, or even as long as the *commendatary* lived, and continued bifhop; and thefe commendams are granted on the king's mandate to the archbifhop, expreffing his confent, which continues the incumbency, fo that there is no occafion for inftitution: a *commendam recipere*, which is to take a benefice *de novo*, in the bifhop's own gift, or of fome other patron, whofe confent is obtained; and for life, when it is equal to a prefentation, without inftitution, or induction. But all difpenfations beyond 6 months were only permiffive at firft, and granted to perfons of merit; the *commendam retinere* is for one or two years, &c. and fometimes for three or fix years, and doth not alter the eftate which the incumbent had before; and this, as long as the commendatary fhould live and continue bifhop, hath been thought good. Vaugh. 18. The *commendam recipere* muft be for life, as other parfons and vicars enjoy their benefices; and as a patron cannot prefent to a full church, fo neither can a *commendam recipere* be made to a church that is then full. Show. 414.

A benefice cannot be *commended* by parts, any more than it may be prefented unto by parts; fo that one fhall have the glebe, another the tythes, &c. Nor can a commendatary have a *juris utrum*, or take to him and his fucceffors, fue or be fued, in a writ of annuity, &c. But a *commenda perpetua* may be admitted to do it. 11 Hen. IV. Compl. Incumb. 360. (See Nelf. Abr. 454.).

Thefe commendams are now in fact feldom or never granted to any but bifhops; and in that cafe the bifhop is made commendatary of the benefice while he continues bifhop of fuch a diocefe, as the object is to make an addition to a fmall bifhopric; and it would be unreafonable to grant it to a bifhop for life, who might afterwards be tranflated to one of the vacant fees.

Commendam, in popifh countries, is a real title of a regular benefice; as an abbey, or priory given by the pope to a fecular clerk, or even to a layman, with power to difpofe of the fruits thereof during his life.

No benefice that has a cure of fouls, i. e. no parfonage, or bifhopric, can be given *in commendam*. This practice being entirely contrary to the canons, none but the pope, who has a power of difpenfing with the canons, can confer it.

When the commendam becomes vacant by the death of the *commendatary*, it is not efteemed vacant by his death; but as it was before the commendam was granted: that making no alteration in the thing: yet the pope gives the fame benefice in commendam again, by a privilege which he ftill continues.

By the pope's bulls, a *commendatary* abbot has the full authority of the regular abbot to whom he is fubftituted. For this reafon, the bulls exprefsly require, that he be a prieft; or, that if he have not yet attained the age of priefthood, he fhall take orders as foon as he has. But this is a mere formality, or matter of ftyle, the thing is never executed.

Indeed, the fpiritual direction of the abbey, while it is *in commendam*, is lodged wholly in the clauftral priors.

The commendatary abbots have not any authority over the religious *in fpiritualibus:* they even cannot either appoint or fet afide the clauftral priors, who are nominated in the bulls the adminiftrators of the fpiritualities; in which, however, this reftriction is added, viz. till the abbot arrive at the age of twenty-five years, to affume the priefthood.

The popes grant benefices *in commendam*, not only to clerks, by difpenfing with their age, and other qualifications required; but they alfo difpenfe with the clericate even in children yet in the cradle, till they become of age to take the tonfure: it being fufficient to obtain a bull, that it be reprefented at Rome, that the child is deftined for the ecclefiaftic ftate. In this cafe there is an Oeconomus, or fteward, appointed to take care of the temporal concerns.

Commendatary, a perfon who holds a church living or preferment *in commendam*.

Commendatary *Letters*, are fuch as are written by one bifhop to another in behalf of any of the clergy, or others of his diocefe travelling thither; that they may be received among the faithful; or that the clerk may be promoted; or neceffaries may be adminiftered to others, &c. Several forms of thefe letters may be feen in our hiftorians; as in Bede, lib. ii. cap. 18.

COMMENDATUS, one that lives under the protection of a great man.

Commendati homines were perfons who, by a voluntary homage, put themfelves under the protection of any fuperior lord; for ancient homage was either predial, due for fome tenure, or perfonal, which was by compulfion, as a fign of neceffary fubjection; or voluntary, with a defire of protection. And thofe who by voluntary homage put themfelves under the protection of any men of power, were fometimes called *homines ejus commendati*, fometimes only *commendati*, as often occurs in Domefday. *Commendati dimidii* were thofe who depended on two feveral lords, and paid one half of their homage to each; and *fub-commendati*, were like under-tenants, under the command of perfons who were dependants themfelves on a fuperior lord. There were alfo *dimidii fub-commendati*, who bore a double relation to fuch depending lords. Domefday. This phrafe feems to be ftill in ufe, in the ufual compliment, *commend* me to fuch a friend, &c. which is to let him know I am his humble fervant. Spelm. of Feuds, cap. 20.

COMMENDO, called alfo *Commani*, *Kommani*, *Aguefto*, and *Guaffo*, in *Geography*, a kingdom of Africa, on the Gold coaft, bordered on the weft by the countries of Jabi and Jaben, on the north-weft by Adom, by Ambrambo on the north; on the eaft, by a little republic lying between Commendo and Fetu, called Addena, or Elmina; and by the ocean on the fouth. The dimenfions are about five miles along the fea-coaft, and about as many up the country. In the centre, on the ftrand, ftands Little Commendo, or Commani, called by the negroes Ekki Tekki, having cape Aldea das Terras on the weft, and Ampani on the eaft, with fome fmall hamlets in the intermediate fpaces. Commendo had formerly been a part of Saba and Fetu, but of late years it has been erected into a feparate monarchy. The chief city, or refidence of the king, is called "Guaffo," which is large and well inhabited, containing no lefs than 400 houfes, and fituated on high ground, at the diftance of four miles from

Little

Little Commendo; the Dutch diſtinguiſh both by the name of Great and Little Commendo. This kingdom produces but little rice; nevertheleſs, the vallies are no leſs fertile than agreeable, and the hills covered with wood, which affords a very delightful proſpect. Behind Little Commendo, the land riſes by a gentle aſcent into little hills, beautifully ſheltered with woods of a perpetual verdure; and at the bottom are meadows and plains diſpoſed in the moſt agreeable manner, and abounding with various kinds of fruit-trees. The natives are warlike, and ſo numerous, that in this little kingdom, the ſovereign is able to raiſe an army of 20,000 men. His ordinary body-guard is compoſed of 500 ſtout fellows, well armed, reſolute, and loyal. It has been ſaid that Commendo abounds in gold mines, but that the king, for fear of exciting the avarice of the Europeans, prohibits the working of them. This country is divided into two diſtinct provinces. We ſhall content ourſelves with deſcribing Little Commendo. This province is called by the Portugueſe Aldea das Terras, and by the natives Ekki Tekki. The town is ſaid to contain at leaſt 100 houſes. It is ſituated on the banks of a fine rivulet, that empties itſelf into the ſea on the ſouthward, which forms a kind of canal, or little oblong harbour for canoes. The N.E. ſide of the town, where the French had formerly a ſettlement, is bordered by little hills, at the foot of which lie fine rich meadows and paſture, as well as fertile fields, every where interſperſed with groves of fruit-trees. Little Commendo, which was once a place of great note, and one of the fineſt towns in Guinea, has ſince exhibited only the remains of a town deſtroyed by fire, and the well peopled ruins of a once flouriſhing and great city. The natives of Little Commendo are in general turbulent, cunning, and deceitful; much addicted to lying and ſtealing. Their employment conſiſts either in fiſhing or in commerce, and their neighbours employ them as brokers and factors, particularly the people of Akamen, who carry on a conſiderable trade. Every morning 70 or 80 large canoes may be ſeen upon the coaſt fiſhing, or trading with the European ſhipping in the road. About the middle of the day they put to ſhore when the ſouth-weſt winds begin to blow, both for facility of unloading, and for ſecuring a market for their cargoes, either at Great or Little Commendo, where the inland negroes aſſemble with the commodities of their principal countries. No markets on earth are better ſupplied with all ſorts of grain, roots, fruits, pulſe, and fiſh, than theſe, nor at a more reaſonable price. Here the Engliſh and Dutch have forts. Next to Cape Coaſt, the Engliſh fort is ſaid to be the principal which they poſſeſs in Guinea, at leaſt on the Gold Coaſt. The Dutch fort of Wodenbourgh, lies at the diſtance of a muſket ſhot, and was built in the year 1688. N. lat. 4° 54′. E. long. 0° 34′.

The principal commodities for which there is a demand by the negroes of Commendo, are glaſs beads, braſs bells, and buttons, long linen cloths and woollen ſtuffs. They are very dextrous in the adulteration of gold, and the practice is very common. When the people of Commendo are at war, they have uſually a ſlave-market at Little Commendo, for the more quick diſpatch of their buſineſs. Here alſo they keep quantities of gold in the hands of certain agents employed to carry on trade, while the reſt are fighting the enemy in the field. The gold trade, however, is not very conſiderable.

COMMENDONE, Gianfrancesco, in *Biography*, an eminent prelate in the church of Rome, was born at Venice in 1524, and began, at the early age of ten years, to compoſe verſes. He purſued his ſtudies at Padua, and in the year 1550, he was introduced to pope Julius III., by whom he was made chamberlain, and afterwards employed on public buſineſs. In 1553, he accompanied the legate cardinal Bardino to Flanders, and from thence he was diſpatched ſecretly to England, to enquire into the ſtate of religion under queen Mary. Paul IV. made him biſhop of Zant, and commiſſioned him to excite the different ſtates of Italy to unite with him in a common league. By Pius IV. he was raiſed to the office of cardinal in 1565, while he was nuncio in Poland. He was employed in various other miſſions to foreign ſtates, and in all theſe he acted with zeal for his church, and executed whatever was committed to his charge with the utmoſt diſpatch and fidelity. Under Gregory XIII. he was proſecuted by the imperial faction for having too great a partiality towards France; his own party was, however, ſo ſtrong, that he was not only acquitted, but upon a dangerous illneſs of the pope, it was projected to raiſe him to the papal crown. The pope, by recovering his health, diſappointed his expectations, and Commendone himſelf died at Padua, in December, 1584. He is not celebrated as an author, having left behind him only ſome Latin poems, among thoſe of the Academy of Occulti, of which he was the zealous patron, and ſome letters inſerted in the notes to thoſe of Julio Poggiano. Commendone was reckoned one of the ableſt politicians of his own time, a man of great learning, and a friend to literature. He cultivated an intimate friendſhip with many of the moſt eminent ſcholars in Italy, and to him were addreſſed ſome letters of Annibal Caro. Gen. Biog.

Commensurable *Quantities*, in *Geometry*, are ſuch as have ſome common aliquot part, or which may be meaſured or divided without leaving a remainder, by ſome meaſure or diviſor, called their common meaſure. Thus, a foot and a yard are commenſurable; there being a third quantity which will meaſure each, viz. an inch; which taken 12 times makes a foot, and 36 times a yard.

Commenſurables are to each other as one rational whole number to another. In incommenſurables it is otherwiſe. The ratio of commenſurables, therefore, is rational; that of incommenſurables irrational: hence, alſo, the exponent of the ratio of commenſurables is a rational number.

Commensurable *Numbers*, in *Arithmetic*, whether integers or fractions, are ſuch as have ſome other number which will meaſure or divide them without any remainder. Thus, 6 and 8, both divided by 2, are reſpectively commenſurable numbers: $\frac{2}{3}$ and $\frac{3}{4}$, or $\frac{8}{12}$ and $\frac{9}{12}$, are commenſurable fractions, becauſe the fraction $\frac{1}{6}$ or $\frac{1}{12}$ will meaſure them both; and in this ſenſe all fractions may be ſaid to be commenſurable.

Commensurable *in Power*. Right lines are ſaid to be commenſurable in power, when their ſquares are meaſured by one and the ſame ſpace, or ſuperficies.

Commensurable *Surds*, are ſuch ſurds as, being reduced to their leaſt terms, become true figurative quantities of their kind; and are therefore as a rational quantity to a rational: ſuch are $3\sqrt{2}$ and $2\sqrt{2}$ being one to the other as 3 to 2. See Surd.

COMMENTACULA, among the Romans, the rod which the flamens carried in their hands when going to ſacrifice.

COMMENTARIENSIS, in *Ancient Military Language*, the perſon who was gaoler of the ſoldiers' priſon among the Romans, and kept its regiſters. He was ſubject to the "triumviri capitales."

COMMENTARY, or Comment, a gloſs, or interpretation, affixed to ſome ancient, obſcure, or difficult author, to render him more intelligible, or to ſupply what he has left undone. The biblical ſtudent may find ſome judicious and uſeful remarks on *commentators*, or thoſe who have written commentaries on the Sacred Scripture, in Mr. Locke's Preface

face to his Paraphrase and Notes on the Epiftles of St. Paul.

Commentary is alfo ufed for a fort of hiftory, written by a perfon who had a chief hand in the tranfactions related.

Such are the commentaries of Cæfar, of Sleidan, Montluc, &c.

The word is alfo ufed for certain books written on fome particular fubject: Kepler has an excellent book of commentaries on Mars, containing obfervations on the motion of that planet.

COMMEQUIERS, in *Geography*, a town of France, in the department of the Vendée, 15 miles N. of Sables d'Olonne.

COMMERAGH, or Cummeragh, the name of a high ridge of mountains which lie between Dungarvan and Clonmell, in the county of Waterford, Ireland. On the fides of this chain, fays Dr. Smith, are many horrid precipices and fteep declivities, and the vallies are full of large fragments intermixed with fand and gravel. On the tops of moft of them are alfo large heaps of ftones. Smith's Waterford.

COMMERCE, the interchange of commodities, or the difpofal of produce of any kind for other articles, or for fome reprefentative of value for which other articles can be procured, with the view of making a profit by the tranfaction. The term is ufually reftricted to the mercantile intercourfe between different countries; the internal dealings between individuals of the fame country, either for the fupply of immediate confumption, or for carrying on manufactures, being more commonly denominated *trade*.

The mutual convenience of an exchange of commodities, muft have been evident almoft as foon as any part of mankind had acquired an idea of diftinct property; the difficulty of communication between different countries muft, however, have long rendered commercial intercourfe very limited and uncertain. The dangers attending long journies induced thofe who engaged in trading to diftant parts, to affociate together for mutual affiftance and defence; and thefe companies of merchants, or caravans, were well adapted for the improvement of commerce, from the information which the individuals compofing them would communicate to each other, and the connections they might occafionally form. In the book of Genefis, mention is made of the companies or caravans of Ifhmaelite merchants trading in fpices from Gilead into Egypt; to one of whom Jofeph was fold, about 620 years after the flood. But this mode of communication between different countries was infufficient for the enterprifing fpirit of commercial adventurers; remote countries cannot convey their commodities by land to thofe places where, on account of their rarity, they are moft defired, and confequently become moft valuable. It was not till fome progrefs had been made in the art of navigation, that the power was acquired of tranfporting with facility the fuperfluous ftock of one part of the earth to fupply the wants of another part, and that the active fpirit of commerce could extend its multifarious concerns to all the known parts of the globe.

The Egyptians, foon after the eftablifhment of their monarchy, are faid to have opened a trade between the Arabian Gulph or Red Sea, and the weftern coaft of the great Indian continent. The commodities which they imported from the eaft, were carried by land from the Arabian Gulph to the banks of the Nile, and conveyed down that river to the Mediterranean: but the maxims and manners of Egypt were inimical to commerce, and this profitable traffick foon declined.

The fituation and circumftances of the Phenicians naturally led them to look to commerce as the only fource from which they could derive opulence or power; and accordingly, the foreign trade carried on by them, particularly from Sidon and Tyre, became more extenfive and important than that of any ftate in the ancient world. Their fhips not only frequented all the ports in the Mediterranean, but they were the firft who ventured beyond the ancient boundaries of navigation, and paffing the ftreights of Gibraltar, vifited the weftern coafts of Spain and Africa. They revived a commercial intercourfe with Arabia and the continent of India, on the one hand, and with the eaftern coaft of Africa on the other; the cargoes which they purchafed in Arabia, Ethiopia, and India, being landed at Elath, the fafeft harbour in the Red Sea towards the north: thence they were carried by land to Rhinocolura, the diftance not being very confiderable, and, being re-fhipped in that port, were tranfported to Tyre, and diftributed over the world.

The wealth which the Phenicians acquired by monopolizing the commerce of the Red Sea, incited their neighbours, the Jews, under the profperous reigns of David and Solomon, to aim at being admitted to fome fhare of it. Solomon fitted out fleets, which, navigated by Phenician pilots and mariners, failed from the Red Sea to Tarfhifh and Ophir, from whence they brought fuch valuable cargoes as fuddenly diffufed wealth and fplendour through the kingdom of Ifrael. But the inftitutions of the Jews were by no means favourable to commerce, which was never carried to any great extent by them while they inhabited Judea.

The Carthaginians applied themfelves to commerce and navigation with ardour, ingenuity, and fuccefs; but as the Phenicians had engroffed the commerce of India, their adventures were chiefly made to the weft and north. Following the courfe which the Phenicians had opened, they extended their voyages beyond the fhores of the Mediterranean, vifiting not only all the coafts of Spain, but thofe of Gaul; and penetrating at laft to Britain. They made voyages of difcovery in different directions, and thus eftablifhed a commercial intercourfe with places which before were wholly unknown; but whatever knowledge of this kind they acquired, it was concealed from the inhabitants of other ftates with the utmoft care.

The Greeks, although their country was almoft encompaffed by the fea, which formed many fpacious bays and commodious harbours, and though it was furrounded by a number of fertile iflands, were, notwithftanding fuch a favourable fituation, a long time before they attained any degree of perfection in navigation. They fcarcely carried on any commerce beyond the limits of the Mediterranean. Their chief intercourfe was with the colonies of their countrymen planted in the leffer Afia, in Italy, and in Sicily. They fometimes vifited the ports of Egypt, of the fouthern provinces of Gaul, and of Thrace, or paffing through the Hellefpont, they traded with the countries fituated around the Euxine fea. The expedition of Alexander into the eaft confiderably enlarged the geographical knowledge of the Greeks. He had obferved the refources which commerce creates, in the exertions of the republic of Tyre, and therefore it became part of his plan to render the empire which he propofed to eftablifh, the centre of commerce as well as the feat of dominion. With this view, he founded Alexandria near one of the mouths of the Nile, that, by the Mediterranean fea, and the neighbourhood of the Arabian gulph, it might command the trade both of the eaft and weft. This fituation was fo judicioufly chofen, that Alexandria foon became the chief commercial city in the world. Not only during the fubfiftence of the Grecian empire in Egypt and in-

in the eaſt, but amidſt all the ſucceeding revolutions of thoſe countries, commerce, particularly that of the Eaſt Indies, continued to flow in the channel which the ſagacity and foreſight of Alexander had marked out for it, till the diſcovery of the navigation by the Cape of Good Hope opened a more expeditious and independent channel to all the maritime ſtates of Europe.

In the early periods of the Roman hiſtory, commerce appears to have been much neglected and undervalued; it ſeems to have been thought a degrading employ by this military people, and to have been left almoſt entirely in the hands of the natives of the countries they conquered. The extent, however, of the Roman power, which included the greateſt part of the known world, the vigilant inſpection of the Roman magiſtrates, and the ſpirit of the Roman government, no leſs intelligent than active, gave ſuch additional ſecurity to commerce, as animated it with new vigour; and, as ſoon as the Romans acquired a taſte for the productions of other countries, commerce, particularly the trade with India through Egypt, was puſhed with new vigour, and carried on to a greater extent. The pilots who ſailed from Egypt to India firſt ventured to quit ſight of the ſhore, and depending wholly on the trade winds, boldly ſailed from Ocelis at the mouth of the Arabian gulph, acroſs the ocean, to the coaſt of Malabar, returning with the eaſtern monſoon, and thus procuring the ſpices and other rich commodities of the continent and iſlands of the farther India, which were brought to the port of Muſiris by the Indians themſelves. The commerce thus carried on will appear conſiderable even in the preſent age, as the trade with India is ſaid to have drained the Roman empire every year of more than four hundred thouſand pounds, and that one hundred and twenty ſhips ſailed annually from the Arabian gulph to that country. The reign of Auguſtus was very favourable to commerce, as the peace which then prevailed over the civilized parts of the world, enabled the merchants to purſue it unmoleſted. Under Tiberius we find the Romans extending their protection to the north, and the town of Havern, the moſt ancient in Frieſland, founded. Under Nero, the capital of England is firſt mentioned as a conſiderable place. Tacitus, who lived for ſome time at London, ſays it was famous for its many merchants, and plenty of its merchandize. Rome, however, as the ſeat of wealth and luxury, continued to be the metropolis of the commercial world, until the fourth century, when Conſtantine removed the ſeat of empire to Conſtantinople, and made it the emporium of commerce. This city was undoubtedly well adapted for that honour; it was favoured by nature with a fine climate, and in a moſt advantageous ſituation for carrying on an extenſive correſpondence with every part of the world then known.

The invaſion by the northern nations in the fifth century, not merely arreſted the progreſs of commerce, but effectually diſſolved all commercial connections, and deprived the merchants of any market for their commodities. Europe became parcelled out into many ſmall and independent ſtates, differing from each other in language and cuſtoms; no intercourſe ſubſiſted between the members of theſe divided and hoſtile communities; their mode of life was ſimple, they had few wants to ſupply, and few ſuperfluities to diſpoſe of. Cities, in which alone an extenſive commerce can be carried on, were few, inconſiderable, and deſtitute of thoſe immunities which produce ſecurity or excite enterpriſe. It became diſagreeable and dangerous to viſit any foreign country, and thus the knowledge of remote regions was loſt; their ſituation, their commodities, and almoſt their names, were unknown. The preſervation of Conſtantinople from the general deſtruction, however, prevented commercial intercourſe with diſtant nations from ceaſing altogether. In that city the knowledge of ancient arts and diſcoveries was preſerved; a taſte for ſplendour and elegance ſubſiſted; the productions of foreign countries were in requeſt; and commerce continued to flouriſh there when it was almoſt extinct in every other part of Europe. The merchants of Conſtantinople did not confine their trade to the iſlands of the Archipelago, or to the adjacent coaſts of Aſia; they took a wider range, and following the courſe which the ancients had marked out, imported the commodities of the Eaſt Indies from Alexandria. When Egypt was torn from the Roman empire by the Arabians, the induſtry of the Greeks diſcovered a new channel, by which the productions of India might be conveyed to Conſtantinople. They were carried up the Indus, as far as that great river is navigable; thence they were tranſported by land to the banks of the river Oxus, and proceeded down its ſtream to the Caſpian ſea. There they entered the Volga, and ſailing up it, were carried by land to the Tanais, which conducted them into the Euxine ſea, where veſſels from Conſtantinople waited their arrival. This extraordinary and tedious mode of conveyance, Dr. Robertſon obſerves, is a proof not only of the violent paſſion which the inhabitants of Conſtantinople had conceived for the luxuries of the eaſt, and of the ardour and ingenuity with which they carried on commerce, but it demonſtrates, that during the ignorance which reigned in the reſt of Europe, a knowledge of remote countries was ſtill preſerved in the capital of the Greek empire. Robertſon's Hiſt. Amer. vol. i.

The devaſtations of the Huns in Italy induced many of the richeſt inhabitants of the country near the bottom of the Adriatic, to fly with their beſt effects into the numerous ſmall ſandy iſles lying amongſt the ſhallow waters near the ſhores of the continent; on which iſles, about ſeventy-two in number, they built ſuch habitations as their circumſtances would admit; and here by degrees aroſe the celebrated commercial city of Venice. Neceſſity firſt obliged them to devote themſelves to commerce, the earlieſt branch of which was naturally the fiſheries. Their next commercial object was the manufacture and exportation of ſalt. Thus by the application of its inhabitants, and the ſecurity of its ſituation, Venice gradually became the general magazine for the merchandize of the neighbouring continent, to which the many rivers that fall into the Adriatic ſea greatly contributed; and as the Venetians in time became the carriers of this merchandize into diſtant countries, they were enabled to bring back raw materials for various manufactures which greatly enlarged their commercial dealings.

In this manner, Venice firſt, and Genoa, Florence, and Piſa afterward, from inconſiderable places became populous and wealthy cities, and laid the foundation for the revival of commerce throughout the Mediterranean, which, in proceſs of time, was extended to the countries of Europe without the ſtreights of Gibraltar. The free cities of Italy, were, for ſeveral centuries, the only places in Europe. weſt of the Eaſtern or Greek empire, which had any conſiderable commerce, or any valuable manufactures for the ſupply of other nations. Their merchants frequented Aleppo, Tripoli, Alexandria, and other ports of Syria and Egypt, where they procured the produce of India; and viſiting the maritime towns of Spain, France, the Low Countries, and England, by diſtributing their commodities over Europe, communicated to its various nations ſome taſte for the valuable productions of the eaſt, as well as ſome ideas of manufactures and arts, which were then unknown beyond the precincts of Italy.

The

The firſt mention of the city of Antwerp, afterwards ſo famous for its trade, is in the year 517, when Theodoric expelled the Danes from it. Some towns in England, as Chicheſter and Abingdon, are ſaid to have been founded about this time, which ſhews that trade and manufactures were gaining ground in this country.

The unſettled ſtate of Europe, ariſing from the fierce and reſtleſs diſpoſition of the barbarous tribes who had taken poſſeſſion of the weſtern empire, cauſed for ſeveral centuries a great ſtagnation of commercial intercourſe. Venice however continued to improve its commerce, and London became " a mart town of many nations, which repaired thither by ſea and land." Some of the Italian cities began to aſſume a degree of independence, and ſeveral towns were founded in Germany and Flanders, which afterwards became of much commercial importance. The commerce of Europe revived a little under the government of Charlemagne, who, among other endeavours to promote it, is ſaid to have formed a project for uniting the two great rivers of the Rhine and the Danube, and thus forming a communication between the German ocean and the Black ſea, without ſailing up the Mediterranean. But his engineers had not ſufficient ſkill to overcome the difficulties they met with, and the undertaking was ſoon relinquiſhed. In a letter from this prince to Offa, king of Mercia, he grants leave for ſuch Engliſh as went in pilgrimage to Rome, to paſs through his dominions free; but ſuch as travelled for the purpoſes of trade were to pay the cuſtomary tolls; and promiſes that the merchants ſhould have legal patronage and redreſs of grievances. Theſe merchants were probably perſons who carried their whole ſtock with them, which of courſe could not be of any very great amount.

The eſtabliſhment of Chriſtianity in Germany produced a much more intimate and regular correſpondence between the north of Europe, and the earlier Chriſtianized countries of Italy, France, Spain, and Britain; ſo that their ſuperfluities and produce were mutually communicated to each other, while Germany received by degrees, from its intercourſe with thoſe countries, conſiderable improvements with reſpect to agriculture, mining, vine-dreſſing, manufactures, and the arts, more immediately conducive to the comforts of civilized life. It conſiderably increaſed the cities and towns, where cathedral churches and houſes for the biſhops and clergy were erected. Thus the propagation of Chriſtianity greatly favoured the advancement of commerce in the north of Europe; while Charlemagne by his conqueſt of Italy, and by rebuilding and reſtoring many of the decayed cities of that country, inſpired thoſe cities with the ſpirit of commerce, manufacture, and navigation, for which they became in after times ſo juſtly famous. This period may be conſidered as the firſt dawn of the revival of commerce in Europe; for although ſubſequent to this time the Saracens or Moors, and the Normans, by their ravages and conqueſts in various parts, greatly obſtructed and retarded its progreſs, yet in ſpite of all oppoſitiom, the free cities in both the extreme parts of Europe in conſequence of the increaſe of their wealth and population from the encouragement of commerce, gradually aroſe to very conſiderable importance.

In the tenth century, the commercial intercourſe which the Germans had previouſly cultivated with the neighbouring ſtates was much increaſed by the diſcovery of valuable ſilver mines at Goſlar in Saxony, which occaſioned other parts of Germany to be explored for mines with conſiderable ſucceſs. The woollen manufacture of Flanders began to acquire ſome degree of importance, being much encouraged by Baldwin, third earl of Flanders, who invited into the country all manner of handicraftsmen for making all ſorts of manufactures, to whom he granted great privileges. He alſo eſtabliſhed annual fairs, and fixed markets on ſtated days of the week at Bruges, Courtray, Torhout, Mont-Caſſel, and other places, where merchants could exchange their goods for others; for "by reaſon of the ſcarcity of money at that time, the Flemings dealt moſtly by permutation, or barter of one kind of merchandize for another; which we read was alſo the practice of almoſt all the Germans and Sarmatians."

The republic of Venice had now acquired ſo much wealth and ſtrength by the great extenſion of her commerce, as to have become a formidable political ſtate, and having annexed to their dominions many cities and towns on the eaſt coaſt of the Adriatic ſea, the doge of Venice aſſumed the title of duke of Dalmatia. They eſtabliſhed a regular commercial intercourſe with the Saracens of Egypt and Syria, "countries ever famous for the production of rice, ſugar, dates, ſenna, caſſia, flax, linen, balm, perfumes, galls, wrought ſilk, ſoap, &c. beſides the rich ſpices and precious ſtones of India, brought to thoſe two countries; with all this rich merchandize, the Venetians now traded all over the weſtern parts of Europe, to their immenſe profit." They obtained from the Greek emperors a freedom from all cuſtoms and taxes in their empire; and in the year 996 the emperor Otho III. likewiſe granted them various privileges, with a right to ſet up fairs in ſeveral parts of Germany, where they carried on a vaſt commerce.

The cruſades contributed materially to the extenſion of commerce during the 11th and 12th centuries. The Genoeſe, the Piſans, and the Venetians, furniſhed the tranſports neceſſary to carry the vaſt armies that embarked on theſe wild enterprizes: they alſo ſupplied them with proviſions and military ſtores. Beſides the immenſe ſums which they received on this account, they obtained commercial privileges and eſtabliſhments of great conſequence, in the ſettlements which the cruſaders made in Paleſtine, and in other provinces of Aſia. From theſe ſources they acquired great wealth, and a proportionate increaſe of power. By the expeditions into Aſia, the inhabitants of all the ſtates of Europe had an opportunity of obſerving the manners, the arts, and the accommodations of people more poliſhed than themſelves. The adventurers who returned from Aſia communicated to their countrymen the ideas which they had acquired, and the habits of life they had contracted by viſiting more refined nations. The Europeans began to be ſenſible of wants with which they were formerly unacquainted; and ſuch a taſte for the commodities and arts of other countries gradually ſpread among them, that they not only encouraged the reſort of foreigners to their harbours, but began to perceive the advantage and neceſſity of applying to commerce themſelves.

The great commercial progreſs of the city of Lubeck ſoon cauſed other towns to be founded in the neighbourhood of the Baltic; which, ſuffering much from the occaſional attacks of neighbouring powers, and the depredations of pirates, were induced to enter into an aſſociation for their mutual ſafety, and the protection of their navigation. Thus was gradually formed the famous Hanſeatic confederacy, which made ſo great a figure in the commercial hiſtory of ſeveral ſucceeding centuries, and of which Lubeck was from the firſt conſidered as the director or head. Werdenhagen fixes on the year 1169 for the firſt of this confederacy, which conſiſted of the twelve following towns on the Baltic ſhore: viz. Lubeck, Wiſmar, Roſtock, Straelſund, Grypeſwald, Anclam, Stetin, Colberg, Stolpe, Dantzick, Elbing, and

and Koningfberg; though probably not all of them at the firft; as fome of them do not appear to have been founded till a later period. Lambecius, librarian to the emperor Leopold, is of opinion, that the Hans-league did not properly commence till after the league between Lubeck and Hamburgh in 1241, at which time the towns comprehended in this affociation were in poffeffion of all the commerce of the fouth fhores of the Baltic, from Denmark to the bottom of the gulph of Finland, befides an extenfive commerce to more diftant parts. About this time the commerce of Norway began to acquire fome degree of importance, and in a treaty between the monarch of that country and Henry III. of England, in 1217, it was agreed that their refpective ftates fhould be free for merchants and others on both fides.

At the beginning of the 13th century, the German merchants of the Steel-yard engroffed all the foreign commerce which then exifted in England, which at that time had very few merchants, and fewer fhips of her own. About 1250, however, a fociety of Englifh merchants was formed, who are faid to have had privileges granted to them in the Netherlands, by John duke of Brabant; whither they had begun to refort with Englifh wool, lead, and tin, bringing in return fine woollen cloths, linen, and other articles. From this fociety, the company ftyled "Merchants of the ftaple of England" took its rife. In 1274, a treaty was concluded with the earl of Flanders for the fettlement of fome commercial difputes which exifted between the two countries.

France at this period poffeffed very little foreign commerce, but in the cities of Italy it had increafed greatly. The republic of Genoa was in its meridian glory, being the greateft maritime power then exifting. Even Venice, great as it was now become, was eclipfed by Genoa, which, towards the conclufion of this century, had reduced the republic of Pifa, till then alfo powerful at fea, to the loweft ebb of fortune, never again to rife to greatnefs, and foon to lofe her independence.

A new æra was now about to commence in commercial hiftory. The difcovery of that valuable, but now familiar inftrument, the mariner's compafs, Dr. Robertfon obferves, may be faid to have opened to man the dominion of the fea, and to have put him in full poffeffion of the earth, by enabling him to vifit every part of it. But the effects of this difcovery were not fo fudden or extenfive as might be expected. The ufe of the compafs enabled the Italians to perform the fhort voyages to which they were accuftomed, with greater fecurity and expedition, but near half a century elapfed, before navigators ventured into any feas which they had not been accuftomed to frequent. One of the firft fruits of fuch adventures, was the difcovery of the Canary iflands by the Spaniards.

Many of the princes of Europe were now becoming more fenfible of the importance of commerce, which led them to enter into treaties for its regulation and defence. Edward I. in 1302 publifhed his famous charter ftyled Charta Mercatoria, by which "The merchants of Almaine, France, Spain, Portugal, Navarre, Lombardy, Florence, Provence, Catalonia, Aquitaine, Thouloufe, Flanders, Brabant, and of all other foreign parts, who fhall come to traffic in England, fhall and may fafely come with their merchandize into his cities, towns, and ports, and fell the fame, by wholefale only, as well to natives as to foreigners." Some particular articles they were allowed to fell by retail; and they were to export any goods they might want from England on paying the ufual cuftoms, except wine, which could not be exported without a fpecial licence. The countries here mentioned fhew the parts to which the commerce of England was at that time chiefly confined; and a very good idea of its extent may be gained from the following account of the exports and imports, in the 28th year of Edward III. from a record in the Exchequer.

Exports.	£.	s.	d.
$31,651\frac{1}{2}$ facks of wool, at fix pounds per fack, and 3036 hundred weight and 65 fells, each hundred weight being 6 fcore, at forty fhillings per hundred weight, with the cuftoms, &c. thereon, amounted to - - -	277,606	2	9
Leather, with its cuftom - - - - -	96	2	6
$4774\frac{1}{2}$ coarfe cloths, at 40 fhillings each, and $8061\frac{1}{2}$ pieces of worfted, at 16*s*. 8*d*. per piece - - - - - - -	16,266	18	4
Cuftoms thereon - - - - - - - - -	215	13	7
Total Exports, with the duties thereon	294,184	17	2

Imports.			
1831 fine cloths, at 6*l*. per cloth, which, with the cuftoms, comes to -	11,083	12	0
$397\frac{3}{4}$ hundred weight of wax, at 40 fhillings per hundred weight, which, with the cuftoms, comes to - - - -	815	7	5
$1829\frac{1}{2}$ tons of wine, at 40 fhillings per ton, which, with the cuftoms, comes to - - - - - - - - - - - - -	3,841	19	0
Linen cloth, mercery, grocery, and all other wares whatever - - - - -	22,943	6	10
On which the cuftom was - - - - -	285	18	3
Total Imports, with the duties thereon	38,970	3	6

Thus, as fir William Temple obferves, "when England had but a very fmall foreign commerce, we were rich in proportion to our neighbours, by felling fo much more than we bought." It is not very probable, however, that the excefs of the exports was generally fo great as is here ftated.

The materials of commerce were now increafing by the improvement of manufactures in various parts of Europe; while the difcoveries of the Portuguefe on the coaft of Africa, and in the adjacent feas, excited a more enterprifing fpirit of mercantile adventure, and at length, in 1487, led to the difcovery of the Cape of Good Hope, which they doubled about ten years after, and thus accomplifhed the firft regular voyage to the Eaft Indies. About the fame time alfo was accomplifhed the great difcovery of the weftern continent. Thefe events, which filled the world with aftonifhment, and gave rife to an infinity of new fpeculations, have fince fupplied it with a prodigious increafe of wealth, and with many new and excellent materials for the immenfe additional commerce which has thus accrued to all the ftates of Europe.

The whole of the vaft regions difcovered in the Eaft and Weft, was by the papal authority divided between the Spaniards and Portuguefe. The former firft made herfelf miftrefs of the iflands, and next of the principal part of the continent of America; in confequence of which the cities of Seville and Cadiz became the ftore-houfes for the riches of the newly-difcovered weftern world. Portugal purfued her commerce and rapid conquefts in the Eaft Indies, fo that Lifbon

Lisbon soon became (what the now declining city of Venice had been for many centuries past) the great magazine for all the rich productions of the East. They had also discovered Brasil in South America, which soon became an almost inexhaustible fund of wealth to Portugal, which may be said to have been then at the height of its commercial greatness.

In the course of the 16th century many circumstances occurred which contributed greatly to the extension of commerce. The English in the pursuit of a north-west passage to India had discovered the whole coast of North America, where, after some years, they began to attempt settlements. They engaged in the Newfoundland fishery, and also in the whale fishery at Spitsbergen or Greenland. The continual jealousies and disputes between the English merchants and the German Hanseatic merchants of the Steel-yard in London, were at length terminated by the abolition of the peculiar privileges of the latter. The discovery of a passage to Russia round the north Cape of Lapland, opened a field for other new discoveries, and new branches of commerce; in consequence of which a company for trading to Russia was immediately formed and incorporated. The commerce with Turkey was encouraged by the incorporation of a company; and the intercourse with Guinea and other places on the coast of Africa, was also thought of sufficient importance to have a company established for carrying it on.

While the importance of the Italian cities was declining, and the commerce of the towns on the Baltic experiencing some diminution, the cities of Hamburgh and Antwerp had risen into considerable importance. The latter in particular, from the convenience of its situation, might for some time be considered as the centre of the commerce of Europe, as well for the merchandize of both the Indies, as for the naval stores and other bulky commodities of the northern states. It was however soon to find a rival among its industrious neighbours in the United Provinces, who, from the time of their independence, applied themselves to manufactures and commerce with the utmost assiduity. France was at this time beginning to encourage the cultivation of the vine, and the improvement of her broad silk manufacture; while Spain, by expelling the protestants from the Netherlands, supplied England, Holland, and the Hanse towns with great numbers of wealthy and industrious manufacturers and artificers, as well as with an accession of many ingenious and beneficial new manufactures.

The 17th century was the period in which the principles were adopted, and most of the establishments formed, which have contributed to advance the commerce of Europe to its present astonishing height. The interests of nations became better understood than in any former age; the utility of commerce had become evident to every one, from the wealth and power it had conferred on the states which had encouraged it; and commercial treaties became frequent between the different nations. Navigation was improved; new settlements were formed, and many of those before made were rising into importance; manufactures were advancing in many parts of Europe; shipping was increasing, and the intercourse between distant places, from the accumulation of knowledge and experience, becoming more expeditious and secure.

The lucrative commerce of the East became one of the leading objects of mercantile pursuit. An English East India company was formed in 1600; and the Dutch companies, which were united in 1602, became one of the most celebrated commercial establishments ever formed. The French visited the East Indies in 1601, but did not establish a regular company for carrying on the trade till 1664. The Danes established an East India company in 1617, and in 1627 the king of Sweden issued letters patent for forming an East India company, but it was not carried into execution till some years after. The Spaniards and Portuguese, however, at this period, possessed by far the greatest share of the commerce of India, which had now become very considerable. The following account published by Mr. Munn, in 1621, of the quantity of Indian merchandize consumed annually in Europe, gives a very good idea of the proportion of the different articles of this branch of commerce: the prices affixed are the prime cost in India, including all charges till actually shipped for Europe.

	s.	d.	
6,000,000 lb. pepper, at	0	2½	per lb.
450,000 lb. cloves, at	0	9	per lb.
150,000 lb. mace, at	0	8	per lb.
400,000 lb. nutmegs, at	0	4	per lb.
350,000 lb. indigo, at	1	2	per lb.
1,000,000 lb. raw silk, at	8	0	per lb.

This statement was probably meant to include only the principal articles; at least it is certain that about 1631 several other kinds of merchandize were usually imported from India, as taffaties, painted callicoes, drugs of various sorts, and China ware. Tea, the great object of commercial intercourse with China, was either not yet an object of commerce, or was imported in such small quantities, that in England at least, in 1660, it was not thought of sufficient consequence to be subjected to a duty.

Dr. Davenant, who published his "Discourses on Trade" in 1698, was of opinion, that from about the year 1656 to 1688, England had every year gradually increased in riches; and that about the last mentioned year, the increase or addition to the wealth, and general stock of the nation, arising from foreign trade and home manufactures, was at least two millions per annum. In this estimate the different branches of trade are stated as follows:

The plantation trade may bring in	-	£ 600,000
The East India trade may bring in	-	500,000
The European, African, and Levant trade, by our own product may bring in	-	600,000
Ditto, by re-exports of plantation goods	-	120,000
Ditto, by re-exports of East India goods	-	180,000
	Total	2,000,000

This account is probably somewhat beyond the truth, with respect to the period to which it refers; but that there had been a considerable influx of wealth, is shewn by the observations of the same author, that from the year 1600 to 1688, the general rental of England was nearly trebled, and the purchase of land half doubled; that the stock of the kingdom was multiplied above five fold, and the money in circulation above four fold. This rapid advance in wealth, can be ascribed to no other cause than the improvement of commerce, which was now becoming of the utmost importance to all the European states, particularly to such as were desirous of maintaining any degree of naval power.

The increase of wealth arising from the extension of commerce, gave rise to the establishment of banks, by which its operations have of late years been so much facilitated. The commercial cities of Venice and Genoa had long experienced the utility of such institutions, which were now adopted in other states. The banks of Amsterdam, of

Hamburgh,

Hamburgh, and of Rotterdam were eſtabliſhed; and in 1694, the bank of England, and the bank of Scotland. The buſineſs of private bankers likewiſe took its riſe, and had become conſiderable, when it received a ſevere check from the unjuſtifiable conduct of Charles II. in ſeizing the money which the bankers had advanced on credit of the taxes. This branch of mercantile intercourſe has however been ſince carried to an extent which in former times would have been deemed wholly incredible.

Thus, with its principles generally underſtood; with moſt of the eſtabliſhments formed which are neceſſary to facilitate its operations; with laws and treaties in force for its encouragement and protection; markets eſtabliſhed for the purchaſe or ſale of commodities in almoſt every part of the globe; navigation brought to a high degree of perfection, vaſt improvements in arts and manufactures; and a great increaſe of artificial wants from the progreſs of luxury and refinement; the commerce of the world, and particularly of Europe, has, during the 18th century, expanded in an aſtoniſhing degree, and become intimately connected with the political exiſtence of almoſt every ſtate.

Commerce *of Great Britain.* The moſt authentic materials from which an idea can be formed of the progreſs and extent of the commerce of Great Britain, are the accounts kept in the office of the inſpector-general of exports and imports, at the cuſtom-houſe of London. Theſe accounts do not ſhew the current value of the commodities exported or imported, but are formed from their quantities, according to certain rates of value affixed to the ſeveral articles of foreign trade in 1696, by which they have been rated ever ſince. It is evident, therefore, that, as the price of all kinds of merchandize is ſubject to great fluctuations, and in general has much increaſed in this country within the laſt hundred years, theſe accounts are far from ſhewing the actual values in the later years; they are, however, from this very circumſtance of being uniformly made up at the ſame rates, the better adapted to a comparative view, and ſhew a progreſſive increaſe which has arrived to an amount never before known in the commerce of any nation. According to theſe eſtimates the total amount of the exports and imports of Great Britain have been as follows:

Years.	Imports.	Exports.
1700	£5,970,175	£7,302,716
1701	5,869,606	7,621,053
1702	4,159,304	5,235,874
1703	4,526,596	6,644,103
1704	5,383,200	6,552,019
1705	4,031,649	5,501,677
1706	4,113,933	6,512,086
1707	4,274,055	6,767,178
1708	4,698,663	6,969,089
1709	4,510,593	6,627,045
1710	4,011,341	6,690,828
1711	4,685,785	6,447,170
1712	4,454,682	7,468,857

At the concluſion of the war, by the peace of Utrecht, a commercial treaty with France was likewiſe negociated: but when the particulars of it came to be diſcuſſed, two of the articles, by which the produce and manufactures of France were to be admitted into this country on the ſame terms as thoſe of the moſt favoured nation, excited ſuch general diſapprobation, that the bill for carrying it into effect was rejected by the houſe of commons. The ſtrongeſt objection to the principle of the treaty, was that it might ruin the trade then carried on with Portugal, which was conſidered as the moſt valuable branch of our European commerce.

It is evident, that from the year 1705, notwithſtanding the diſadvantages it always labours under in time of war, commerce had been gradually increaſing; but when peace enabled it to return to its uſual channels, and reſtored ſome branches which had been conſiderably interrupted, its general advancement became more obvious, and although from the mode then uſually adopted, of judging of the profits of commerce merely by the exceſs of the value of the exports, the balance appeared leſs than it had been in former years, the wealth which flowed into the country from foreign trade, being no longer abſorbed in public loans, ſoon enabled the government to make a permanent reduction in the legal rate of intereſt. The war with Spain in 1718, did not cauſe much interruption of commercial intercourſe, except in the direct trade with that country.

Years.	Imports.	Exports.
1713	£5,811,077	£7,352,655
1714	5,929,227	8,361,638
1715	5,640,943	7,379,409
1716	5,800,258	7,614,085
1717	6,346,768	9,147,700
1718	6,669,390	8,255,302
1719	5,367,499	7,709,528
1720	6,090,083	7,936,728
1721	5,768,510	8,681,200

At this period the judicious principle of promoting the exportation of Britiſh manufactures, which had hitherto been applied only to woollen goods, was extended to Britiſh manufactures and produce in general; which were allowed to be exported duty free, except a few articles chiefly materials for manufactures, the exportation of which it would not have been proper to encourage; while drugs and other materials uſed for dyeing, were, upon being firſt duly entered, to be imported duty free, but upon re-exportation were to pay ſpecific duties. For this highly beneficial regulation, ſo ſimple in its principle, and ſo comprehenſive in its extent, the country was indebted to the enlightened wiſdom of Mr. Walpole: the experiment excited much doubt and ſolicitude as to its ſucceſs, but it ſoon appeared that the loſs of revenue in the duties thus given up, was a mere trifle in compariſon with the ſtimulus it gave to manufactures and the conſequent extenſion of commerce.

Years.	Imports.	Exports.
1722	£6,378,098	£9,650,789
1723	6,505,676	9,489,811
1724	7,394,405	9,143,356
1725	7,094,708	11,352,480
1726	6,677,865	9,406,731
1727	6,798,908	9,553,043
1728	7,569,299	11,631,383
1729	7,540,620	11,475,771
1730	7,780,019	11,974,135
1731	6,991,500	11,167,380
1732	7,087,914	11,786,658
1733	8,016,814	11,777,306
1734	7,095,861	11,000,645
1735	8,160,184	13,544,144
1736	7,307,966	11,616,356
1737	7,073,638	11,842,320
1738	7,438,960	12,289,495

The above period was almoſt wholly a time of peace, during which the commerce of Great Britain was gradually advancing,

advancing, both from the improvement of ſeveral of the exiſting branches, and the acquiſition of new ones. The South-ſea company undertook the Greenland whale fiſhery, which had been entirely relinquiſhed by this country for ſome years paſt ; and encouragement was given to fiſheries on the coaſt of America. Attempts were made to obtain a ſhare of the fur trade of north America, which was almoſt entirely in the hands of the French. The Oſtend Eaſt India company, which had been found prejudicial to the Engliſh trade in thoſe parts, was ſuſpended ; while our trade with China increaſed conſiderably, particularly in the article of tea. The trade of the Levant company was very flouriſhing ; as was likewiſe that of the Hudſon's bay company, though the latter was but of ſmall extent. The produce of ſeveral valuable commodities was at the ſame time augmenting, from an increaſed cultivation of rice in the American colonies, and of coffee in the Weſt India iſlands, while great quantities of corn were annually exported from Great Britain to France, Portugal, Spain, and Italy.

The war which began in 1739, was occaſioned chiefly by diſputes reſpecting our commerce in the Weſt Indies, which had been much interrupted by the Spaniards. It cauſed, at firſt, ſome decline of foreign trade, which however ſoon regained the extent to which it had been carried during the preceding peace.

Years.	Imports.	Exports.
1739	£7,829,373	£9,495,366
1740	6,703,778	8,869,939
1741	7,936,084	11,469,872
1742	6,866,864	11,584,427
1743	7,802,353	14,623,653
1744	6,362,971	11,429,628
1745	7,847,123	10,497,329
1746	6,205,687	11,360,792
1747	7,116,757	11,442,049
1748	8,136,408	12,351,433

At this time, a much greater proportion of the exports conſiſted of unmanufactured produce than it has ſince ; as it appears there had been exported from England in five years, from 1744 to 1748, no leſs than 3,768,444 quarters of corn, which at medium prices was worth 8,007,948 *l.*

That a conſiderable increaſe of commerce had taken place, is evident from the quantity of ſhipping employed. The total tonnage of veſſels that cleared outwards on an average of three years preceding the war, had been 503,568 tons ; the average of the three years, ending with 1751, was 661,184 tons. The encouragement of the fiſheries, and the regulation of the Guinea or African trade, which had been in the hands of an excluſive company, but was now in a great meaſure laid open ; cauſed ſome extenſion of foreign trade, although the Levant, or Turkey trade, which had been conſidered as one of the moſt valuable branches, was beginning to decline rapidly, from the French improving the natural advantages they poſſeſs for a trade with thoſe parts.

Years.	Imports.	Exports.
1749	£7,917,804	£14,099,366
1750	7,772,039	15,132,004
1751	7,943,436	13,967,811
1752	7,889,369	13,221,116
1753	8,625,029	14,264,614
1754	8,093,472	13,396,853
1755	8,772,865	12,182,255
1756	7,961,603	12,517,640
1757	9,253,327	13,438,285
1758	8,415,025	15,034,994
1759	8,922,976	14,696,892
1760	9,832,802	15,579,073
1761	9,543,901	16,365,953
1762	8,870,234	14,134,093

It is evident that commerce had not been very materially affected by the war. The years 1755 and 1756 marked the loweſt point of its depreſſion ; whence it gradually roſe, till it had gained a ſuperiority over the unexampled traffic of 1750, a year of eſtabliſhed peace and ſecurity.

By the peace of 1763, although many iſlands which had been taken in the Weſt Indies were reſtored, Great Britain retained a number of newly acquired iſlands, perhaps more than could be immediately brought into cultivation with advantage. The arrangements reſpecting Aſia were very favourable to the Eaſt India company, and in Africa an excluſive trade was ſecured in the article of gum Senegal, a material indiſpenſably neceſſary to the perfection of many of our manufactures. The immediate conſequence, however, of the acquiſition of additional territories, was, that a wide field was opened for ſpeculation and commercial enterpriſe, which cauſed much productive capital to be withdrawn from the trade and manufactures of Great Britain ; yet our merchants were not only able to maintain their own credit, but alſo to aſſiſt their correſpondents during the commercial embarraſſments in Holland and other parts of the continent.

In 1765, the principles and meaſures were adopted which ſoon involved the country in diſputes with its American colonies. Impolitic reſtrictions were laid on a beneficial intercourſe which had long ſubſiſted between the Britiſh colonies and the Spaniſh Weſt India ſettlements ; which being ſoon followed by other cauſes of diſcontent, drove the Americans into public reſolutions to make no further importations from Great Britain, but ſuch as were unavoidably neceſſary, and to encourage, to the utmoſt of their power, every kind of manufacture that was practicable among themſelves. This ſtep ſoon produced ſerious effects in Great Britain ; the merchants connected with America found themſelves unable to fulfil their engagements by the ſtoppage of large ſums due to them from that country ; the whole ſyſtem of their buſineſs was deranged, and general diſtreſs ſpread through the circle of their connections ; the manufacturers ſuffered by the want of regular payments from the merchants, while their materials, and made up goods, to an alarming amount, were becoming a dead ſtock upon their hands ; in conſequence of which, great numbers of workmen were thrown out of employ. Petitions were preſented to parliament from all the trading and manufacturing towns, which probably had ſome effect in procuring a temporary adjuſtment of the diſpute.

The non-importation agreement in America, was renewed in 1769 and 1770 ; yet the commerce of Great Britain, notwithſtanding theſe interruptions of an important branch of it, continued to increaſe ; and previous to the war which followed, had attained to a greater extent than in any former years.

Years.	Imports.	Exports.
1763	£11,665,036	£16,160,181
1764	10,364,307	16,512,403
1765	10,889,742	14,550,507
1766	11,475,775	14,024,964
1767	12,073,956	13,844,511
1768	11,878,661	15,117,982
1769	11,908,560	13,438,236

Years.	Imports.	Exports.
1770	12,216,937	14,266,653
1771	12,821,995	17,161,146
1772	14,508,715	18,732,379
1773	12,522,643	16,654,052
1774	14,548,902	17,607,447

The prohibition of all trade and intercourfe with the American colonies excited ferious alarms, not only on account of the lofs of a valuable branch of trade, but from the fuppofed encouragement which the acquifition of it would give to the trade of thofe powers who affifted the colonies. Thefe apprehenfions, however, in a few years appeared to be in a great meafure groundlefs, many Britifh manufactures found their way to America, though not imported directly from hence; and Mr. Chalmers obferves, that "there was an evident tendency in our traffic to rife in 1779, till the Spanifh war impofed an additional burthen. There was a fimilar tendency in 1780, till the Dutch war added, in 1781, no inconfiderable weight. And the year 1781, accordingly, marks the loweft degree of depreffion, both of our navigation and our commerce, during the war of our colonies. But with the fame vigorous fpirit, they both equally rofe, in 1782, as they had rifen in former wars, to a fuperiority over our navigation and commerce, during the year wherein hoftilities with France began."

Years.	Imports.	Exports.
1775	£ 14,816,955	£ 16,946,523
1776	12,449,189	15,685,107
1777	12,643,834	14,152,243
1778	10,975,533	12,375,712
1779	11,435,263	13,597,771
1780	11,714,967	13,689,073
1781	12,723,613	11,470,388
1782	10,341,628	13,224,637

The opportunity of renewing the commercial connections between this country and America, from the conclufion of peace, was eagerly embraced; but fubfequent experience proved, that a greater degree of caution had now become neceffary to render it a beneficial trade. The arrangements relative to the commerce of Ireland, had a very beneficial effect in that country, which had hitherto been excluded from almoft every fpecies of commerce, and reftrained from fending the produce of her own foil to foreign markets. The convention with Spain fettled more accurately the limits within which Britifh fubjects were allowed to cut logwood on the Mufquito coaft, and confequently gave greater certainty and fecurity to the trade with thofe parts. The commercial treaty with France, by difcontinuing many of the prohibitions and prohibitory duties which had exifted for almoft a century between the two nations, opened a wide field for fpeculation and adventure. The confolidation of the cuftoms by the abolition of all the confufed and complex duties which then exifted, and the fubftitution of a fingle duty on each article in their ftead, was a meafure of great convenienee to all perfons engaged in mercantile tranfactions. Under all thefe circumftances, fupported by the improvements which had taken place in feveral of the principal manufactures, the foreign trade of Great Britain increafed greatly during the peace, and in the year 1792, had attained to an unparallelled height, both in point of value, and with refpect to quantity of fhipping employed in it.

Years.	Imports.	Exports.
1783	£ 13,122,235	£ 15,450,778
1784	15,272,802	14,961,074
1785	16,279,490	16,770,239
1786	15,786,072	16,300,730
1787	17,804,024	16,870,114
1788	18,027,170	17,472,408
1789	17,821,102	19,340,548
1790	19,130,886	20,120,121
1791	19,669,782	22,731,995
1792	19,659,358	24,905,200

The total number of veffels which belonged to the feveral ports of the Britifh empire on the 30th September 1792, was 16,079; the amount of their tonnage 1,540,145 tons; and the number of men and boys ufually employed in navigating them 118,286. The number of veffels that entered inwards at the feveral ports of Great Britain (including their repeated voyages) was as follows:

	Ships.	Tons.
Britifh - - -	12,030	1,587,645
Foreign - - -	2,477	304,074
Total	14,507	1,891,719

At this period, the commerce of Great Britain was generally admitted to be in a very flourifhing ftate. The application and improvement of machinery in almoft every branch of manufacture, had reduced the charges of workmanfhip fo far, as to enable our manufacturers to fupply foreign markets on better terms than any other country could offer; while the increafe of capital, arifing from the accumulation of the profits of fuccefsful commerce during a period of peace, gave our merchants the means of allowing longer credit than could be obtained elfewhere. The high price of the public funds, led many perfons to employ their money in difcounting private fecurities, which greatly facilitated the extenfion of commercial credit, but probably tempted fome to trade much beyond the amount which their capital juftified, or to fpeculate largely without any real property of their own; fo that when the apprehenfion of war produced a greater degree of caution, and began to affect particular branches of trade, many were involved in embarraffments; and on the commencement of the war in 1793, commercial concerns, in general, experienced a ferious fhock. The affiftance afforded by government to fuch houfes as appeared to be really folvent, by lending them exchequer bills for a certain time, operated very fuccefsfully, and averted the confequences that were apprehended; credit revived, and as the war in its progrefs almoft annihilated the foreign trade of fome of the powers engaged in it, the commerce of Great Britain received a confiderable augmentation; and, protected by its naval fuperiority, continued to increafe, notwithftanding all the meafures which political animofity could devife to obftruct or deftroy it.

Years.	Imports.	Exports.
1793	£ 19,256,717	£ 20,390,180
1794	22,288,894	26,748,967
1795	22,736,889	27,312,338
1796	23,187,319	30,424,184
1797	21,013,956	28,917,010
1798	27,857,889	33,591,777
1799	26,837,432	35,991,329

1800

Years.	Imports.	Exports.
1800	30,570,605	43,152,019
1801	32,795,557	42,301,701

The increafe during the above period, though really very great, was not however equal to what it would appear from the above accounts to have been. This irregularity in the comparative view which the account of imports and exports generally furnifhes with fufficient accuracy, of the commerce of Great Britain, arifes from the article of coffee, the import of which was formerly little more than fufficient to fupply its fmall confumption in this country. But the interruption of the trade of France, the conqueft of their Weft India iflands, and the greatly increafed cultivation of coffee in Jamaica, caufed nearly the whole fupply of the continent with this commodity to depend during the war on Great Britain. In the infpector-general's book of rates, coffee is valued on importation at 7 *l*., and on exportation, at no lefs than 14 *l*. 10 *s*. per cwt.; while, during the above period, the real average value was about 5 *l*. per cwt. when imported, and 5 *l*. 10 *s*. when exported. The official account, therefore, from 1794, when coffee fuddenly became a very confiderable article of exportation, requires fome correction; and if the over-eftimated value of this article is deducted, the exports of the year 1800 will appear to have been 38,120,120 *l*., and of 1801, 37,786,856 *l*.

The fhort interval of peace in 1802, produced an immediate extenfion of foreign trade; and Mr. Addington thought himfelf juftified "in pronouncing the commerce of the country to be in a ftate of unrivalled and unexampled profperity." The value of Britifh manufactures exported, confiderably exceeded the preceding year, and the total amount of the exports, according to the official values, was 46,120,962 *l*. But in this and the fucceeding years, it will be proper to adopt the correction juft mentioned, which will give the amount of the imports and exports as follows:

Years.	Imports.	Exports.
1802	£ 31,442,318	£ 41,411,966
1803	27,992,464	31,578,495
1804	29,201,490	34,451,367
1805	30,344,628	34,954,845
1806	31,094,089	36,528,132

The account of imports for the laft year is not quite correct; the imports from the Eaft Indies for that year being incomplete.

Almoft every article being greatly under-valued in thefe accounts (except in one or two inftances) the total muft give a very inadequate idea of the real extent of the commerce of Great Britain. Some idea may be formed of the undervaluation of the imports by thofe of the Eaft India company, taking the account of their fales as the importation; the medium value of which, on an average of three years, was 6,100,000*l*.; whereas, the medium value by the accounts of the infpector-general, for the fame three years, was 4,572,000*l*. Of the actual value of Britifh produce and manufactures exported, which ufually conftitutes about two-thirds of the total export, we have more correct information. By an act paffed in 1798, and revived in 1802, called the convoy act, the exporters were required to declare the real value of Britifh manufactures exported, in order to afcertain the amount of duty chargeable thereon; and from thefe declarations, the actual value of Britifh produce and manufactures exported has been afcertained as follows:

In 1803	£ 40,100,870
1804	40,349,642
1805	41,068,942
1806	43,242,176

The extent of fhipping employed in commercial intercourfe at this period, will be feen in the following account of the number of veffels which belonged to the feveral ports of the Britifh empire, on the 30th September 1805.

	Ships.	Tons.	Men & Boys.
England	14,790	1,799,210	117,668
Jerfey & Guernfey	185	16,528	2,011
Ifle of Man	404	9,650	2,336
Scotland	2,581	210,295	15,160
Ireland	1,067	56,806	5,070
The Plantations	3,024	190,953	15,407
	22,051	2,283,442	157,712

The commerce of Great Britain with *Ireland*, has increafed with the improvement of that country, particularly fince the year 1780, when a more liberal fyftem of policy was adopted with refpect to the foreign trade of Ireland. The imports from thence confift chiefly of butter, beef, pork, bacon, lard, tallow, cattle, hides, feathers, ftarch, rape-feed, linens, linen-yarn, woollen-yarn, pearl-afhes, copper-ore, and a few other articles of lefs importance. The exports are coals, ironmongery and hardware, hoops for barrels, beer, cyder, dried cod, herrings, chiefly from Scotland, earthenware, bottles and window-glafs, refined fugar, hops, lead, tin-plates, fail-cloth, cabinet-ware, wearing apparel, apothecaries-ware, books and ftationary, painters' colours, hats, haberdafhery, woollen, cotton, and filk manufactures of all kinds; with rum, brandy, geneva, wines, groceries, drugs, dye-ftuffs, flax and hemp, raw and thrown filks, and other foreign produce.

Years.	Imports.	Exports.
1798	£ 2,735,686	£ 2,974,363
1799	2,770,731	4,086,986
1800	2,312,824	3,741,499

Confiderable endeavours have been made to improve the manufactures of Ireland, but with little fuccefs, except in the linen manufacture, which probably proceeds from the want of fufficient capital, and from the facility with which Britifh manufactures can be procured at a very fmall additional expence; the latter will, therefore, for a long time, continue to conftitute a large proportion of the imports of Ireland.

Value of Britifh manufactures exported from Great Britain to Ireland.

In 1791	£ 1,470,972	In 1796	£ 1,781,789
1792	1,511,844	1797	1,310,996
1793	1,055,276	1798	1,657,954
1794	1,281,316	1799	2,405,999
1795	1,612,270	1800	1,787,966

The trade between Great Britain and *Ruffia* has been confidered highly beneficial to both countries; to Ruffia in point of profit, and to Great Britain, as fupplying articles effential to the fupport of its navy. The capital employed muft be much greater than formerly, from the increafed value of the principal articles; and the balance of trade, which is confiderably

ably in favour of Ruſſia, is paid by means of the commercial tranſactions between Great Britain and other countries. The articles imported are iron, hemp, flax, tallow, pot-aſhes, deals, and lath-wood, coarſe linens, hog's briſtles, &c. The exports are principally broad-cloths and woollen ſtuffs, refined ſugar, cotton, lead, tin, iron and ſteel ware, earthen ware and glaſs, coals, alum, ſalt, horſes, London porter, with articles of leſs importance.

Years.	Imports.	Exports.
1800	£ 2,382,098	£ 1,025,335
1801	2,246,877	919,843
1802	2,182,430	1,376,399

The total number of veſſels that entered inwards from Ruſſia, and that cleared out for that country from Great Britain in three years, ending with 1806, was as follows:

	Inwards.		Outwards.	
Years.	Britiſh.	Foreign.	Britiſh.	Foreign.
1804	830	29	558	53
1805	961	14	927	52
1806	1106	21	677	32

The trade to *Denmark* and *Norway*, though of ancient date, is not of very great extent; the imports conſiſt chiefly of timber and corn; and the exports, of Weſt India produce and other foreign merchandize; the quantity of Britiſh manufactured goods which thoſe countries take being of ſmall amount.

Years.	Imports.	Exports.
1800	£ 241,563	£ 540,698
1801	208,794	416,475
1802	155,672	537,517

The total number of veſſels which entered inwards from Denmark and Norway, in the year 1806, was 1607, of which 529 were Britiſh ſhips: the total number which cleared outwards was 1690, of which 790 were Britiſh.

The trade with *Sweden*, which is carried on chiefly in ſhips of that country, has not varied materially in its extent during the laſt twenty years. The imports conſiſt chiefly of iron of a ſuperior quality, pitch, tar, deal boards, and ſail-cloth. The exports are principally colonial produce.

Years.	Imports.	Exports.
1800	£ 309,280	£ 78,840
1801	295,645	111,254
1802	327,350	108,296
1803	288,651	98,045

The total number of veſſels which entered inwards from Sweden, in the year 1806, was 353, of which 187 were Britiſh ſhips: the total number which cleared outwards was 362, of which 142 were Britiſh.

The imports from *Pruſſia*, conſiſt of all kinds of grain, hemp, flax, madder, lintſeed, gooſe-quills, briſtles, pearl-aſhes, mill-ſtones, and timber of various deſcriptions. The exports are chiefly alum, copperas, coals, beer, ſalt, wrought braſs and iron, lead, tin plates, earthen-ware, glaſs, woollen and cotton goods, ſome cotton yarn, India goods, raw and refined ſugar, drugs, dye-ſtuffs, pepper and other ſpices, coffee, rum, tobacco, &c.

Years.	Imports.	Exports.
1800	£ 1,340,904	£ 794,452
1801	1,387,149	660,739
1802	1,057,602	1,071,896
1803	831,225	1,916,502

The total number of veſſels which entered inwards from Pruſſia in the year 1805 was 1946, of which 837 were Britiſh ſhips: the total number which cleared outwards was 1627, of which only 482 were Britiſh. In 1806 the total numbers were much leſs, in conſequence of Pruſſia being involved in the war.

The trade with *Germany* had not experienced any conſiderable variation with reſpect to its extent, from the commencement of the laſt century, till on the extenſion of the war with France in 1794, it ſuddenly became the channel through which the principal part of the continent received the goods they had before obtained direct from Great Britain. The following account of exports to Germany ſhews the rapid increaſe of trade with that country during the war.

Years.	Britiſh Manufactures.	Foreign Merchandize.
1793	£ 718,474	£ 1,764,221
1794	1,634,530	4,308,695
1795	1,760,133	6,311,876
1796	1,591,810	6,582,179
1797	1,964,967	6,419,587
1798	2,042,774	8,646,691
1799	2,032,567	6,640,729
1800	4,364,120	8,300,470
1801	4,928,617	6,186,687

The total number of veſſels which entered inwards in the ſeveral ports of Great Britain from Germany (including Hamburgh) and which cleared outwards for that country, was as follows:

	Inwards.		Outwards.	
Years.	Britiſh.	Foreign.	Britiſh.	Foreign.
1793	217	54	292	77
1794	258	108	443	152
1795	259	222	257	406
1796	347	342	533	415
1797	237	257	314	371
1798	408	113	647	187
1799	409	126	426	181
1800	435	459	574	458

The total number of veſſels which entered inwards from Germany (including Hamburgh) in the year 1806 was 604; the total number which cleared outwards for that country 956.

The imports from *Holland* are butter and cheeſe in large quantities, geneva, juniper berries, flax, hemp, oak bark, rags, flower-roots and ſeeds, books, maps and prints. The exports are raw and refined ſugars, train oil, copperas, a few cotton goods, ſome woollen goods, coffee, rice, and foreign merchandize of various kinds: their amount, as follows:

Years.	Imports.	Exports.
1800	£ 972,600	£ 3,208,613
1801	1,025,958	3,496,744
1802	974,537	4,957,997
1803	630,403	1,565,355

The total number of veſſels which entered inwards from Holland in the year 1804 was 790, and the number which cleared outwards 521. The number which entered inwards in 1805, was 709; outwards 323; which, from the two countries being at war, were of courſe nearly all neutral veſſels.

France poſſeſſes ſuch natural advantages in the produce of its ſoil, and the convenience of its ſituation for procuring the commodities of all other countries, that while its manufactures

tures were encouraged, and it retained poffeffions in the Eaft and Weft Indies, little inducement remained for commercial intercourfe with Great Britain, and even this limited traffic was much impeded by the high duties and prohibitions which mutual jealoufy had impofed. In 1786 a more liberal fyftem was adopted by a treaty of commerce, in confequence of which the trade between the two countries increafed confiderably. In the year 1792, the exports to France amounted to 1,228,166*l.* 3*s.* 9*d.* of which 743,280*l.* 12*s.* 1*d.* was Britifh manufactures, and 484,885*l.* 11*s.* 8*d.* foreign merchandize. In the following year, the trade with France was fufpended by war, on the termination of which, in 1802, commiffioners were appointed for adjufting the conditions of a new commercial treaty, but its completion was prevented by the renewal of hoftilities.

The trade with *Portugal* was formerly a very beneficial branch of our commerce, but has declined very much. The imports confift chiefly of wine, cotton-wool, and indigo, with confiderable fums in cafh and bullion. The exports are almoft wholly Britifh produce and manufactures.

Years.	Imports.	Exports.
1798	£ 700,383	£ 750,918
1799	1,047,054	1,073,411
1800	916,848	1,011,893

The total number of veffels which entered inwards from Portugal in the year 1800 was 340, of which 270 were Britifh veffels. The number which entered inwards in the year 1806 was 468; outwards 332.

The extent of the trade with *Spain*, previous to the war in 1796, will appear from the ftatement of imports and exports.

Years.	Imports.	Exports.
1792	£ 897,840	£ 794,101
1793	485,872	476,726
1794	748,546	634,554
1795	992,853	437,830
1796	809,881	546,126

The year 1806 being a year of war, the trade with Spain was of courfe confined to neutral veffels: the number which entered inwards was 222, and the number which cleared outwards 126.

The *Mediterranean trade* was fubject to much interruption during the war which began in 1793, in confequence of which many of the goods ufually imported from Venice and Italy were brought over-land through Switzerland and Germany to Hamburgh and Tonningen to be fhipped for England. The Turkey and Levant trade was formerly one of the principal branches of Englifh commerce, but it is now of much lefs importance. The chief articles imported, are cotton-wool, mohair, goats' hair, opium, fenna, and other drugs, galls, madder, vallonea, and other dye-ftuffs, currants, figs, raifins, goat fkins, and box-wood; raw filk was formerly a principal article, but very little is now brought from Turkey, that of Italy being much fuperior. The exports confift of lead, tin-plates, wrought and caft iron, hardware, a confiderable number of watches, fome cotton goods, and a few woollen goods, India piece goods, coffee, fugar, cinnamon, cloves, pimento and other fpices. The extent of the different branches of the Mediterranean trade will appear from the following ftatements.

Gibraltar and the Streights.

Years.	Imports.	Exports.	Ships inward.	Ships outward.
1799	£ 62,992	£ 358,784	47	56
1800	35,665	294,558	20	43
1801	24,887	362,971	19	54
1802	21,792	530,537	32	48
1803	23,112	487,699	17	48
1804	33,860	560,399	27	62
1805	42,919	183,824	19	59

In the year 1806, the number of veffels which entered inwards was 24, outwards 83.

Italy.

Years.	Imports.	Exports.	Ships inward.	Ships outward.
1799	£ 224,607	£ 367,173	69	81
1800	411,765	587,530	115	113
1801	165,042	378,007	44	94
1802	804,329	2,048,784	127	248
1803	748,020	656,607	182	74
1804	268,029	359,854	76	126
1805	393,517	507,535	106	117

In the year 1806, the number of veffels which entered inwards was 90, outwards 61.

Malta.

Years.	Imports.	Exports.	Ships inward.	Ships outward.
1801	£ 11,448	£ 88,735	10	14
1802	16,698	12,023	36	4
1803	8,922	133,629	22	15
1804	32,913	114,031	20	23
1805	9,304	127,515	6	12

In the year 1806, the number of veffels which entered inwards was 26, outwards 26.

Minorca.

Years.	Imports.	Exports.	Ships inward.	Ships outward.
1800	£ 13,500	£ 12,246	19	5
1801	6,768	36,130	16	15
1802	22,106	21,478	25	5

In the year 1803, the trade with Minorca ceafed, from its having been reftored to Spain.

Turkey and Levant.

Years.	Imports.	Exports.	Ships inward.	Ships. outward.
1799	£ 33,091	£ 226,078	3	13
1800	199,773	166,804	19	6
1801	141,137	172,198	9	10
1802	182,424	180,000	20	18
1803	175,427	155,369	27	9
1804	148,277	81,625	16	1
1805	103,590	135,411	22	8

In the year 1806, the number of veffels which entered inwards was 23, outwards 3.

The articles imported from the coaft of *Africa* into Great Britain are gum arabic, gum fandarach, and fenegal, camwood, red-wood, ebony, ivory, a few oftrich feathers, and fome fkins; their amount in the year 1800 was 82,289*l.* 8*s.* 8*d.* The exports have hitherto been of far greater value,

being

being principally intended for the purchase of slaves for the West Indies. They consisted of bugles, cowries, spiritous liquors, a great number of guns and cutlasses, gunpowder, wrought brass, copper and iron, glass, earthen ware, rice, groceries, apothecaries' ware, woollen, cotton, and linen goods, and large quantities of India piece goods. The total official value in the year 1800 was 1,017,365 *l.* 11 *s.* 5 *d.* of which 521,922 *l.* 19 *s.* 11 *d.* was British merchandize. The abolition of the infamous traffick in human beings, must cause a great revolution in the trade to this part of the world, as it appeared in the year 1789 that about 38,000 of the inhabitants of Africa were annually carried away in British ships for supplying the colonies with slaves, which of course employed a considerable number of vessels. The number of ships that cleared out from Great Britain for Africa, in the year 1804, was 176.

The *East India* trade furnishes a remarkable instance of an extensive branch of commerce carried on successively in the hands of an exclusive company, while most other commercial monopolies have made very small profits, and generally soon expired. The trade to India, however, since the immense territorial acquisitions of the English in that part, can no longer be considered as a mere commercial adventure, as it is now in a great measure a business of agency, for transmitting to Europe the fortunes acquired by British individuals in the East. The quantity of merchandize brought from thence, consequently greatly exceeds the value of the exports to India. The latter consists chiefly of woollens, metals, and naval and military stores, the remaining articles being of trifling amount in comparison, and almost wholly for the use of Europeans, as the natives are peculiarly attached to the use of their own produce and manufactures. The exports to China include a considerable amount in bullion, the other articles are woollen cloths and camblets, lead, and tin; the articles exported in private trade are, skins and furs, glass of various descriptions, jewellery, toys, and watches, cuttings of cloth, a very few woollens, some cutlery and hard ware, and silver. The amount of the company's exports to India and China, will appear from the following statements.

India.

Season.	Merchandize, or Manufacture.	Metals.	Stores.
1781	£ 200,808	£ 157,614	£ 163,878
1782	123,834	183,356	133,773
1783	95,251	122,855	77,237
1784	92,205	93,806	55,256
1785	74,683	80,152	104,226
1786	122,709	97,899	85,179
1787	108,388	137,194	153,603
1788	119,449	99,028	152,587
1789	80,184	273,104	100,435
1790	75,141	191,944	120,525
1791	86,680	124,889	108,560

China.

Season.	Merchandize, or Manufacture.	Metals.	Stores.	Bullion.
1781	£ 129,179	£ 10,349	£ 2,206	£ ———
1782	94,992	9,416	1,717	———
1783	113,763	4,579	1,743	———
1784	146,741	27,835	2,904	———
1785	224,612	37,989	7,503	724,317
1786	202,023	35,535	6,972	749,833
1787	323,107	38,046	7,289	646,798
1788	335,392	59,208	6,598	489,192
1789	354,717	107,995	7,769	787,078
1790	431,385	105,707	4,081	532,705
1791	486,993	99,448	4,000	422,098

The imports from the East Indies consist of Bengal piece-goods, coast and Surat piece-goods, Bengal and China raw-silk, tea, pepper, saltpetre, nankeen cloth, china, wrought silks, a small quantity of china-ware, sugar, coffee, indigo, and various drugs. The total amount of the imports, on the company's account, and in private trade, according to the official rates of the inspector-general's office, was as follows:

Years.	Import.	Years.	Import.
1781	£ 2,526,339	1793	£ 3,499,023
1782	626,319	1794	4,458,475
1783	1,301,495	1795	5,760,810
1784	2,996,652	1796	3,372,689
1785	2,703,940	1797	3,942,384
1786	3,156,687	1798	7,626,930
1787	3,430,868	1799	4,284,805
1788	3,453,897	1800	4,942,275
1789	3,362,545	1801	5,424,441
1790	3,149,870	1802	5,794,906
1791	3,698,713	1803	6,348,887
1792	2,701,547	1804	5,214,621

But a more accurate idea of the real value of the imports from the East Indies, may be formed from the annual amount of the company's sales, which was

In 1801	£ 7,595,181	In 1803	£ 6,042,526
1802	6,626,347	1804	5,866,073

The *West India* trade is, in some respects, the most important branch of the commerce of Great Britain; as on the colonial produce which it supplies, much of the trade with different parts of Europe chiefly depends. The value of the British West India produce from the old islands, imported into Great Britain, on a medium of four years, preceding the 5th of January 1796, according to the current prices during that period, was estimated, exclusive of the duties, at about 6,800,000 *l.* per annum. This sum is not wholly a return for goods exported, a part of it must be considered as remittances of the property of persons who possess estates in the West Indies; but who are wholly or occasionally resident in England; and of persons who have lent money on mortgage or otherwise in the West Indies, and receive their interest from the sale of the produce.

Official Value of Imports from the West Indies.

Years.	British West Indies.	Conquered Islands.	Total.
1801	£ 6,759,617	£ 4,105,839	£ 10,865,456
1802	7,293,316	2,699,504	9,992,820
1803	5,786,432	362,014	6,148,436

The value of the British West India islands, in a commercial view, will be very conspicuous from the following statement of the total quantities of sugar, rum, coffee, and cotton-wool, exported from them.

Years.

Years.	Sugar. Cwt.	Rum. Galls.	Coffee. Cwt.	Cotton Wool. lbs.
1793	2,129,750	4,907,051	92,016	9 173,583
1794	2,141,921	5,597,520	141,007	8,473,175
1795	1,743,939	4,173,734	144,800	11,675,495
1796	1,816,584	5,567,754	94,086	8,854,413
1797	1,636,681	4,279,164	114,947	6,918,153
1798	2,015,602	6,224,076	165,075	7,909,832
1799	2,628,470	6,270,449	132,259	7,529,881
1800	2,413,997	6,231,225	180,374	10,611,349
1801	2,959,958	8,148,571	199,359	11,261,014
1802	3,463,366	8,676,381	230,148	8,799,891
1803	2,886,479	8,781,496	173,883	5,650,615

The total number of veſſels which entered inwards from the Weſt Indies, in the year 1804, was 721, containing 204,411 tons, and navigated by 12,119 ſeamen. The number of veſſels which cleared outwards was 790. The value of Britiſh produce and manufactures exported to the Britiſh plantations in the Weſt Indies, excluſive of the Conquered iſlands, was 3,408,232 *l.*

The trade with the United States of *America*, has rapidly advanced to very conſiderable importance; and Great Britain now ſupplies them with commodities to a far greater amount, than in the moſt favourable years previous to their independence, although the number of Britiſh ſhips employed is conſiderably leſs. In the year 1789 the number of Britiſh veſſels which entered inwards in this trade was 253, the number outwards 358; in the year 1799, the number which entered inwards was only 42, the number outwards 57.

Years.	Imports.	Exports.
1798	£ 1,782 720	£ 5,580,370
1799	1,818 941	7,056,558
1800	2,357,922	6,885,507

The total number of veſſels which entered inwards from the United States, in the year 1806, was 561, of which 53 were Britiſh; the total number which cleared outwards was 575, of which only 39 were Britiſh.

The remaining poſſeſſions of Britain in North America, being countries not very fertile or fully inhabited, the trade with them is not of very great extent. The following ſtatement of the exports to thoſe parts in the year 1800, will, however, ſhew that the trade is well worth preſerving, independent of the conſideration that it is the means of procuring articles of much importance in other branches of commerce.

To Hudſons bay	£ 38,061	0	9
Newfoundland	219,458	5	11
Canada	460,155	13	3
New Brunſwick	81,230	15	4
Nova Scotia	177,083	17	10
Total	£ 975,989	13	1

With reſpect to the general balance of trade, or the ultimate profit which Great Britain derives from its commerce with all other countries, Mr. Irving, the inſpector-general of imports and exports, to whom the public have, for many years, been indebted for the judicious arrangement and explanation of the official documents relating to foreign trade, has juſtly remarked, that there are perhaps few queſtions to which the human attention can be directed more difficult to form an opinion upon, from the variety of conſiderations, and the vaſt ſtatements with which it is connected, and alſo from the materials on which concluſions are to be formed, being in ſome inſtances defective; he has, however, ſtated it as his opinion, that the balance of trade in favour of Great Britain, according to the true value of the goods exported and imported, amounted on a medium of the four years preceding 1796, to upwards of 6,500,000 *l.* per annum, excluſive of the profits derived from the Eaſt and Weſt India trades, which he eſtimated at upwards of 400,000 *l.* per annum; and excluſive of the profits derived from the fiſheries.

An accurate view of the progreſs and extent of commerce in all the European ſtates, would furniſh much information; but with reſpect to ſeveral, no authentic particulars of this kind have been made public, and the foreign trade of others has been ſo entirely turned out of its uſual channels ſince the commencement of the war of the French revolution, that any account of its preſent ſtate would be very incomplete and unſatisfactory.

With reſpect to domeſtic commerce, we may obſerve, that the king is the arbiter of it; as it pertains to his prerogative to eſtabliſh public marts, as markets and fairs, to regulate weights and meaſures, and to give money, which is the univerſal medium of commerce, authority and currency.

A great part of the foreign commerce of England is now carried on by collective companies: ſome incorporated by the king's charters, with an excluſive privilege, as the Eaſt India company; others only private aſſociations, as the Turkey and Hamburgh companies. See Company.

Commerce, *Chambers of.* See Chamber.

Commerce, *Characters in.* See Character.

COMMERCY, in *Geography*, a handſome town of France, and chief place of a diſtrict in the department of Meuſe, on the weſtern ſhore of that river. E. long. 5° 24'. N. lat. 48° 20'. It has a ſub-prefect, and counts 3418 inhabitants. The diſtrict contains 181 communes, with a population of 73,103 individuals. There are ſeveral iron forges, paper mills, glue, violin, and linen manufactures.

COMMERSONA, in *Botany.* Sonnerat. See Barringtonia.

COMMERSONIA, (ſo named by Forſter, in memory of M. Commerſon, the celebrated French naturaliſt and traveller.) Forſt. Gen. 22. Linn. jun. Supp. 26. Schreb. 535. Willd. 596. Lam. Ill. 550. Gært. 586. Juſſ. 428. Vent. 4. 17. Claſs and order, *pentandria pentagynia.* Nat. Ord. Undetermined; Juſſ. Vent.

Gen. Ch. *Cal.* one-leafed, five-cleft, bearing the petals between the ſegments; ſegments egg-ſhaped, acute, longer and broader than the petals. *Cor.* Petals five, dilated at the baſe on each ſide, with an inflexed lobe, ſpreading. *Stam.* Filaments very ſhort, ſituated at the baſe of the petals; anthers roundiſh, didymous. *Nectary* a five-cleft ring, between the petals and the germ, with five filiform villous ſmall bodies between the diviſions; diviſions lanceolate, erect, ſhorter than the petals. *Piſt.* Germ ſuperior, globular, villous, with five projections; ſtyles five, filiform, approximating, ſhort. *Per.* Capſule roundiſh, hard, echinate with long ſoft briſtle-ſhaped hairs, five-celled; two ſeeds in each cell. *Seeds* egg-ſhaped.

Eſſ. Ch. Calyx one-leafed, bearing the corolla. Petals five. Nectary five-cleft. Capſule five celled, echinate.

Sp. C. *echinata.* Linn. jun. Supp. 26. Mart. Lam. Willd. Gært. tab. 94. Lam. Ill. tab. 218. (Reſtiaria; Rumph. Amb. 3. 187. tab. 119.) A middle-ſized tree. *Trunk* rarely the bulk of a man, with a diffuſe head and ſmooth bark, eaſily ſeparable from the wood; young branches woolly. *Leaves* alternate, petioled, obliquely egg-ſhaped, acuminate, ſerrated, a little wrinkled, ſhining, dark green

above

above, hoary underneath. *Flowers* very fmall, white, in axillary panicles. *Capfule* fomewhat globular, with a coriaceous echinate rind, five-coccous, five-valved; cocci inverfely egg-fhaped, narrowing downwards, femibilocular from the back, two-valved; valves of the contiguous cocci united and forming the proper partitions of the capfule. *Seeds* two in each cell, attached to the central angle of the cells, ovate-oblong, a little thicker upwards, flightly compreffed, of a red-ferruginous colour, blackifh at the top, incompleatly arilled; aril membranous, very thin, whitifh, lacerated, fixed to the umbilicus of the feed, covering its whole ventral, but not its dorfal part. Gært. A native of Otaheite, the Friendly Ifles, and the Moluccas.

COMMIA, Bofc. Nouv. Dict. Clafs and order, *diœcia monandria*.

Gen. Ch. *Male catkins*. *Scales* obtufe, each concealing a fingle ftamen. *Female catkins*. *Calyx proper* three-leaved; leaves acute, permanent. *Cor.* none. *Pift.* Germ fuperior; ftyles three, fhort; ftigma thick. *Peric.* Capfule three-lobed, three-celled. *Seeds* one in each cell.

A tree. *Leaves* alternate, lanceolate, quite entire, fmooth, recurved. *Flowers* in axillary and terminal catkins. A native of Cochin-china. A white gum exudes abundantly from its bark, which is fometimes ufed as a medicine in dropfies and obftructions, but is too violent in its effects to be taken without great caution.

COMMINATORY, a claufe inferted in a law, edict, patent, &c. importing a punifhment wherewith delinquents are menaced; which, however, is not to be executed in its rigour.

Thus, in France, when an exile is enjoined not to return on pain of death, it is deemed a *comminatory* penalty; fince, if he do return, it is not ftrictly executed; but a fecond injunction is then laid on him, which is more than comminatory, and from the day of the date thereof, imports death without remedy.

COMMINES, PHILIP DE, in *Biography*, a celebrated hiftorian, was born of a noble family in Flanders in 1445. He fpent the early part of his life in the court of Charles the Bold, duke of Burgundy; but in 1472 he went over to the fervice of Louis XI. king of France, who adopted him as a favourite, and employed him in various important negociations. He married an heirefs of the houfe of Anjou, by whom he acquired confiderable landed property. He accompanied his fovereign in many of his journies and in fome expeditions of a more ferious nature; and he attended upon his fucceffor Charles VIII. to the conqueft of Naples. Under this prince he was accufed of having efpoufed the caufe of the duke of Orleans, for which he was arrefted, and imprifoned in an iron cage for eight months. He was afterwards transferred to a prifon at Paris, where he was eighteen months without being able to obtain a trial. Commines was at length honourably acquitted, but it does not appear that, either in the remainder of this reign, or in that of the duke of Orleans who fucceeded, and for whom he had fuffered, he was afterwards publicly employed. He died, at his feat of Argenton, in Poitou, of which he had been denominated the lord. Commines poffeffed various qualities well adapted to render him eminent as a ftatefman. He had a fine perfon, and an excellent underftanding: he was a complete mafter of many modern languages, and had fo great a command of his own powers that he could dictate to four fecretaries at once. As a literary character he is chiefly known for his "Memoirs," which contain an account of the principal events of the reigns of Louis XI. and Charles VIII. during a period of thirty-four years. This work is highly efteemed on account of the perfonal knowledge and obfervation of the author, who united a fincere and candid difpofition, with a fimple and unaffected ftyle. By the learned Lipfius, Commines is regarded as equal to the hiftorians of antiquity; his "Memoirs" he recommends as the vade mecum of princes. They have gone through many editions, which have been illuftrated with notes by different learned men; but the moft efteemed impreffion is that of the abbé Lenglet du Frefnoy, 1747, in 4 vols. 4to. printed at Paris, with London in the title page. Nouv. Dict. Hift. Du Frefnoi.

COMMINGES, in *Geography*, (in Latin *Convenæ*,) was before the French revolution of 1789, a county in the province of Gafcony, and forms now part of the department of Haute-Garonne in France.

COMMINUTION, the act of grinding, or breaking any matter into fmaller particles.—The effect of chewing, or mafticating our food, is the *comminution* thereof.

COMMIRE, JOHN, in *Biography*, a Jefuit, was born in 1625 at Amboife, where his father kept a tennis-court. He received a good education, and applied himfelf chiefly to claffical literature. He acquired great reputation as a p et, by a collection of pieces in Latin which appeared in 1678, but he was, at the fame time, diligent in his profeffion, as a teacher and director in theology. His poems confift of paraphrafes on various parts of the fcriptures, odes, fables, epigrams, &c. of which the general character is facility, copioufnefs, and amenity. He is thought to have fucceeded beft in his odes, but his fables are in high repute. He died at Paris in 1702, leaving behind him the character of an open and upright difpofition. An edition of his poems was publifhed in 2 vols. 12mo. in the year 1754. Nouv. Dict. Hift.

COMMIS, Fr. A clerk, deputy, or fubordinate perfon, who is employed in any of the war-departments of the French.

COMMIS *general du parc des vivres*; commis-general of the provifion-park. This officer exercifes his functions under the orders of the director-general of provifions. His employment requires a good deal of capacity and zeal, as well as of probity. His duties and relations are multifarious and extenfive. He fhould always encamp in the centre of the baggage, to be able to have an eye to the whole, and to be lefs interrupted.

COMMIS *General des travaux du parc des vivres*, commis-general of labour and work in the provifion-park. The duties of this employment are troublefome, and require much attention. It fhould never be beftowed on a man that does not poffefs experience, prudence, and firmnefs, without being too rigorous or fevere, as he has authority over every thing connected with the different kinds of work in the park.

COMMIS *des entrepreneurs pour la fourniture des lits*; clerks of undertakers for the furnifhing of beds. They have a right to vifit and examine the beds and every thing connected with them, and to refufe or reject whatever is infufficient or defective.

COMMIS *du treforier de l'extraordinaire des guerres*, clerks of the treafurer of the wars, or of the paymafter-general of the army. They deliver the certificates to the troops who leave lodgings or quarters. They were under the jurifdiction of the high conftable.

COMMISERATION, in *Pathology* and *Ethics*, is frequently ufed as fynonymous with *compaffion*, which fee; but, in its general ufe, it is fomewhat different. It is always preferred, when we wifh to exprefs our fympathy for misfortunes, which it is not in our power to remove, or for which there is no apparent remedy. Commiferation, ruminating upon the ftate and fuffering of others, induces a permanent concern. In fuch cafes it may be faid, that we commiferate the

the unfortunate fufferer, rather than that we have compaffion upon him. But although this is a more helplefs, it is not an ufelefs affection. It fooths the mind of the afflicted, and greatly alleviates their forrows, when every other confolation fails. *Condolence* is the expreffion of our commiferation. Cogan on the Paffions, p. 134.

COMMISSAIRE, Fr. *Commiffary*. This word or term was ufed in the old French fervice, to exprefs a variety of occupations, and was annexed to a good many different appellations, of which the following are the principal.

COMMISSAIRE *General des Guerres ou commiffaire General des Armées*, commiffary general of the wars. This charge, office, or appointment, was created for *Befançon*, in 1637, and did not long exift, being fuppreffed in his perfon, becaufe it gave too much authority, and too many privileges, to the perfon invefted with it.

COMMISSAIRE *Général de la Cavalerie légére*, Fr. He was the third general officer of all the regiments of cavalry, and he had a regiment of his own under the name of the regiment of the *commiffaire général*, or commiffary general.

COMMISSAIRE *Ordonnateur des Guerres*. This appointment was fuperior to that of an ordinary or provincial commiffary of war. It was commonly a fort of recompence and advancement granted in confideration of fervices rendered by the one or the other commiffaries of war, whether of the armies or in the interior of the ftate. The *commiffaire ordonnateur* is charged with objects of the firft importance, and with a greater variety of them than the other commiffaries are.

COMMISSAIRES *des Guerres*, commiffaries of the wars, or mufter-mafters general. They enjoyed peculiar privileges, but were fubordinate to the governors and commandants of towns and garrifons, without whofe permiffion they could not mufter any regiment.

COMMISSAIRES *Ordinaires des Guerres*, ordinary commiffaries of the wars, or deputy-mufter mafters. Officers fubordinate to the immediately preceding, who ought to affift at reviews, who are charged with the conduct, police, and difcipline of troops, and with making the men obferve the military decrees. With the army, they have the detail of the hofpitals, bread, victuals, &c. &c. They make inventories of provifions, and are charged with the management of convoys. Their creation is very ancient: for there is mention made of them under the reign of king Jean I. in 1355. They were called at firft *conducteurs des gens de guerre*, (conductors of the people of war, or of military people) a title or appellation which they enjoyed for a long time under Louis XIII., and they are ftill called fo in their commiffions. Thofe who were not gentlemen, had the right of taking the rank of fquire, or efquire; of enjoying all the privileges of the nobleffe, and of acquiring noble fiefs.

COMMISSAIRE *Provincial des Guerres*, provincial commiffary of the wars. There were no *commiffaires provinciaux des guerres* before the year 1635. They were afterwards fuppreffed, and were re-eftablifhed in 1704, under Louis XIV., with the fame privileges, rights, attributions, and authorities for the fervice of cities of war, that the ordinary commiffaries of the wars enjoyed for the fervice of marches, and of the armies.

COMMISSAIRE *General des Vivres*, commiffary general of provifions. This officer has under him feveral other commiffaries, who ought to know the number of men, which each of them will have to fubfift, in order to make choice of a proper place for caufing the provifions to be brought to, as alfo to form magazines for the duration of the campaign, and of courfe to procure a fufficient number of bakers and workmen.

COMMISSAIRE *d'Artillerie*, commiffary of artillery. There is one fuch officer in each department of the ordnance, who keeps one of the three keys that belong to the artillery-magazine. It is at his requifition that the governor or commandant of a place fends foldiers to remove, when neceffary, the pieces of artillery and ftores of war. He has the fuperintendance and direction of every thing connected with the cleanlinefs and general management of the magazines.

COMMISSAIRES *provinciaux d'Artillerie*, provincial commiffaries of artillery. Thefe were of two forts or defcriptions. The one had the names or titles of the provinces; the other had merely the title of provincial. But on fervice, they both received the fame pay.

COMMISSAIRES *ordinaires d'Artillerie*, ordinary commiffaries of artillery. Thefe were fubordinate to the provincial commiffaries, and were diftributed among the forts, garrifoned towns, navy, and dockyards.

COMMISSAIRES *extraordinaires d'Artillerie*, extraordinary commiffaries of artillery. Under the monarchy of France, thefe formed the third of ordnance commiffaries, and they were in like manner diftributed on duty in garrifoned places, and on board fhips of war.

COMMISSAIRE *provincial en l'Arfenal de Paris, au department de l'Ifle de France*, provincial commiffary in the arfenal of Paris, in the department of the ifle of France. This officer received his commiffion from the grand mafter, in whofe gift it was, and poffeffed the exclufive privilege of being made privy to every alteration or movement that took place in the arfenal.

COMMISSAIRE *General des Poudres et Saltpetres*, commiffary general of gun-powder and faltpetre. This appointment was created in 1634, with that of fuperintendant general of gun-powder and faltpetre. It was at laft fuppreffed, and the grand mafter of the ordnance appointed a perfon to exercife its functions.

COMMISSAIRE *General des Fontes*, commiffary general of the founderies. This appointment was the gift of the mafter of the ordnance, and was invariably beftowed on thofe who had given convincing proofs of their abilities and fkill in the cafting of cannon, &c.

COMMISSAIRES *des Guerres entretenus dans l'Hotel des Invalides*, commiffaries of war kept in the *hotel des invalides*. It was a principal part of their duty to keep a regular roll or lift of all the names of the different officers, non-commiffioned officers, and foldiers, that might be detached on garrifon duty, &c. from which they made a monthly return to the fecretary at war. Each commiffary, at every review or infpection of the corps of invalids, had particular directions to mark and point out thofe men who appeared to be capable of ferving, of whom a regular return was made to the fecretary at war.

COMMISSAIRE *General des Fortifications*, commiffary general of fortifications. This was an office of great importance, as it was his duty to give the plans for places and new works; to approve or condemn thofe that had been ordered by others; to vifit the fortified places of the kingdom; to order the reparation of works that had been damaged; to regulate the conduct of the engineers, and to give them orders for the good of the fervice.

At a fiege, he directed the tracing out of the lines of circumvallation and countervallation, and the fecuring of the pofts; he decided on attacks which were made according to his plan; he directed the making of lodgments, faps, mines, the traverfe of the ditch, the attack of the breach, and

and after the place was taken, caused it to be repaired. In defending a place, he had the same or equal power. His appointments amounted to about 30,000 livres per annum.

COMMISSARY, in *Military Language* of Britain, has various denominations, though he is generally a civil officer appointed to inspect the musters, stores, and provisions for the army. The number of such officers is not limited in time of war.

Commissaries *general*, and commissaries *of accounts*, in our service, are appointed by warrant under the king's sign manual, directing them to obey all instructions given to them for the execution of their duty by the lords commissioners of the treasury. These instructions are generally prepared by the comptrollers of the army-accounts, under the orders of the treasury, and subject to its subsequent inspection.

COMMISSARY *General of the Musters*, or *Muster-master general*. This officer takes an account of the strength of every regiment as often as he pleases; reviews them; sees that the horse are well mounted, and that all the men are well armed and clothed. He receives and inspects the muster-rolls, and thereby knows exactly the strength of the army. A new officer has been appointed under the appellation of *Inspector-general of Cavalry*, who performs the duties in that respect, which used to be performed by the muster-master general.

COMMISSARY *General of Stores*. A civil officer who has charge of ordnance stores, for which he is accountable to the office of ordnance. He has other commissaries under him, as well as clerks and conductors, particularly in time of war.

COMMISSARY *of the Train-horses*. A civil officer of the ordnance, who has the inspection of all horses belonging to the train of artillery, the hospital, and the bakery. He has a number of conductors, drivers, &c. under him.

COMMISSARY *of Accounts*. A person of responsibility, who, with a proper establishment, attends each army, sufficiently large and numerous to render it necessary for the purpose of taking, examining, and controlling accounts on the spot. All such commissaries make returns of their examinations, on which, as documents, the comptrollers of the army-accounts ground their inquiries into that branch of the public expenditure.

COMMISSARY *General of Provisions*. An officer who is charged with furnishing the army in the field and on service, with all sorts of provisions; forage, &c. generally by contract, and sometimes otherwise. He has a variety of commissaries, store-keepers, clerks, &c. under him.

COMMISSARY, in the *Ecclesiastical Law*, an officer of the bishop, who exercises ecclesiastical jurisdiction in those parts of the diocese, which are so remote from the see, that the chancellor cannot call the subjects thereof to the bishop's principal consistory, without their too great molestation.

This officer, called by the canonists *commissarius*, or *officialis foraneus*, is appointed to supply the bishop's office in the out-parts of the diocese, and in such parts as are peculiar to the bishop, and exempted from the jurisdiction of the archdeacon: for where the archdeacons have jurisdiction, as in most places they have, either by prescription or composition, the commissary is superfluous, and frequently vexatious, and ought not to be: yet in such cases, a commissary is sometimes appointed by the bishop, and takes prestation-money of the archdeacon yearly *pro exteriori jurisdictione*, as it is ordinarily called. But this is held to be a wrong to archdeacons and the poorer sort of people. Cowel's Interp. 4 Inst. 338.

COMMISSARY *Court*, in *Scots Jurisprudence*. At the reformation, all episcopal jurisdiction exercised under the authority of the bishop of Rome was abolished; and the course of justice in consistorial causes was thus stopped. Hence queen Mary, besides naming a commissary for every diocese, did, by a special grant, establish a new *commissary-court* at Edinburgh, consisting of four judges or commissaries. This court is vested with a double jurisdiction; one diocesan, which is exercised in the special territory contained in the grant, *viz.* the counties of Edinburgh, Haddington, Linlithgow, Peebles, and a great part of Stirlingshire; and another universal, by which the judges confirm the testaments of all who die in foreign parts, and may reduce the decrees of all inferior commissaries, provided the reduction be pursued within a year after the decree. Bishops, upon their re-establishment in the reign of James VI., were restored to the right of naming their several commissaries. The commissaries retain to this day an exclusive power of judging in declarations of marriage, and of the nullity of marriage; in actions of divorce and of non-adherence, of adultery, bastardy, and confirmation of testaments; because all these matters are still considered to be properly consistorial. Inferior commissaries are not competent to questions of divorce, under which are comprehended questions of bastardy and adherence, when they have a connection with the lawfulness of marriage, or with adultery. Commissaries have now no power to pronounce decrees in absence for any sum above 40*l.* Scots, except in causes purely consistorial; but they may authenticate tutorial and curatorial inventories: and all bonds, contracts, &c. which contain a clause for registration in the books of any judge competent; and protests on bills, may be registered in their books.

COMMISSION, in *Common Law*, is the same with *delegatio* among the civilians; and is taken for the warrant, or letters-patent, which all persons exercising jurisdiction, either ordinary or extraordinary, have to authorise them to hear or determine any cause or action: such as the commission of judges, &c.

The term, however, is sometimes extended farther than to matters of judgment; as in the commission of purveyors, which seems to be null by the statute for taking away purveyance, 12 Car. II. and the high commission-court, which was founded on the statute 1 Eliz. and is also abolished by act of parliament 16 Car. I. The persons charged with a commission are hence called *commissioners*; sometimes *committees*.

Commissions of inquiry shall be made to the justices of one bench or the other, &c., and to do lawful things are grantable in many cases. Most of the great officers, judicial and ministerial, of the realm, are made by commission. And by such commissions, treasons, felonies, and other offences, may be heard and determined; by this method, likewise, oaths, cognizances of fines, and answers, are taken, witnesses examined, offices found, &c. Bro Ab. 12. Rep. 39. See stat. 42 E. III. c. 4. Most of these commissions are appointed by the king under the great seal of England; but a commission under the grand seal may be determined by a privy seal; and by granting another new commission to do the same thing, the former commission determines; and on the death or demise of the king, the commissions of judges and officers generally cease. Bro. Commis. 2 Dyer 289.

COMMISSION *of Anticipation*, was anciently a commission given under the great-seal, to collect a tax or subsidy before the day. 15 Hen. VIII.

COMMISSION *of Array*. See MILITIA.

COMMISSION *of Association*, is a commission under the great seal to associate two, or more learned persons, with the several justices, in the several circuits and counties in Wales.

COMMISSION *of Bankruptcy*, a commission under the great seal,

feal, directed to five or more commiffioners, to enquire into the particulars of a man's circumftances, who hath failed, or broke; and to act according to certain ftatutes made in that behalf. See Bankrupt, and Petition *of Bankruptcy*.

Commissions *of Charitable Ufes* go out of the chancery to the bifhop and others, where any lands given to charitable ufes are mifemployed, or there are any fraud or difputes concerning them, to enquire of and redrefs the abufe, &c. 43 Eliz. cap. 4.

Commission *of Delegates*, a commiffion under the great feal to certain perfons, ufually two or three temporal lords, as many bifhops, and two judges of the law, to fit upon an appeal to the king in the court of chancery, where any fentence is given in any ecclefiaftical caufe by the archbifhop. Stat. 25 Hen. VIII. c. 19. Now generally three of the common law judges and two civilians fit as judges. See Court and Delegates.

Commission *to enquire of faults againft the law*, an ancient commiffion fet forth on extraordinary occafions and corruptions.

Commission *of Lunacy*, a commiffion out of chancery to enquire whether a perfon reprefented to be lunatic, be fo or not; that, if lunatic, the king may have the care of his eftate, &c. 17 Edw. II. c. 10.

Commission *of Peace* See Justice *of Peace*.

Commission *of Rebellion*, or *Writ of Rebellion*, is iffued out when a man, after proclamation made by the fheriff upon a procefs out of the chancery, to prefent himfelf, under pain of his allegiance, to the court by a certain day, does not appear. See Rebellion.

This commiffion is directed by way of command to certain perfons; three, two, or one of them; to apprehend, or caufe to be apprehended, the party as a rebel; and to bring him to the court on a day affigned.

This writ or commiffion goes forth after an attachment returned, *non eft inventus*, &c.

Commission *of Sewers*, is directed to certain perfons to fee drains and ditches well kept, and maintained, in the marfhy and fenny parts of England, for the better conveyance of water into the fea, and preferving the grafs upon the land. Stat. 23 Hen. VIII. c. 5. 13 Eliz. c. 9. The ftat. 3 Jac. I. c. 14. ordains, that all ditches, water-courfes, &c. within two miles of London, falling into the Thames, fhall be fubject to the commiffion of fewers; and the lord-mayor, &c. is to appoint perfons who have this power. 7 Ann. c. 10.

Commission *to examine witneffes*, is fometimes appointed by the court of equity in cafes that require it, as when the caufe arifes in a foreign country, and the witneffes are at home, or when the witneffes are abroad, or foon to leave the kingdom; or again, when they are aged and infirm. This commiffion is empowered to exercife the fame jurifdiction as would have been exercifed if the witneffes had attended. See Suit.

Commission *of Treaty with Foreign Princes*, is where leagues and treaties are made and tranfacted, between ftates and kingdoms, by their ambaffadors and minifters, for the mutual advantage of the kingdoms in alliance.

Commission *to take up Men for War*, was a commiffion to prefs or force men into the king's fervice. This power of impreffing has been heretofore doubted; but the legality of it is now fully eftablifhed. Foft. Rep. 154. Blackft. Com. v. 419. Cowp. 517. See Impressing.

Commission, *Militaire*. A brevet, or power, granted in writing by the minifter of war in the name of the fovereign, and fealed with the great feal, by which he, to whom it is given, exercifes the military charge entrufted to him, and takes his rank from the day of the date thereof. Commiffion in a military fenfe, in our fervice, denotes any fituation or place, which an individual may hold in the regular army, militia, or volunteers. All commiffions in the line, guards, or volunteer-corps, muft have the royal fign manual. Commiffions however in the militia do not bear the royal fign manual, except that of the adjutant, who is commonly called a king's officer. The lieutenants or deputy-lieutenants of counties affix their feals and fignatures to militia-commiffions after they have been laid before the king for his approbation. Fourteen days conftitute the time allotted for the royal approbation or difapprobation. And if his majefty does not within that time *difapprove* of the perfon fo recommended, a notification of his pleafure and acquiefcence is fent by one of the principal fecretaries of ftate, to the lord lieutenant or to thofe acting by commiffion in his abfence.

Commission *Militaire* is alfo a momentary or temporary tribunal appointed or ordered to fit for the trial of military crimes and offences. When judgment is pronounced and the duty is performed, for which it was appointed, its authority, as well as its exiftence, ceafes.

Commissions *of Array*. Commiffions iffued to experienced officers to draw out and array the fitteft men in each county for fervice, and to march them to the fea coafts, or to fuch other parts of the county as were thought to be moft in danger. There were hundreds of fuch commiffions between the 36th of Henry III., and the reign of Edward IV. The form of one is to be feen in "Rufhworth's Hiftorical Collection," publifhed in 1640. Such commiffions were attempted to be revived by Charles I.; but they were voted illegal and unconftitutional by the parliament.

Non commiffioned is a term commonly employed to denote a clafs of men, who ftand between the rank and file of a battalion, and the commiffioned and warrant officers, as ferjeants-major, ferjeants for inftance.

Commission *Officers*. See Officer.

Commissions, *Book of*. See Book.

Commission, in *Commerce*. See Factorage.

COMMISSIONER, he who has a *commiffion*, *e. gr.* a patent, or other legal warrant, to execute any public office. See Warrant, &c.

Such are, *commiffioners* of hawkers and pedlars, *commiffioners* of alienation, *commiffioners* of the ftamps, &c.

Commissioners *of Public Accounts*. See Accounts.

Commissioners *of the Cuftoms*. See Custom *houfe*.

Commissioners *of the Dock-yards*. See Dock-*yards*.

Commissioners *of Excife*. See Excise.

Commissioners *of the Navy*. See Navy.

Commissioners, *Lords, of the Treafury*. See Treasury, and Exchequer.

Commissioners *of Trade*, &c. See Board.

COMMISSUM *Fidei*. See Fidei.

COMMISSURE, Commissura, a term ufed by fome authors for the junctures, or for the fmall interftices of bodies; or the little clefts between the particles; efpecially when thofe particles are broadifh or flat, and lie contiguous to one another, like thin plates, or *lamellæ*.

The word literally fignifies *a joining*, or connecting of one thing to another.

Commissure, in *Architecture*, &c. denotes the joint of two ftones; or the application of the furface of the one to that of the other.

COMMISSURÆ *Cerebri*, in *Anatomy*, are parts of the brain, which join together the right and left fides of this vifcus.

There are three of thefe commiffures: an anterior one which is directly under the anterior crura of the fornix; a pofterior, which is behind the optic thalami, and in front of the tubercula quadrigemina; and a middle one, which joins together the oppofed convexities of the thalami nervorum opticorum. For a further defcription of thefe parts, fee BRAIN.

COMMITMENT, in *Law*, the fending of a perfon to prifon by warrant or order, who hath been guilty of any offence not bailable, or for which bail is refufed. It may be by the king and privy council, or fecretary of ftate, by the judges of the law, juftices of peace, and other magiftrates, who have authority by the laws and ftatutes of the realm to do it, which muft be exactly purfued.

As to the manner of commitment, it is enacted by 2 & 3 P. & M. c. 10., that juftices of peace fhall examine perfons brought before them for felony, &c. or fufpicion thereof, before they commit them to prifon, and fhall bind their accufers to give evidence againft them. A juftice of the peace may detain a prifoner for examination, and it is faid that three days are a reafonable time for this purpofe. 2 Hawk. P. C. c. 16. § 11, 12. Dalt. c. 125. 2 Inft. 52, 591.

Every commitment muft be in writing, under the hand and feal, and fhew the authority, of him that made it, and the time and place, and muft be directed to the keeper of the prifon. It may be either in the king's name, and only tefted by the juftice, or in the name of the juftice. It may command the gaoler to keep the party in fafe and clofe cuftody, which he is bound by law to do. 2 Hawk. P. C. c. 16. § 13, 14, 15. It ought to fet forth the crime with convenient certainty, whether the commitment be by the privy council, or by any other authority; otherwife the officer is not punifhable by reafon of fuch mittimus, for fuffering the party to efcape; and the court before which he is removed by Habeas-corpus, ought to difcharge or bail him; and this holds not only where no caufe at all is expreffed in the commitment, but alfo where it is fo loofely fet forth, that the court cannot judge whether it were a reafonable ground for commitment or not. 2 Hawk. P. C. c. 16. § 17. See ARREST and BAIL. A commitment for high treafon or felony in general, without expreffing the particular fpecies, has been held good. (2 Hawk. P. C. c. 16. § 16.) But now, fince the Habeas-corpus act, it feems that fuch general commitment is not good. Moreover, it is fafe to fet forth that the party is charged upon oath; but this is not neceffary, for it hath been refolved, that a commitment for treafon, or for fufpicion of it, without fetting forth any particular accufation or ground of the fufpicion, is good. 2 Hawk. P. C. c. 16. § 17. Every fuch mittimus ought to have a lawful conclufion, *viz.* that the party be kept till he be delivered by law, or by order of law, or by due courfe of law; or that he be kept till further order (which fhall be intended of the order of law) or to the like effect; and if the party be committed only for want of bail, it feems to be a good conclufion of the commitment, that he be kept till he can find bail; but a commitment till the perfon who makes it fhall take further order, feems not to be good: and it feems that the party committed by fuch or any other irregular mittimus, may be bailed. 2 Hawk. P. C. c. 16. § 18.

A commitment grounded on an act of parliament ought to be conformable to the method prefcribed by fuch ftatute. Where a man is committed as a criminal, the conclufion muft be, "until he be delivered by due courfe of law;" if he be committed for contumacy, it fhould be "until he comply."

All commitments muft be to fome prifon within the realm of England; for by the Habeas-corpus act (ftat. 31 Car. II. cap. 2.) it is enacted "that no fubject of this realm, being an inhabitant or refiant of this kingdom of England, dominion of Wales, or town of Berwick-upon-Tweed, fhall or may be fent prifoner into Scotland, Ireland, Jerfey, Guernfey, Tangier, or into any ports, garrifons, iflands or places, beyond the feas, which then were, or at any time after fhould be, within or without the dominions of his majefty." By ftat. 14 Ed. III. c. 10, fheriffs fhall have the cuftody of the gaol as before that time they were wont to have, and they fhall put in fuch under keepers for whom they will anfwer. This is confirmed by ftat. 19 Hen. VII. c. 10. It hath alfo been held, that regularly no one can juftify the delivering of a prifoner in cuftody out of the common gaol, unlefs there be fome particular reafon for fo doing, as ficknefs endangering life, or evident danger of a refcous from rebels, &c.: neverthelefs conftant practice feems to authorize a commitment to a meffenger; and it is faid, that it fhall be intended to have been made in order for the carrying of the party to gaol. 2 Hawk. P. C. c. 16. § 8, 9. And it is faid, that if a conftable bring a felon to gaol, and the gaoler refufe to receive him, the town where he is conftable ought to keep him till the next gaol delivery. H. P. C. 114. 2 Hawk. P. C. c. 16, § 9. A prifoner in the cuftody of the king's meffenger, on a warrant from the fecretary of ftate, who is brought into K. B. by Habeas-corpus to be bailed, but has not his bail ready, cannot be committed to the fame cuftody, under which he came; but muft be committed to the cuftody of the marfhal, which will prevent the neceffity of fuing out a new Habeas-corpus; as he may be brought up from the prifon of the court, by a rule of court, whenever he fhall be prepared to give bail. 1 Burr. 460. If a perfon arrefted in one county for a crime done in it, fly into another county, and be retaken there, he may be committed by a juftice of the firft county to the gaol of fuch county. (H. P. C. 93.) But by the better opinion, if he had, before any arreft, fled into fuch county, he muft be committed to the gaol thereof by a juftice of fuch county. 2 Hawk. P. C. c. 16. § 8. Dalt. c. 118. It feems alfo to be laid down as a rule by fome books, that any offender may be committed to the gaol next to the place where he was taken, whether it be in the fame county or not. 2 Hawk. P. C. c. 16, § 8. By ftat. 6 Geo. I. c. 19. vagrants and other criminals, and perfons charged with fmall offences, may, for fuch offences, or for want of fureties, be committed either to the common gaol or houfe of correction, as the juftices fhall think proper. By ftat. 24 Geo. II. c. 55. if a perfon is apprehended, upon a warrant indorfed, in another county, for an offence not bailable, or if he fhall not there find bail, he fhall be carried back into the firft county, and be committed, or if bailable, bailed by the juftices in fuch firft county.

With refpect to the charges of commitment, it is enacted by ftat. 3 Jac. I. c. 10, that offenders committed are to bear their own charges, and the charges of thofe who are appointed to guard them; and if they refufe to pay, the charges may be levied by fale of their goods. And by ftat. 27 Geo. II. c. 3. if they have no goods, &c. within the county where they are apprehended, the juftices are to grant a warrant on the treafurer of the county for payment of their charges. But in Middlefex

dlefex the fame fhall be paid by the overfeers of the poor of the parifh where the perfon was apprehended. By ftat. 3 Hen. VII. c. 3. the fheriff fhall certify the names of all prifoners in his cuftody to the juftices of gaol delivery.

Prifoners, committed at firft to the proper prifon, ought not to be removed thence, except in fome fpecial cafes; and in peculiar circumftances, fpecified by 31 Car. II. c. 2. A perfon, legally committed for a crime, which certainly appears to have been done by fome one or other, cannot be lawfully difcharged by any other but the king, till he be acquitted on his trial, or have an *ignoramus* found by the grand jury, or none to profecute him on a proclamation for that purpofe, by the juftices of gaol-delivery. But if a perfon be committed on a bare fufpicion, without any appeal or indictment, for a fuppofed crime, when afterwards it appears there was none; as for the murder of a perfon thought to be dead, but afterwards found to be alive, it hath been held that he may be fafely difmiffed without any farther proceeding. 2 Hawk. P. C. c. 16. § 22. But the fafeft way for the gaoler is to have the authority of fome court, or magiftrate, for difcharging the prifoner. If the words of a ftatute are not purfued in a commitment, the party fhall be difcharged by Habeas-corpus. Jacob's Law Dict. by Tomlins. See ARREST, BAIL, IMPRISONMENT, MITTIMUS, &c.

COMMITTEE, in *Law*, one or more perfons, to whom the confideration of any matter is referred, either by a court, or by confent of the parties concerned.

COMMITTEE *of Parliament*, is a board confifting of a certain number of members, appointed by the whole houfe for the examining of a bill, or making report of an inquiry, or procefs of the houfe, &c.

Sometimes the whole houfe is refolved into a *committee*; on which occafion each perfon has a right to fpeak, and reply as much, and as often as he pleafes; an expedient they ufually have recourfe to in extraordinary cafes, and where any thing is to be thoroughly canvaffed. When the houfe is not in a *committee*, each gives his opinion regularly, and is only allowed to fpeak once, unlefs to explain himfelf.

The ftanding *committees*, appointed by every new parliament, are thofe of *privileges* and *elections*, of *religion*, of *grievances*; of *courts of juftice*, and of *trade*, though only the former act. See PARLIAMENT.

COMMITTEE *of the king*, is ufed for a widow of one of the king's tenants; thus called, as being by the ancient law of the realm *committed* to the king's care and protection. See WIDOW.

COMMMITTEE of a *Lunatic*, *Ideot*, &c. denotes the perfon to whom the care and cuftody of fuch lunatic, &c. is committed by the court of chancery. See LUNATIC.

COMMITTEES of *Corporations*, &c. are felect members who perform the general routine of bufinefs. See CORPORATIONS.

COMMODATE, COMMODATUM, in the *Civil Jurifprudence*, the loan or free conceffion of any thing moveable or immoveable, for a certain time on condition of reftoring again the fame individual after a certain term.

The commodate is a kind of loan; there is this difference, however, between a loan and a commodate, that the latter is gratis, and does not transfer the property: the thing muft be returned in effence, and without impairment: fo that things which confume by ufe, or time, cannot be objects of a commodate, but of a loan; in regard they may be returned in kind, though not in identity.

COMMODAVIENSIS, an appellation given by fome authors to a fpecies of *lapis calaminaris* found in Bohemia. But as it yields no zinc, Mr. Marggraff denies it to be true calamine.

COMMODITIES, *Staple*. See STAPLE.

COMMODORE, in the *Britifh Marine*, a general officer invefted with the command of a detachment of fhips of war deftined on any particular enterprize; during which time he bears the rank of a brigadier-general in the army, and his fhip is diftinguifhed by a broad red pendant tapering towards the outer end, and fometimes forked.

COMMODORE is alfo a name given to a felect fhip in a fleet of merchantmen, which leads the van in time of war, bearing a light in her top to conduct the reft.

COMMODUS, LUCIUS AURELIUS ANTONINUS, in *Biography*, was the only fon of the emperor Marcus Antoninus and Fauftina, and born A. D. 161. He was educated with the utmoft attention, and he enjoyed very fuperior advantages from the precepts and inftructions of tutors appointed to prefide over his infantile ftudies and purfuits; but from the firft openings of his mind, he difplayed an untoward difpofition, and a ftrong propenfity for low and unworthy gratifications. He difcovered an averfion from whatever was rational and liberal, and a fond attachment to the fports of the circus and the amphitheatre, the combats of gladiators, and the hunting and deftroying of wild beafts. To wean him from thefe purfuits, and with a view of engaging his mind in ufeful and manly occupations, his father made him a partaker of the fovereign power in his fifteenth year. This inftance of parental affection did not produce the defired effect; it only furnifhed him with better opportunities of indulging every fenfual gratification. Upon the death of Marcus, in the year 180; he fucceeded to the quiet and undifputed poffeffion of the throne; he faw about him neither competitor to remove nor enemies to punifh, and during the firft three years of his reign, the influence of his father's virtuous counfellors reftrained him from any acts of tyranny towards his fubjects. During this period, however, he indulged in every fpecies of licentioufnefs, and revelled in all the licence of fovereign and unreftrained power, but his hands were unftained with blood, and occafionally he difplayed a generofity of fentiment worthy of a great mind; he had in one inftance refufed to fee the proofs of a confpiracy formed againft him, and it was hoped he might have followed the track of his illuftrious father. A fatal incident decided his fluctuating character. An affaffin was employed to deftroy him; in making the attempt he exclaimed "the fenate fends you this." The deed was prevented, and Commodus from that hour encouraged a deep-rooted hatred for the whole body of fenators. Spies and informers increafed his fufpicions and excited his jealoufy of power in any other hands than his own. Accufation was regarded as proof, and the mockery of a pretended trial led only to certain condemnation. The execution of any confiderable fenator was ever attended with the death of all thofe who fhould attempt to revenge, or publicly dare to lament his fate, and when Commodus had tafted of human blood, he became incapable of pity or remorfe. His minifters were one after another the victims of his fears or of his cruelty. Perennis was condemned to die for a charge of afpiring to the empire, and after his death the conduct of Commodus affumed the appearance of virtue. He repealed the moft odious of his minifter's acts, loaded his memory with public execrations, and afcribed to his pernicious counfels, all the errors of inexperienced youth. But his feeming repentance lafted only a fhort month, and then every fentiment of humanity appeared to be obliterated from his breaft. He abandoned the reins of government to the moft unworthy, and he valued nothing in fovereign power, except

except the unbounded licence of indulging his fenfual appetites. His hours were fpent in a feraglio of beautiful women and boys, felected from all ranks of the people, and from every province of the empire. The intervals of luft were filled up with the bafeft amufements. The fervile crowd, whofe fortune depended on their monarch's vices, applauded thefe vile purfuits. Having by long practice attained great fkill in the ufe of the bow, he exhibited his talents before the people, and animals of the rareft fpecies were collected from the remoteft part of his dominions in order to ferve as marks for the fceptered archer. The perfidious voice of flattery reminded him that by exploits of the fame nature, the Grecian Hercules had acquired a place among the gods, and an immortal memory among men. He accordingly affumed the title and infignia of Hercules; in this character he affembled all the helplefs and diftreffed of the city, and caufing them to be wrapped up in fantaftical habits, like dragons and monfters, and armed with fponges inftead of ftones, he rufhed upon them with his club and laid them all dead at his feet. He exhibited himfelf more than 700 times in the character of a gladiator, and in all his combats he was victorious, but his amufements in this way were frequently fatal to his antagonifts. It would take more of our work than can be allotted to this article to defcribe all the cruelties and acts of favage barbarity which difgraced the reign of Commodus. At length his deteftable career came to its merited end. Oppofition to his bloody defigns was given by fome of his bofom counfellors, among whom was Marcia, his favourite concubine. He refolved to put them to death, and entered their names in a long lift deftined to the fame fate. Marcia difcovered his intentions, and apprized her friends of their common danger. They refolved to anticipate the blow, and Marcia mixing fome poifon in wine, prefented it to him as he came from the bath. He foon fell afleep, but the dofe not being fufficiently ftrong, he awoke; while, however, he was labouring under the effects of the poifon, a robuft youth, by profeffion a wreftler, entered his chamber, and ftrangled him without refiftance. The body was fecretly conveyed out of the palace, before a fufpicion was entertained either in the city or the court of the emperor's death. Such was the fate of Commodus, and "fo eafy," fays the hiftorian, "was it to deftroy a tyrant, who, by the artificial powers of government, had oppreffed, during thirteen years, fo many millions of fubjects, each of whom was equal to their mafter in perfonal ftrength and perfonal abilities." Gibbon.

COMMOIGNE, in *Law*, a word fignifying a fellow-monk, that lives in the fame convent. 3 Inft. 15.

COMMON, in *Agriculture*, an open piece of ground, made ufe of equally by different perfons who occupy lands in the parifh to which it belongs or in which it lies.

It is remarked by Mr. Marfhall in his "Treatife on Landed Property," in regard to the origin of commonable lands, "that, a very few centuries ago, nearly the whole of the lands of England lay in an open, and more or lefs, in a commonable ftate. Each parifh, or townfhip, (at leaft in the more central and northern diftricts) comprifed different defcriptions of lands; having been fubjected, during fucceffive ages, to fpecified modes of occupancy, under ancient and ftrict regulations, which time has converted into law. Thefe parochial arrangements, however, varied fomewhat in different diftricts; but, in the more central and greater part of the kingdom, not widely. Under this ingenious mode of organization, each *parifh* or *townfhip* was, he fays, confidered as *one common farm*, though the tenantry were numerous. Round the village in which the tenants refided lay a few fmall inclofures or *grafs yards* for rearing calves, and as baiting and nurfery grounds for other farm-ftock. This was the common farmftead or *homeftall*, which was generally placed as near the centre of the more culturable lands of the parifh or townfhip as water and fhelter would permit." And that "round the homeftall lay a fuit of *arable fields*, including the deepeft and foundeft of the lower grounds, fituated out of waters' way, for raifing corn and pulfe: as well as to produce fodder and litter for cattle and horfes in the winter feafon." While in the loweft fituation, as in the water-formed bafe of a rivered valley, or in fwampy dips, fhooting up among the arable lands, lay an extent of *meadow grounds* or *ings*, to afford a fupply of hay for cows and working ftock, in the winter and fpring months.

That on the out-fkirts of the arable lands, where the foil is adapted to the pafturage of cattle, or on the fpringy flope of hills, lefs adapted to cultivation, or in the fenny leafes of vallies, which were tunnel or gravelly water-formed lands, which were too dry to produce an annual fupply of hay with fufficient certainty, one or more *ftinted paftures*, or hams, were laid out, for milking cows, working cattle, or other ftock which requires fuperior pafturage, in fummer.

While the bleakeft, worft-foiled, and moft diftant lands of the townfhip were left in their native wild ftate, for *timber* and *fuel*, and for a *common pafture*, or fuit of paftures, for the more ordinary ftock of the townfhip, whether horfes, rearing cattle, fheep or fwine, without any other ftint, or reftriction, than what the arable and meadow lands indirectly gave; every joint tenant, or occupier of the townfhip, having the nominal privilege of keeping as much live ftock on thefe commons, in fummer, as the appropriated lands he occupied would maintain, in winter.

Further, that the appropriated lands of each townfhip were laid out with equal good fenfe and propriety. That each occupier might have his proportionate fhare of lands of different qualities, and lying in different fituations, the arable lands more particularly were divided into numerous parcels, of fizes, doubtlefs, according to the fize of the given townfhip, and the number and rank of the occupiers.

And that the whole might be fubjected to the fame plan of management, and be conducted as one common farm, the arable lands were moreover divided into compartments, or "fields," of nearly equal fize, and generally three in number, to receive, in conftant rotation, the triennial fucceffion of fallow, wheat (or rye), and fpring crops, (as barley, oats, beans, and peas), thus adopting and promoting a fyftem of hufbandry, which, howfoever improper it is become in thefe more enlightened days, was well adapted to the ftate of ignorance and vaffalage of feudal times, when each parifh or townfhip had its fole proprietor; the occupiers being at once his tenants and his foldiers, or meaner vaffals. The lands were in courfe liable to be more or lefs deferted by their occupiers, and left to the feeblenefs of the young, the aged, and the weaker fex. But the whole townfhip being, in this manner, thrown into one fyftem, the care and management of the live ftock at leaft would be eafier and better than they would have been under any other arrangement. And at all times, the manager of the eftate was better enabled to detect bad hufbandry, and enforce that which was profitable to the tenants and the eftate, by having the whole fpread under the eye at once, than he would have been had the lands been diftributed in detached inclofed farmlets, befides avoiding the expence of inclofure. And another advantage, he thinks, arofe from this more focial arrangement: in barbarous times the tenants, by being concentrated in villages, were not only beft fituated to defend each other from predatory attacks,

tasks, but were called out by their lord with greater readiness in cases of emergency.

But it is remarked, that beside the organized townships which were inhabited and cultivated in the manner described, there were, and are to the present day, in different parts of England, extensive tracts of lands, some of them of a valuable quality, which lie nearly in a state of wild nature!—These uninhabited tracts are styled *forests*, and heretofore many or most of them have been attached to the crown; and some of them are still under royal patronage. Whether they were originally set out for amusement merely, or whether the timber which stood on them was of peculiar value, or whether, at the time of laying out townships, those tracts were impenetrable woods, inhabited by wild beasts, and when these were destroyed, or sufficiently overcome to render them objects of diversion, were taken under the protection of the crown, is not perhaps well ascertained. But let the original intention have been either of these, it no longer exists. The timber in most cases has fallen a sacrifice to age and neglect, and the *game* is no longer an object of regal pastime. But whether or not the forests (now so called) originated in wild woodlands, occupied by ferocious animals at the time of laying out townships, there were doubtless tracks of that description in different parts of the kingdom, and which now bear no marks of the common field system; but which appear evidently to have been inclosed from a state of woodland or common pasture; though it is possible they may have been nominally attached to neighbouring parishes. Of this description principally are the wealds of Kent and Sussex, and many other old inclosed lands in different parts of the kingdom, whose fields or inclosures are of irregular shapes, and their fences crooked. And it is observable, that these woodland districts, as the forest lands, are divided into manors, which have not an intimate connection, or correspondence with parishes or townships; a further evidence that they were in a wild state, when the feudal organization took place.

It is stated by the author of "Modern Agriculture," that "on all the open field parishes, where the same arrangement continues as was at first established, there is a considerable extent of common field allotted for the pasturage of the live stock belonging to the inhabitants. These generally consist of such lands as are less fit for the plough, or more distant from the town or village. The parish commons are for the most part divided into three fields; one for the pasturage of the horses, another for the neat cattle, and the third for the sheep. These horses are generally tended by one of the farmer's servants. The whole of the sheep belonging to the parish are put under the charge of a common shepherd, who is hired at the general expence; and the cows and young cattle are taken care of nearly in a similar manner. Where the inhabitants of several adjoining parishes possess rights of common pasturage on an extensive common, as is frequently the case, particularly in the counties of Middlesex, Surry, Northampton, and other districts in the middle and southern parts of the kingdom, all the horses, cattle, sheep, hogs, &c. which are sent to the commons, are committed to the care of one or more persons appointed for the purpose. In some cases the right is limited; or, as it is called, *stinted*. When that is the case, such a number of cattle only, as the straw and hay growing on the farms will maintain in winter, is permitted to pasture these commons in summer. And therefore each farmer is, by particular laws, prevented from sending above a certain number, which is regulated, partly by the extent of his farm, and in some cases by the title on which he claims a right of commonage in the particular instance.

But where the common is unstinted; or in other words, where the farmers possess right of pasturing any number and species of live stock which they choose to send, and without restraint of any kind, the value of such right is considered by many farmers so inconsiderable as not to be worthy of their attention. Such farmers as possess improved breeds of horses, cattle, and sheep, seldom, indeed, if ever, send any of them to be pastured on the commons, whether stinted or unstinted. They generally dispose of their right, for a trifle, to some neighbouring farmers or dealers, who have no objection, in the view of profit, of running the risk of their cattle meeting with accidents, or being infected with disease, as must naturally be expected to happen on these extensive commons, where so many cattle are promiscuously collected together.

It has been remarked by a late able writer, that "the commons in Middlesex, as in most other places, are three fourths of them covered with heath and furze, from which a little of the worst sort of firing is obtained by the poor. The trifling quantity of food which cattle consume from these shrubs, does not, and indeed cannot, improve them, as it is barely sufficient to keep them from starving. Much of the remainder is occupied by roads, gravel pits, and ponds, yielding nothing. After the most mature consideration, he is inclined to think, that about 5,500 acres of the commons in the above county are employed in the production of grass for the feeding of cattle, affording indeed but a miserable pasture, as the greater part is under water during winter; and, from being poached and trodden down by cattle while wet, is rendered hard, lumpy, full of holes, and partakes of the sterility of mortar during summer. The grasses are mostly of the dwarf kind, and of scanty produce, with a large proportion of the carnation and other grasses which are known to be rather more dangerous than nourishing; so much so, as to induce some of the most observing farmers in various parts of the kingdom, possessing extensive common rights, after a fair trial to refrain altogether from turning their cattle on such commons.

On such authority it may well, he says, be questioned, whether commons are of any more use to the community than they would be were they consigned to the bottom of the deep. But without attempting the solution of such a question at present, he may be allowed to observe, that the value of commons, considered solely as to their power of increasing animal food, and as totally unconnected with the adjoining inclosures, is extremely small indeed. But when considered as affording an opportunity to the neighbouring farmer to turn his stock out, at certain seasons of the year, they become an object of some importance. For in the spring quarter of the year, by receiving the stock during these months, the growth of hay is encouraged, they answer the purpose of pasture, and the farmer is thereby enabled to mow all his grass land: which must sensibly increase the quantity of hay to be sent to market; as at Finchley and Harrowweald in this county; or being applied during the winter months to the support of a greater quantity of live-stock in places more distant from a good hay-market; and in others, for the purpose of folding on the arable land."

It is further stated, that "on estimating the value of the commons in the same county, including every advantage that can be derived from them in pasturage, locality of situation, and the barbarous custom of turbary, it appears, he says, that they do not produce to the community, in their present state, more than four shillings per acre! On the other hand, they are, in many instances, of real injury to the public, by holding out a lure to the poor man for procuring the means of materials

wherewith to build his cottage, and ground to erect it upon; together with firing, and the run of his poultry and pigs for nothing. This is of courfe temptation fufficient to induce a great number of poor perfons to fettle upon the borders of fuch commons, But the mifchief does not, he fays, end here: for having gained thefe trifling advantages, through the neglect or connivance of the lord of the manor, it unfortunately gives their minds an improper bias, and inculcates a defire to live from that time forward without labour, or at leaft with as little as poffible. The animals kept by this defcription of perfons, it is foon difcovored by their owners, are not likely to afford them much revenue, without better feed than the fcanty herbage of a common. Hence they are tempted to pilfer corn, &c. towards their fupport: and, as they are ftill dependent on fuch a deceptious fupply, to anfwer the demands of their confumption, they are in fome meafure conftrained to refort to various difhoneft means, fo as to make up the deficiency.

And there is another very ferious evil which the public fuffers from thefe commons, the fame writer obferves, which is, "that they are the conftant rendezvous of gipfies, ftrollers, and other loofe perfons, living under tents, which they carry with them from place to place according to their conveniency. Moft of thefe perfons have affes, many of them horfes, nay, fome of them have even covered carts, which anfwer the double purpofe of a caravan for concealing and carrying off the property they have ftolen, and alfo of a houfe for fleeping in at night. They ufually ftay a week or two at a place; and the cattle which they keep ferve to tranfport their few articles of furniture from one common to another. Thefe, during the ftay of their owners, are turned adrift to procure what food they can find in the neighbourhood of their tents, and the deficiency is made up from the adjacent hay ftacks, barns, and granaries. They are known, he fays, never to buy any hay or corn, and yet their cattle are fupplied with thefe articles of good quality. The women and children beg and pilfer, and the men commit greater acts of difhonefty. In fhort, fays he, the commons of this county are well known to be the conftant refort of footpads and highwaymen, and are literally and proverbially a public nuifance. And that they are fo in the more diftant counties is evident, from the Gloucefter and Hereford reports of the ftate of agriculture. There are alfo many additional injuries which commons render to fociety, of other kinds to thofe which have been noticed above. But that the commons of Middlefex, fays he, are capable of being improved, fo as to produce large crops of all the vegetables ufually cultivated, and to rear and fupport a very highly improved breed of cattle, there can be no fort of doubt. Indeed it is truly lamentable to fee, in every part of thefe kingdoms, fuch extenfive tracts of land lying wafte or uncultivated; producing no revenue to the owners of fuch property, and extremely doubtful if of any, the fmalleft benefit to the community. But it is particularly difgraceful to this, the firft and principal county, which, fo far from raifing a fufficient fupply of bread for its inhabitants, is under the neceffity of importing corn from every quarter of the world (Europe, Afia, Africa, and America,) while, at the fame time, it has fo many acres of good land lying wafte, and locked up from the operation of the plough. By the fingle means of inclofure an abundant quantity of corn might be produced, and 150,000 *l.* a year added to the wealth of the county, which is now abfolutely loft to fociety, with as carelefs an indifference as if the proprietors of the foil were afraid of becoming too rich; or, as if like the dog in the manger they would not permit the community to fhare in a bleffing of which they themfelves are not inclined to partake.

The benefits and advantages that would be derived from a general inclofure of commons, are, he thinks, fo numerous, as far to exceed his powers of defcription or computation. The opportunity it would afford of feparating dry ground from wet, of well draining the latter, and liming the rotten parts, is of infinite confequence: as fuch an arrangement would, with the aid of intelligent breeders, be the means of raifing a breed of fheep and neat cattle far fuperior to the prefent race of wretched half-ftarved animals now feen in fuch fituations. It would have the effect of fupporting a more numerous ftock upon the fame quantity of food by reftraining the cattle and fheep within due bounds. Their reftlefs and rambling difpofition not only treads the grafs off the ground, but alfo takes the flefh off their bones. This renders the attendance of a fhepherd neceffary, and requires likewife that they may be driven to and from the fold. Further, the live-ftock would by this means be rendered many hundreds per cent. more valuable to individuals and the community than it has hitherto been, or can poffibly be, without inclofure; and, what is of the laft, the greateft importance, it would tend to preferve fuch improved breeds from that deftructive malady, (the rot) which makes fuch terrible havoc among our flocks. Add to this, that the markets would be more plentifully fupplied with beef and mutton, and the price of thefe articles confiderably reduced.

It does not, he fays, appear neceffary to ftate with precifion (nor indeed is it capable of being fo ftated) what would be the encreafe or value of the commons of this country on their being inclofed and well and properly cultivated. It may, however, with fafety be ftated at upwards of 15 times their prefent value to the proprietors, and 40 times their prefent value to the public. But increafing the rental of fuch land to 15, or perhaps 20 times, its prefent amount, is by no means the greateft advantage that may be expected to refult from an inclofure of commons. The general falubrity and healthinefs of the country would neceffarily be improved, while induftry would be largely encreafed among the moft ufeful claffes of fociety, beggary and robbery much leffened, and the general ftock of corn and cattle almoft inconceivably augmented. And wherever inclofures are made with due attention to the intereft of the poor (as they ought always to be), they will be found to ameliorate their condition, as much as they increafe the property and the comforts of the rich."

It is further obferved, that "the commons of this kingdom being, with very few exceptions, without ridges, furrows, or drains, have not the means of difcharging that fuperfluous water from the furface of them, which is well known to be of great detriment to vegetation in general.

Many commons in low fituations, and where the foil happens to be of a retentive quality, hold water like a fponge, which being always ftagnant, as well as exceffive in quality, renders the foil of fuch commons much too wet for the pafturage of fheep, and is, no doubt, the caufe of many of the diforders which that animal is fubject to, particularly that fatal malady, the rot. From the fame caufes, alfo, the neighbourhood of moft commons muft be particularly unfriendly to the health and longevity of man. Only let us, fays he, reverfe the fcene, and for a moment fuppofe thefe commons to be inclofed, the neceffary ditches and drains funk, and the land brought into tillage, and we fhall fee all the fuperabundant moifture got rid of; and the water, being kept in conftant motion, by trickling down the fides of the ridges into the furrows, and from thence into the ditches and rivulets, will be found to fertilize the very foil which in its prefent ftagnant ftate it ferves to injure;

injure; while, by leaving the land dry, it will be rendered more healthy both for men and cattle. The effects of fuch a meafure would foon fhew themfelves in many diftricts of this ifland, which, at prefent, are very unpropitious to the health of man, in the much greater longevity of the inhabitants. It may alfo be further noticed, he fays, that commons are entirely defective in the great article of labour; but no fooner does an inclofure take place, than the fcene is agreeably changed from a dreary wafte, to the more pleafing one of the fame fpot, appearing all animation, activity, and buftle. Every man, capable of performing fuch operations, is furnifhed with plenty of employment, in finking ditches and drains, in making banks and hedges, and in planting quicks and trees. Nor are the wheelwright, carpenter, fmith, and other rural artificers, under the neceffity of being idle fpectators of the fcene, fince abundance of work will be found for them, in the creation of farm houfes, and the neceffary appendages thereto; and in the forming and making of roads, bridges, gates, ftiles, implements of hufbandry, &c. Even after a few years, when this kind of temporary exertion is over, by the whole being brought into a regular fyftem of hufbandry, it will ftill continue to provide both food and employment for a very increafed population.

"It is highly probable, he thinks, that if the legiflature fhould pafs an act for the general inclofure of wafte land, it would increafe the quantity of rural labour fo much as to advance its price confiderably, and thereby have the good effect of drawing a vaft number of hands out of the unwholefome confinement of manufactories; where, in addition to the life-fhortening effects of fuch confinement, the morals of the people are expofed to certain contamination."

With refpect to the effect produced by inclofures on the population of the country, it may be obferved, that the inclofing of 1000 acres in any one parifh would probably require 100 different labourers, many of whom would undoubtedly be drawn from fuch of the adjoining parifhes as had lefs work than workmen. Thus it muft follow, that the neighbouring towns and villages would diminifh, juft as much as the parifh in which the inclofure is going forward, would increafe its numbers; yet the amount of the community will evidently be the fame. But although the inclofing of wafte land certainly does not immediately either increafe or leffen population, as fome writers feem to have fuppofed, yet, that inclofures ultimately affect population, (and that as to its increafe,) infomuch as the diftrict is thereby made more conducive to health, is, he fays, fufficiently evident. Every thing that has a tendency to make a nation more healthy and productive, muft, of neceffity, operate as a ftimulus to population. The certainty of a man's being able, with eafe and comfort, to provide for himfelf and family, by the increafe of rural labour, is at once an inducement to marriage, and a confequent increafe of population.

The inhabitants wholly fupported by agriculture in England and Wales, appear, the fame writer fays, to be nearly, or perhaps quite, fix millions, (while it fupplies provifions for near two millions more,) or one to every fix acres and a half of cultivated foil. The eftimation is made in this manner.

Estimate.

Cultivators of farms, fix perfons to every 100 acres, is - - - - - -	2,340,000
Ditto of gardens, hop-grounds, nurferies, &c.	300,000
	Brought over 2,640,000
Smiths, wheel-wrights, bricklayers, mafons, carpenters, painters, plumbers, glaziers, various manufacturers of furniture, woollen cloth, and making it up, linen, and making it up, leather, and making it into fhoes, boots, &c. horfe, harnefs, and faddlery; as many of each of this defcription of perfons, as are wholly employed by the cultivators of the foil; men, women, and children, about feven perfons to each farm, of 100 acres, is - - - - - - -	2,800,000
The like of millers, bakers, malfters, brewers, diftillers, ftarch-makers, dealers in corn, and perfons employed in the commerce of corn -	500,000
The landlords of farms - - - -	40,000
Perfons fupported by taxes on the produce of land - - - - - - - -	120,000
	6,100 000

Not but that the extremes vary much, as there are fome few grazing farms, with only one foul to fifty, and arable farms that are peopled in the proportion of one perfon to three acres of land. In point of produce, the commons, in their prefent ftate, apparently, though, he thinks, not really afford entire fupport to human beings, in the proportion of one to an hundred acres. But by being inclofed, and brought into the prefent ordinary cultivation of the country, every fix acres and a half might do the fame.

Should agriculture experience a rapid advance towards perfection, as there is reafon to imagine it will, both from the exertions of the board, and of intelligent individuals, every three or four acres, would, in a few years, be capable of fupporting its inhabitant; and, as from its nature, it might certainly be carried on from one degree of perfection to another; it may even arrive at fuch a pitch of excellence, as that every acre of land fhall fupport its man."

It has long fince been well obferved by Dr. Anderfon, that while land is in the condition of common, man is debarred from ever being able to ameliorate the foil, and thus to augment its product to the ftate; but that he is not prevented fo effectually from deteriorating it. While, in the ftate of a common, the furface of the ground may be broken by him in fuch a way, as not to recover for ages a fward equal to that which was originally upon it. It may be caft up and funk into pits; it may be converted into wet and rotten marfhes, by cafual obftructions being thrown in the way of the water, which no one finds it his intereft to remove; it may, in fhort, while a common, be abufed in a thoufand ways, by reafon of the obftinacy, indolence, or caprice of individuals, but it never can be benefited by the induftry of man; and not only may this be done, but thefe things actually are done, in innumerable inftances; fo that to a perfon who contemplates the lofs that the nation muft fuftain by thefe deplorable abufes, nothing can afford a more melancholy train of reflections, than that which the frequent recurrence of thofe difgufting commons fuggefts to his mind, as he travels over the otherwife delightful country of England. When he ftops to inquire more minutely into the effects of this kind of property upon the morals and domeftic economy of the individuals who claim a right to thefe commons, he only finds additional caufes, he fays, of regret. He frequently difcovers that the quiet and induftrious cultivator, having a right upon a common, is obliged to aban-

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don that right, becaufe of the harraffments to which he is fubjected from turbulent and affuming neighbours, who have obtained a fmall footing there, with a predetermined refolution, perhaps, to encroach much farther than their rights would authorife; becaufe they know that towards the reftraining of thefe exceffes, no obvious and eafy means occur. Thus does the peaceable man often find it better to relinquifh his right almoft entirely, than be fubjected to the perpetual contention that would occur in defending it. Such an inquirer frequently finds, that in confequence of this, the fmall flocks of the poor cottager, who cannot afford to look after them continually himfelf, are fo tormented by being chafed from place to place by thefe marauders, that inftead of a relief to the poor cottager, thefe flocks prove only a torment to him; his family becomes, in confequence of this, a burthen on the parifh, which is obliged to fupport them; he finds, that among thofe who are bred up in thefe fituations, there are many young men who delight more in active plunder, than in fober induftry; and who, tempted by the high prices that luxurious inhabitants of towns offer for game, become poachers, and from fuch powerful confederations of determined profligates for their mutual protection, that no one, lefs determined than themfelves, will dare to interfere with them; which enables them to carry on their depredations with impunity. He further obferves, that the money thefe young men thus acquire, is ufually fquandered in drinking and riotous exceffes; the young women are contaminated by their converfation, corrupted by their exceffes, and debauched; the laft evil attending which courfes, is a great number of illegitimate children, and an extravagant poor rate. But who, fays he, can eftimate the detriment that a nation fuftains, when the morals of the country inhabitants of it become corrupted? It is like, fays he, tainting the fprings of water with poifon, which, inftead of promoting health and vigour, as they naturally ought to have done, produce one univerfal mafs of infectious difeafe. It is common, he adds, to read in the Hiftory of Britain, that the rôt became at times fo prevalent in England, as to carry off many millions of fheep at once; and thefe difeafes were regarded, like the peftilence among the human fpecies, as a terrible vifitation of heaven for the fins of a guilty land. There is great reafon to believe that thefe frequent mortalities among the flocks were entirely occafioned by the numerous commons, which were in thofe times much more extenfive than at prefent; for it is ftill known, that in neglected fpots, where water is allowed to ftagnate and generate marfhes, as is often the cafe with commons when the feafon proves wet, the fheep paftured upon them are, to this day, fo much fubjected to the rot, as to induce many perfons, as has been obferved, rather to give up their right, than to allow their flocks to enter upon thefe unhealthy paftures. Confidered under every poffible point of view, then, fays he, it appears to be undeniable, that the prevalence of commons is a great national grievance, which ought, if poffible, to be removed; and that the Board of Agriculture cannot be more beneficially employed, than by granting all the aid that their wifdom can devife, for removing thefe bars that at prefent tend to prevent the equitable divifion of this kind of property.

It is evident from every one of the agricultural furveys which have been yet made, he fays, that in every county in England and Wales, there are extenfive tracts of land of this defcription (for commons and waftes may be confidered as nearly fynonymous terms, although it be a truth that many of thefe commons confift of land naturally as good as any in the kingdom). Of the extent of thefe lands, were it neceffary, a tolerably accurate knowledge, he thinks, might be obtained; but as to the amount of improvement, it is impoffible for any perfon to form at prefent an idea of it, fhould the profperity of this country be permitted to go forward for a confiderable length of time in that accelerating ratio into which it would naturally fall, if the general tranquillity of the nation were preferved, and the obftructions which have hitherto repreffed exertions in agriculture removed. It is enough here to fay, he thinks, that it would be an object of immenfe magnitude. He has had occafion to obferve, that in fome favourable fituations, it is well known that land, in the courfe of a very few years, has been made a thoufand times at leaft more productive than in its original ftate. Many commons are at prefent lying wafte in fituations equally favourable as thefe; and many other fituations may become equally favourable by an extenfion of thofe modes of facilitating intercourfe, which are now in contemplation, and are only prevented from being carried into effect by barriers that judicious laws may eafily remove. See WASTE LAND.

In regard to the appropriation of commonable lands, it has been obferved by Mr. Marfhall, that the fpecies of unappropriated lands in this country are, at prefent,

1ft. "Foreft lands, and other extenfive waftes, on which feveral manors, or adjacent townfhips, have a right of common pafturage.

2d. "Commonable lands of diftinct townfhips, or manors, whofe appropriated lands are wholly inclofed, and in a ftate of mixed cultivation.

3d. "Commonable lands of townfhips, whofe arable fields, &c. are partially inclofed;" and

4th. "Commonable lands of townfhips, whofe arable fields remain wholly open."

And in refpect to the principles on which the appropriation of fuch lands requires to be conducted, it may be obferved, that as, by an eftablifhed principle of the general law or conftitution of the country, immemorial cuftom eftablifhes right, neither the original rights and regulations, refpecting fuch lands, nor the changes which may have taken place during a fucceffion of centuries, from the origin of forefts and townfhips, to the lateft periods of time, are objects of inveftigation or inquiry; but many acquired rights which exift in any certain cafe at the time of appropriation, and which would continue to exift were it not to take place. "The poffeffor of a cottage," fays the fame writer, "which has enjoyed, time immemorial and without interruption, the liberty of pafturage, though fuch cottage were originally an encroachment of a *freebooter* or an *outlaw*, has indifputably as legal a claim to a proportionate fhare of the commonable lands, as the poffeffor of the demefne lands of the manor has (merely as fuch), although they may have defcended from father to fon from the time of their feverality. For it is evidently on the eftimated values of the refpective *rights which exift*, and which can be rightfully exercifed in *time to come*, and on thefe alone, that a juft and equitable diftribution can be effected."

It is, however, ftated, that before the diftribution of commonable lands among the owners of common pafturage can take place, the more *abftract rights* which belong to commons require to be eftimated, and the juft claims of their poffeffors to be fatisfied. Thefe are, he fays, principally manorial rights, and the rights of tithes.

The manorial claims are to be regulated by the particular advantages which the lord of a given manor enjoys, and which he will continue to enjoy, while the commons remain open and unappropriated; whether they arife from mines, quarries, water, timber, alien tenants, fuel, eftover, pannage, or game? And that "his claim, as guardian of the foil, as productive

productive of *pasturage only*, is in most cases only honorary; he cannot as such (unless through ancient custom) profit by the *herbage* or the *browse* that the soil produces." But that "the claim of the lord of the manor, in right of the soil on which *thriving timber* is standing, is substantial. For out of this, he has, in effect, a real yearly income, equal to the annually increasing value of the timber: a species of advantage which, if the commons remain open and unappropriated, he will in course continue to enjoy, so long as the timber continues to increase in its value. His claim, therefore, in this respect, depends on the quantity of timber, and its state of growth taken jointly. Young thriving timber not only affords an annual increase of value at present, but will continue its benefits for many years to come, if it be suffered to remain undisturbed on the soil which supports it, during the estimated period of its future increase; whereas, dotards, and stinted trees which afford no increase of value, do not entitle their owner to any share of the soil they stand upon. The trees themselves, or their intrinsic value, are all the lord of the manor can have a right to claim."

And further, in like manner, the claims of the crown, or of hereditary rangers (if any), on the forest lands, ought, he conceives, to be satisfied.

But the claims of *tithe owners*, aggregately considered, are more complex and obscure. In a case where the great and small tithes are united, where the tithe of wool and lamb, and that of grain, roots, and herbage, belong to the same owner, and where no modus exists, it may seem to be reasonable that he should have the option of receiving land of equal value to the existing value of the whole of the tithes, or of taking the chance of their value, in the state of cultivation. But seeing the evil tendency of corn tithes, and the impropriety of laying on so harmful a burthen, as they are now become, upon lands that have never borne it, there can be little risk in saying that it would be at least politic in parliament to prevent it. Beside, it stands part of the statute law, he believes, that the lands which have never been under tillage, shall not pay tithes during the first seven years of their cultivation; during which time, the incumbent's income might, by leaving the tithe to take its course, be materially abridged, and his circumstances thereby be rendered distressing.

It is therefore concluded, that, on the whole, it appears to be proper in this case, that the law should instruct commissioners to set out lands equal to the existing value of the tithes at the time of appropriation; and, where much corn land (land fit for corn) shall be appropriated, to set out a farther quantity, equal to the reversion of the extra value of the tithes to arise from such corn lands, seven years after the appropriation shall have taken place, above the value of the tithes that exist, provided any such extra value shall appear by the estimates.

And further "in cases in which the tithe of lamb and wool, and the tithe of corn, &c. belong to separate owners, the line of rectitude and strict justice to all parties, appears, he says, to be still more difficult to draw. The former is clearly entitled to land, or a money payment equal to his loss of tithe; but the right of the other is less obvious. To cut him off entirely from any share of the lands, and likewise from any share of tithes to arise from them after they shall be appropriated, may seem unjust; he may be a lay rector, and may have lately purchased the tithes, or a clerical rector who has recently bought the advowson under the expectation of an *inclosure*. On the other hand, it appears to be hard that the proprietors of the parish should first give up land for the tithe of wool and lamb which will no longer exist, and then be liable to a corn tithe on the same lands, after they shall have bestowed on them great expence in clearing and cultivation. Indeed the injustice of such a measure is evident. A middle way, therefore, he thinks, requires to be sought; and it will be difficult, perhaps, to find one which has more justice in it than that which is proposed for the first case."

It may, however, says he, be urged that, admitting the foregoing regulation to be the true ground on which a remuneration in lieu of tithes of commonable lands ought to be estimated, the difficulties of cultivation would in some cases be great, and might be the cause of dispute and delay in the general work of appropriation; and a more practical method, though less reconcileable to theory, presents itself. Thus, let a certain proportion in value, of the lands to be appropriated as one, be assigned in lieu of the whole of the tithes of the township or manor, supposing the whole be payable in kind; and if there are more than one tithe owner in the manor or township, let the commissioners divide such aggregate allotment among the several owners and claimants, as the rector, the vicar, &c.; and the owners of land, &c. who pay tithe by ancient modus not in kind: such owners being entitled to a share of the same as the tithe owners, in proportion to the advantage they receive, by such ancient privilege.

And if any other abstract claim on the lands to be appropriated be fairly made out, or any alien right, as that of a non-parishioner, or extra manorial occupier who has acquired by ancient grant, or by prescription, the privilege of depasturing them, be fully proved, its value requires to be accurately estimated, and land to be assigned in lieu of it."

When this has been done, the remainder of the *unstinted commons* of a given township or manor belongs to the owners of its common right lands and houses; but in what proportion may be difficult to determine with mathematical precision. Nevertheless, by adhering strictly to the general principle, on which alone he conceives an equitable appropriation can be conducted, *viz.* that of determining each man's share by the benefit which he has a right to receive at the time of appropriation, and which he might continue to receive, were it not to take place, truth and justice may be sufficiently near approached.

He considers that one of the first steps towards an equitable distribution of unstinted commons, is to ascertain the common right houses, and to distinguish them from those which have no right of commonage, and which therefore can have no claim to any share of the lands of the unstinted commons, further than the right of the lands they stand upon.

By ancient, and, he believes, pretty generally received, though somewhat vague idea, respecting the rights of commonage, the occupier of every common right house has the privilege of depasturing as many cattle, sheep, or other live stock, on the common in summer (provided, it must be understood, that it is large enough to permit every occupier to exercise this right), as the grounds he occupies within the township or manor can properly maintain in winter; and no one can exceed that proportion, for the surplus of the pasturage (if any) belongs to the lord of the soil, according to Fitzherbert and Blackstone.

Under this regulation, the appropriated lands of a common field township, which are not occupied jointly with a common right house, may be said to be deprived, during the time they are so occupied, of their right of commonage. And in some of the private bills of inclosure, which have been suffered to pass through parliament, the lands which happened to be in this state of occupancy at the time of

paffing the bills, were deprived of their intereft in the common lands, for ever: Notwithftanding, perhaps, they had a few years preceding this accidental circumftance, an undoubted right to their portion of them; a right which, a few weeks or a few days afterward, might have reverted to them, without the fmalleft ftint, by the temporary alienation. If any of the appropriated lands of a townfhip or manor have been eftranged from its commons, during time immemorial, have never been occupied jointly with a common right houfe, or in any way enjoyed of right the common pafturage, within memory, they may, with fome reafon, be faid to have loft their right, and be excluded from a participation.

It is ftated, that by this ancient, and in a degree effential, ufage, common right houfes have a clear right to the land of the commons, fuperior to the ground they ftand upon; efpecially if they rightfully enjoy a privilege of partaking of the fuel and pannage they afford; for thefe properly belong to the houfes, not to the lands; and ftill efpecially if they are not conveniently fituated for enjoying the feveral benefits which the commons afford in their wild ftate. And whatever a common right houfe is worth, merely as fuch, that is to fay, whatever it will let or fell for, over and above a non-common right houfe of the fame intrinfic value, it certainly ought to participate, in the diftribution, according to fuch extra value.

"The true proportionate fhares of the common right lands are to be afcertained on the fame principle. For although the ancient regulation refpecting common right may continue in force while the commons remain open and unappropriated, it would be found troublefome, or unmanageable, as a rule to their juft appropriation. There are few, if any, commons (of common-field townfhips at leaft) that now afford pafturage in fummer for all the ftock which the appropriated lands are capable of maintaining in winter; fo that their feveral proportions only could be ufed: and thefe proportions may be calculated with much greater certainty and difpatch, on the refpective rental values of the lands, than on the more vague and troublefome eftimation of the quantities of ftock they would winter, which indeed would be beft calculated by the rental value of the land. Confequently, in adopting this as the bafis of calculation, the ancient rule is in effect complied with.

But ftill there is another circumftance, he fays, of fome importance, which requires attention, before an equitable diftribution can be made. For although each common right occupier may have a right to ftock in proportion to the productivenefs or rental value of his appropriated lands, every one could not do this with equal profit, and of courfe could not receive equal benefit. Lands fituated on the fide of a common, are much more beneficial in this refpect, than lands which lie a mile or two from it, with bad roads between them. And it is the real advantage which an occupier can freely receive that is the true guide in the partition; which confequently ought to be conducted, not on the rental value of the land, abftractly confidered, but on this and its fituation with refpect to the commonable lands, jointly. In other words, it is the rental values of the common right lands while the commons remain open, not what they will become after the commons are inclofed, which he conceives to be the proper ground-work of appropriation. And that in cafes where commonable lands are wholly attached to manors, and not common to the parifh or townfhip in which they are fituated, as in forefts and woodland diftricts, the felf-fame principle of diftribution is applicable. The remainder of the commons (after the owners of abftract rights have been fatisfied) belong to the common right lands and houfes, no matter whether fuch lands and houfes belong to copyhold tenants exclufively, or to copyholders and freeholders jointly, provided the immemorial cuftom of the manor make no diftinction in their refpective rights; the well eftablifhed cuftoms of manors being in all cafes rules of conduct and unerring guides to commiffioners."

With thefe, he fuppofes, end the great difficulties as to the principles of appropriation; the reft he confiders as merely technical; the works of admeafurement, eftimation, and calculation: operations that are familiar to profeffional men in every diftrict, and which require nothing but application and integrity to render them fufficiently accurate. It is however a matter of vaft importance to have perfons fully converfant with the fubject as commiffioners in all fuch cafes.

Through the uncertainty and expence attending private acts, a great portion of thefe unftinted common lands remain nearly as nature left them;—appearing in the prefent ftate of civilization and fcience, as blotches on the face of the country, efpecially when feen under the threatening clouds of famine, which have now repeatedly overfpread it.

COMMON-*Field Land*, fignifies a defcription of land of a fomewhat fimilar kind to that of commons, only lying in extenfive fields. There is a large portion of this fort of land in almoft every county of the kingdom. It has been obferved by Mr. Middleton, that the common arable fields in the county of Middlefex are about 20,000 acres; and in that, as well as in moft other counties, are divided into too fmall properties to be advantageoufly cultivated. He fays he has known thirty landlords on a field of 200 acres; and the property of each fo divided as to lie in ten or twenty places, containing from an acre or two downwards to fifteen perches; and in a field of 300 acres he has met with patches of arable land, containing eight perches each. In this inftance the average fize of all the pieces in the field was under an acre. In all cafes, he obferves, they lie in long, narrow, winding, or worm-like flips. Land fo diftributed occafions great lofs of time to the farmer, in removing his teams and labourers; and what is of equal importance, he can neither crofs-plough nor harrow and clean fuch land in a workmanlike manner. And another great inconvenience attending common-field land is, the farmer cannot crop with that which beft fuits his foil, but is confined to fow fuch grain as muft be cut with his neighbour's. An act to inclofe common-field land would be advantageous to the farmer, and make the eftates compact, and of more value to the owners. Neither can he fow any green or meliorating crops, vary the ufual impoverifhing fucceffion, or even deftroy the vermin. In fhort, the cultivator of thefe lands finds his expences double, and his crops only half of what they might be, if the land were laid together and well-fenced."

By inclofing the common-fields, fays he, which confift of a turnip and barley foil, both the landlord and the farmer are freed from the fhackles of an exhaufting and obfolete rotation of crops, and placed at liberty to diftribute for cultivation the foil in the moft improved manner, keeping it clean, in better heart, raifing fuch roots and green crops as are in the greateft demand at market, and only growing a crop of corn for the fake of renewing the courfe of green and root crops. In this manner intelligent men, after inclofure, can double the produce of their land.

It is added that the invariable rotation of crops in all the common-fields is, firft year a fallow, fecond year wheat, third year peafe or oats, then begin again with a fallow. This, he fays, is the deftructive fyftem of arable management that moftly prevails in this kind of land, and by which fome

fome of the beft land in the kingdom is condemned to be unemployed every third year; and the farmer who occupies it is compelled to pay three years rent in taxes, for two years ufe of it, and of courfe to maintain his family, fervants, cattle, and implements of hufbandry, every third year, without having any return from the land. It is, therefore, impoffible that lands of this fort can ever be cultivated to the greateft advantage, while they remain in their prefent ftate. See INCLOSING.

It is obferved by Mr. Marfhall that "abfurd as the common field fyftem is, in almoft every particular, at this day, it was admirably fuited to the circumftances of the times in which it originated, the plan having been conceived in wifdom and executed with accuracy as appears in numberlefs inftances, even at this diftance of time."

It is remarked that in the weftern extreme of the ifland the common field fyftem has never, perhaps, been adopted; has certainly never been prevalent, as in the more central parts of England. There, a very different ufage would feem to have been early eftablifhed, and to have continued to the prefent time; when lords of manors have the privilege of letting off the lands of common paftures, to be broken up for corn, the tenant being reftricted to two crops; after which the land is thrown open again to pafturage. And it is at leaft probable, that the lands of that country have been cleared from wood and brought into a ftate of cultivation through fimilar means. At prefent they are judicioufly laid out, in farms of different fizes, with fquare ftraight-lined inclofures, and with detached farm fteads fituated within their areas; the villages being generally fmall and mean; the mere refidence of labourers. Thefe are circumftances which ftrongly evince that the common field fyftem never took place in this part of the ifland, as it did in the more central parts.

But during the two laft centuries, more particularly within the laft, the feudal organization, having loft its original bafis, has itfelf been mouldering away. A great majority of the appropriated common field lands and commons have been partially or wholly inclofed, either by piecemeal, each proprietor inclofing his own flip (a very inconvenient mode of inclofure); or by *general confent*: the whole of the proprietors agreeing to commit their lands to the care and judgment of arbiters or commiffioners; who, reftoring the fields to their original intirety, reparcelled them out, in a manner more convenient to the feveral proprietors, and laid each man's portion, which had confifted of numberlefs narrow flips, in one or more well-fhaped grounds, or by *acts of parliament*, whereby not only common fields, common meadows, and ftinted paftures, but unftinted commons alfo, have been appropriated, by commiffioners named in, or chofen in purfuance of, each refpective act, who, throwing back the entire townfhip to its original ftate, laid it out afrefh, according to the directions of the act and their own judgment.

COMMON *Field Hufbandry*, that fort of cultivation which is practifed in common fields. See HUSBANDRY. It has been obferved in the "Agricultural Report of Wiltfhire," that the introduction of the common field hufbandry feems to have been very flow and progreffive; and that the difperfed fituation and fmallnefs of the pieces, of the common field lands now in cultivation, evidently fhew that the occupiers began with tilling a fingle acre, as one day's work for a plough, or perhaps only half an acre each; and that, as a want of corn increafed, this cultivation was augmented until they had cultivated all that was moft proper for that purpofe, ftill leaving thofe parts which were lefs fit for the plough, or more diftant from home, in a conftant ftate of commonage, but by mutual agreement keeping the cattle out of the cultivated parts till after harveft. This was, probably, the origin of common fields. It does not feem probable, that any improved methods of cultivation can be adopted on common field lands, until the fyftem of common field hufbandry is abolifhed. See COMMON and COMMON *Field Lands*.

COMMON *Meadows* and *Paftures*, are fuch meadows and paftures as are held in a ftate of commonage. It is remarked, by the author of the "Agricultural Survey of Wiltfhire," that, by the fame kind of mutual agreement, as is ftated in fpeaking of common field lands, thofe who have rights fhut up, and in fome cafes inclofed, fuch parts of their common paftures as were moft proper to mow for hay, dividing them into certain fpecific quantities, either by land-marks, or by lot, for mowing, and fuffering the common herd of cattle to feed there again as foon as the hay was carried off, till it was time to lay them up for a new crop: and that this was the origin of common meadows. And that the mutual agreements, originally founded in neceffity, became, when approved by the lords, and obferved for a length of time by the tenants, what are called "cuftom of manors," conftituting the very effence of the court baron, or manorial court, by which both lord and tenants were and are ftill bound; and of which, though the lord or his fteward is the judge, the tenants are the jury, the cuftom of the manor equally binding both.

COMMON, *Communis*, in a general fenfe, fomething that belongs to all alike; is owned or allowed by all; and is not confined to this more than that.

In which fenfe, *common* ftands oppofed to *proper*, *peculiar*, &c. Thus, the earth is faid to be our *common* mother; in the firft, or golden age, all things were in *common*, as well as the fun and elements; the name animal is common to man and beaft; that of fubftance to body and fpirit. Philofophers difpute whether there be any fuch thing as *common* notions, innate, or impreffed on the mind by nature herfelf; or whether our ideas are all adventitious. See IDEA.

COMMON, *Communia*; (i. e. *quod ad omnes pertinet*) in *Law*, fignifies that foil, the ufe whereof is *common* to a particular town or lordfhip: or it is a profit that a man hath in the land of another perfon, ufually in common with others; or a right or privilege, which one or more perfons claim to take or ufe, in fome part or portion of that which another man's lands, waters, woods, &c. do naturally produce; without having an abfolute property in fuch land, waters, wood, &c. It is called an "incorporeal right," which lies in "grant," as if originally commencing on fome agreement between lords and tenants, for fome valuable purpofes; which by age being formed into a prefcription, continues, although there be no deed or inftrument in writing which proves the original contract or agreement. 4 Co. 37. 2 Inft. 65. 1 Vent. 387. And there is not only common of PASTURE, which the word "common," in its moft ufual acceptation, fignifies; but alfo *common* of PISCARY, *common* of ESTOVERS, *common* of TURBARY, &c. And in all cafes of *common*, the law doth much refpect the cuftom of the place: for there the rule is, *confuetudo loci eft obfervanda*. 7 Rep. 5.

COMMON *of pafture*, is a right of feeding one's beafts on another's land; for in thofe wafte grounds, ufually called commons, the property of the foil is generally in the lord of the manor; as in "common fields," it is in the particular tenants. This kind of common is divided into *common* in grofs, *common* appendant, *common* appurtenant, and *common per caufe de vicinage*.

COMMON *in grofs*, is a liberty to have *common* alone, that is

is without any land or tenement in another man's land, granted either to a perfon for life or to him and his heirs. This is commonly paffed by deed, or fpecialty, and claimed by prefcriptive right.

Common *appendant*, and Common *appurtenant*, are ufually confounded; both being defined to be a liberty of *common* appertaining to, or depending on, fuch or fuch a freehold; which *common* muft be taken with beafts *commonable:* as horfes, oxen, &c. being accounted fitteft for the plowman; and not with goats, geefe, and hogs. Others diftinguifh between the two, thus; *common appurtenant* may be fevered from the land whereto it appertains; and is where the owner of land has a right to put in other beafts not *commonable;* as hogs, goats, &c. which neither plough nor manure the land. Whereas *common appendant*, according to lord Coke, had its original in the following manner:

"When a lord enfeoffed another in arable lands to hold of him in foccage; the feoffee, to maintain the fervice of his plough, had at firft, by courtefy of his landlord, *common* in his waftes, for neceffary beafts to eat and compoft his lands; and that for two caufes; 1°. Becaufe it was tacitly implied in the feoffment; by reafon the feoffee could not till, or compoft his pafture: by confequence, therefore, the feoffee had, as a thing neceffary, or incident, *common* in the waftes, or lands of the lord. 2°. For the maintenance and advancement of tillage."

Common appendant belongs only to ancient arable land, and not to a houfe, meadow, pafture, &c; and it is of common right. But it is not common appendant, unlefs it hath been appendant time out of mind. 1 Danv. 746. It may be upon condition; for all the year, or for a certain time, or for a certain number of beafts, &c. by ufage; though it ought to be for fuch cattle as plough and compoft the land to which it is appendant. 1 Danv. 797. Common appendant may be to common in a field after the corn is fevered, till the ground is refown, and it may be to have common in a meadow after the hay is carried off, till Candlemas, &c. Yelv. 185. This common, which in its nature is not reftricted by number, may be limited by cuftom as to the beafts; whereas common appurtenant ought always to be for thofe levant and couchant, and may be *fans* number. Plowd. 161. A man may prefcribe to have common appurtenant for all manner of cattle, at every feafon in the year. 25 Aff. 8. He who hath common appendant or appurtenant can keep but a number of cattle proportionable to his land; for he can common with no more than the lands to which his common belongs is able to maintain. 3 Salk. 93.

Common *pur caufe de vicinage*, i. e. by reafon of neighbourhood, is the liberty that the tenants of one lord in one town, have to *common* with the tenants of another lord in another town.

But it is to be obferved, that thofe who claim this kind of *common*, (which is ufually called *intercommoning)* may not put their cattle into the *common* of the other lord, for then they are diftrainable; but, turning them into their own fields, if they ftray into their neighbour's *common*, they muft be fuffered.

The inhabitants of one town or lordfhip may not put in as many beafts as they will, but with regard to the freehold of the inhabitants of the other; for otherwife it were no good neighbourhood, upon which all this depends. Terms de Ley. If one lord enclofes the common, the other town cannot then common; but though the common of vicinage is gone, common appendant remains. 4 Rep. 38. 7 Rep. 5. Every common pur caufe de vicinage is a common appendant. 1 Danv. Abr. 799. This is indeed only a permiffive right, intended to excufe what in ftrictnefs is a trefpafs in both, and to prevent a multiplicity of fuits. And therefore either townfhip may enclofe and bar out the other, though they have intercommoned time out of mind. Blackft. Com. ii. 34.

The property of the foil in the "common" is entirely in the lord; and the ufe of it jointly in him and the commoners. Lords of manors may depafture in commons where their tenants put in cattle: and a prefcription to exclude the lord is againft law. 1 Inft. 122. The lord may agift the cattle of a ftranger in the common by prefcription; and he may licenfe a ftranger to put in his cattle, if he leaves fufficient room for the commoners. 1 Danv. 795. 2 Mod. 6. The lord may alfo furcharge, &c. an overplus of the common; and if, where there is not an overplus, the lord furcharge the common, the commoners are not to diftrain his beafts; but muft commence an action againft the lord. F. N. B. 125. The lord may diftrain when the common is furcharged, and bring action of trefpafs for any trefpafs done in the common. 9 Rep. 113. A lord may make a pond on the common, though he cannot dig pits for gravel or coal; the ftatutes of approvement extending only to inclofure. 3 Inft. 204. 9 Rep. 112. 1 Sid. 106. If the lord makes a warren on the common, the commoners may not kill the conies; but are to bring their action, for they may not be their own judges. 1 Rol. 90. 405. By ftatute of Merton (20 H. III. c. 4.) lords may "approve" againft their tenants, *viz.* inclofe part of the wafte, &c. and thereby difcharge it from being common, leaving common fufficient; and neighbours as well as tenants, claiming common of pafture, fhall be bound by it. If the lord inclofes on the common, and leaves not common fufficient, the commoners may not only break down the inclofures, but may put in their cattle, although the lord ploughs and fows the land. 2 Inft. 88. 1 Rol. Abr. 406. By ftat. 29 Geo. II. c. 36. Owners of commons, with the confent of the majority, in number and value, of the commoners; the majority of the commoners, with confent of the owners, or any perfons, with the confent of both, may inclofe any part of a common for the growth of wood. If the wood be deftroyed, the offender may be punifhed according to ftat. 1 Geo. 1. c. 48.; if not convicted in fix months, the owner fhall have fatisfaction from the adjoining parifhes, &c. as for fences overthrown by ftat. Weftm. 2. Perfons cutting wood on commons fhall incur the fame penalty. And by ftat. 31 Geo. 2. c. 41, the recompence is to be paid to perfons interefted, in proportion to their intereft. A commoner hath only a fpecial and limited intereft in the foil, but yet he fhall have fuch remedies as are commenfurate to his right; and therefore he may diftrain beafts damage-feafant, bring an action on the cafe, &c.; but not being abfolute owner of the foil, he cannot bring a general action of trefpafs for a trefpafs done upon the common. A commoner cannot do any thing on the foil which tends to the melioration or improvement of the common, as cutting down of bufhes, fern, &c. 1 Sid. 251. 12 Hen. VIII. 2. 13 Hen. VIII. 15. Therefore, if a common every year in a flood is furrounded with water, the commoner cannot make a trench in the foil to avoid the water, becaufe he has nothing to do with the foil, but only to take the grafs with the mouth of the cattle. 1 Rol. Abr. 405. 2 Bulft. 116. Every commoner may break the common if it be inclofed; and although he does not put his cattle in at the time, yet his right of commonage fhall excufe him from being a trefpaffer. Lit. Rep. 38. 1 Rol. Abr. 406. If a tenant of the freehold ploughs it, and fows it with corn, the commoner may put in his cattle, and with them, eat the corn growing upon the land: fo if he lets his corn

corn lie in the field, beyond the usual time, the other commoners may, notwithstanding, put in their beasts. 2 Leon. 202, 203. The commoner cannot use common except with his own proper cattle; but if he hath not cattle to manure the land, he may common other cattle to manure it, and use the common with them; for, by the loan, they are in a manner made his own cattle. 1 Danv. 798. A commoner may distrain beasts put into the common by a stranger, or every commoner may bring action of the case, where damage is received. 9 Rep. 11. But one commoner cannot distrain the cattle of another commoner, though he may those of a stranger, who hath no right to the common. 2 Lutw. 1238. See SURCHARGE *of Common*, and DISTURBANCE *of Common*.

Upon agreement between two commoners to inclose a common, a party having interest, not privy to the agreement, will not be bound; but one or two wilful persons shall not hinder the public good. Chan. Rep. 48. Commons must be driven yearly at Michaelmas, or within 15 days after; infected heifers and stone-horses under size, &c. are not to be put into commons, under forfeiture, by stat. 32 Hen. VIII. c. 13. New erected cottages, though they have four acres of ground laid to them, ought not to have common in the waste. 2 Inst. 740. In law-proceedings, where there are two distinct commons, the two titles must be shewn: cattle are to be alleged commonable; and common ought to be in lands commonable; and the place is to be set forth where the messuage and lands lie, &c. to which the common belongs. 1 Nelf. 462, 463. By stat. 13 Geo. III. c. 81. in every parish where there are "common field-lands," all the arable lands lying in such fields shall be cultivated by the occupiers, under such rules as three-fourths of them in number and value (with the consent of the land and tithe-owners) shall appoint, by writing under their hands; the expence to be borne proportionably, under the management of a field-master, or field-reeve, to be appointed annually in May. For other particulars, see Jacob's Law Dict. by Tomlins.

COMMON, in *Geometry*, is applied to an angle, line or the like, which belongs equally to two figures, or makes a necessary part of both.

COMMON, in *Grammar*, denotes the gender of nouns which is equally applicable to both sexes, male and female. Such is that of *parens*, parent; which is either masculine, or feminine, as it is used to signify either father, or mother.

The Latin grammarians, besides this, which they call the *common of two*, also make a *common of three;* which extends to masculine, feminine, and neuter.

COMMON, *Communis*, in *Ancient Music*, was an appellation given to the seventh species of the diapason. See DIAPASON.

COMMON *Bail*. See BAIL.

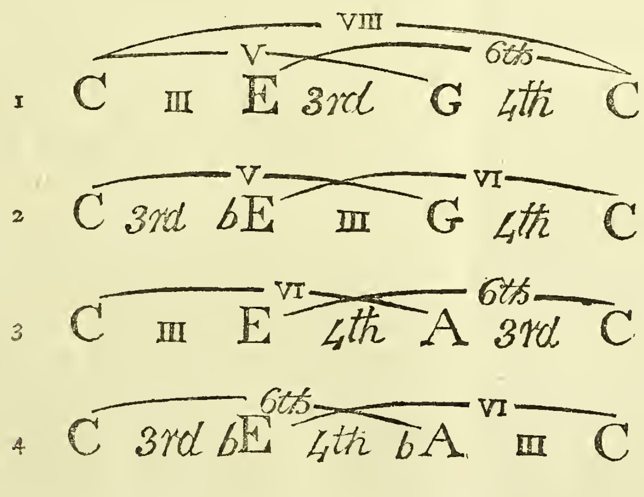
COMMON *Barretor*. See BARATRY.

COMMON *Bench*. The court of Common Pleas was anciently called *Common Bench*, because the pleas of controversies between common persons were there tried and determined.

In law books and references, the court of Common Pleas is written C. B. from *communi banco*, or C. P.: and the justices of that court are styled *justiciarii de banco*. See COURT and *Common* PLEAS.

COMMON *Centre of Gravity*, in *Mechanics*. See CENTER *of Gravity*.

COMMON *Chord*, in *Music*, is sometimes used to denote the third, fifth, and octave of any note, considered as a bass. It will afford some light into the composition of chords, to exhibit all the possible variations in the order or arrangement of the concord, major *third* (III), minor *third* (3d), and minor *fourth* (4th), constituting the common chord in the following manner, *viz.*



1 the common chord.

2 the common chord minor.

3 the chord of sixth, or $^{6}_{3}$.

4 the chord of $^{b6}_{b}$ or $^{b6}_{b3}$.

5 the chord of $^{6}_{4}$.

6 the chord of $^{b6}_{4}$.

By a comparison of the several chords in the first arrangement above, it will appear, that when the four notes, C, E, G, and C, constituting the common chord, are sounded together, all of the seven concords, viz. 3d, III, 4th, V,

V, 6th, VI and VIII are in reality heard between the different notes, except the VI: and this circumſtance, combined with the III being above the baſs or loweſt note, ſeem eſſential to a full or common chord. In the ſecond arrangement, or C, ♭E, G and C, it will be perceived, that all the concords are heard except the 6th; and this, combined with the third above the baſs note, conſtitutes the common chord of the minor mode. In the third arrangement, it will be ſeen, that there is no V produced, while a III occupies the place immediately above the baſs note, being the chord of ſixth. The fourth arrangement will alſo be found without a V, but with the 3d next the baſs, conſtituting the chord $^{\flat 6}_{\flat}$. The fifth arrangement will be found without a 6th, and with no third (but a 4th), next to the baſs, and this conſtitutes the chord $^{6}_{4}$. And laſtly, the ſixth arrangement will be found without a VI, or a third above the baſs, which conſtitutes the chord $^{\flat 6}_{4}$.

In performances by voices and perfect inſtruments, as violins, violincellos, &c. theſe ſeveral chords will be all heard *perfect*; and in each of the ſix caſes, a union or blending of the ſix concords, almoſt ſimilar to a ſingle ſound, will be perceived, but much more delightful to the ear; the characteriſtic differences of which conſtitute the character of the common chord and its five inverſions, as above. But upon the common keyed inſtruments, ſuch as organs, piano-fortes, harpſichords, &c. which contain but twelve ſounds within the octave, it is impoſſible that theſe ſingle or compound chords can all be heard perfect, but the greater part of the whole of them muſt be tempered or ſlightly altered from the true chord (ſee Temperament). If, for inſtance, the III C E above, were ſharpened ſeven ſchiſmas, or 7 Σ, which is very nearly the caſe in *Equal Temperament* (which ſee), the 3d E G flattened 8 Σ, and the 4th G C ſharpened Σ; the common chord, or firſt arrangement upon ſuch an inſtrument, would produce the following tempered concords, *viz.* 3d − 8 Σ, III + 7 Σ, 4 + Σ, V − Σ, and 6th − 7 Σ, combined with VIII; which chords, combined and blended, impreſs upon the ear the peculiar ſenſation of the common chord in this temperament. In the ſecond arrangement, or common chord minor, the effect produced will depend upon the union of the following tempered chords, viz. 3d − 8Σ, III + 7Σ, 4th + Σ, V − Σ, VI + 8 Σ and VIII. A common chord C E G C, upon an inſtrument tuned according to earl Stanhope's temperament, (ſee Philoſophical Magazine, vol. xxviii. p. 141) will be found to conſiſt of the following perfect chords, *viz.* 3d, III, 4th, V, 6th, and VIII; whence his lordſhip denominates his key of C major to be perfect (ſee Stanhope Temperament); but if we conſider the ſecond arrangement, or common chord of C minor, upon one of his lordſhip's inſtruments, we ſhall find 3d − $10\frac{1}{2}\Sigma$, III + $10\frac{1}{2}\Sigma$, 4th, V, VI + $10\frac{1}{2}\Sigma$, and VIII to conſtitute this chord, nearly, the very ſmall interval *minute* (*m*) only, being in any caſe omitted. Thus it will be eaſy to compare the effect of any inverſions of the common chord, in this, or any other temperament of the ſcale which may be propoſed.

Common *Clerk*. See Town *Clerk*.

Common *Crier*. See Crier.

Common *Council*. See *Mayor's* Courts.

Common *Day*, in plea of land, ſignifies an ordinary day in court, as *octabis Hilarii, quindena Paſchæ*, &c. It is mentioned in 13 Rich. II. ſtat. 1. cap. 17. and in the ſtatute 51 Hen III. concerning general days in bank. *Blount* and *Cowel.*

Common, *Diſturbance of.* See Disturbance *of Common.*

Common *Duct*, in *Anatomy*. See Ductus *Communis.*

Common, *Eſtate in.* See Estate.

Common *of Eſtovers.* See Estovers.

Common *Field-land.* See Common *ſupra.*

Common *Fine*, in *Law*, a certain ſum of money, which the reſiants within the liberty of ſome leets pay to the lord thereof; called in ſome places, *head-ſilver;* in others, *cert-money*, or *certum letæ*, and *head-pence.*

It was firſt granted to the lord towards the charge of his purchaſe of the court-leet; whereby the reſiants have now the conveniency of doing their ſuit within their own manors, without being compelled to go to the ſheriff's turn.

Common *in Groſs.* See Common *ſupra.*

Common *Hunt*, the chief huntſman belonging to the lord mayor and aldermen of London.

Common *Informer.* See Informer.

Common *Intendment*, in *Law*, the *common* underſtanding, meaning, or conſtruction of any thing: without ſtraining it to any foreign, remote, or particular ſenſe: and *Bar to Common Intendment*, is an ordinary, or general bar, which is commonly an anſwer to the declaration of the plaintiff. See Bar and Intendment.

Common *Jury.* See Jury.

Common *Law*, that body of rules generally received, and held as law in this nation, in contradiſtinction to the ſtatute, or written law, and including not only general cuſtoms, or the common law properly ſo called; but alſo the particular cuſtoms of certain parts of the kingdom, and likewiſe thoſe particular laws, that are by cuſtom obſerved only in certain courts and juriſdictions.

The common law is grounded upon the general cuſtoms of the realm, and comprehends the law of nature, the law of God, and the principles and maxims of the law: it is founded upon reaſon, and it is ſaid to be the perfection of reaſon, acquired by long ſtudy, obſervation, and experience, and refined by learned men in all ages. It is juſtly regarded as the common birth-right, which the ſubject has for the ſafe-guard and defence, not only of his goods, lands, and revenues, but of his wife and children, body, fame, and even life. Co. Litt. 97, 142. Treatiſe of Laws, p. 2. According to Hale, the common law of England is the common rule for adminiſtering juſtice within this kingdom, and aſſerts the king's royal prerogatives, and likewiſe the rights and liberties of the ſubject. It is, in general, that law by which the determinations in the king's "Ordinary courts" are guided; and this directs the courſe of deſcents of lands; the nature, extent, and qualifications of eſtates, together with the manner and ceremonies of conveying them from one to another; the forms, ſolemnities, and obligations of contracts; the rules and directions for the expoſition of deeds, and acts of parliament; the proceſs, proceedings, judgments, and executions of our courts of juſtice; alſo the limits and bounds of courts, and juriſdictions; the ſeveral kinds of temporal offences and puniſhments, and their application, &c. Hale's Hiſt. of the Common Law, p. 24—44, 45.

As to the origin of the common law, which, adopting the expreſſion of lord chief juſtice Hale, is as undiſcoverable as the head of the Nile; our ancient lawyers, and particularly Forteſcue, warmly inſiſt, that the cuſtoms, which conſtitute our common law, are as old as the primitive Britons, and that they have been continued down, through the

the feveral mutations of government and inhabitants, to the prefent time, unchanged and unadulterated. This, fays judge Blackftone, may be the cafe as to fome; but, in general, as Mr. Selden obferves, this affertion muft be underftood with many grains of allowance; and ought only to fignify, as the truth feems to be, that there never was any formal exchange of one fyftem of laws for another; though, doubtlefs, by the intermixture of adventitious nations, the Romans, the Picts, the Saxons, the Danes, and the Normans, they muft have infenfibly introduced and incorporated many of their own cuftoms with thofe that were before eftablifhed; thereby in all probability improving the texture and wifdom of the whole, by the accumulated wifdom of divers particular countries. Accordingly, lord Bacon obferves, that our laws are as mixed as our language; and, as our language is fo much the richer, the laws are the more complete. And, indeed, our antiquaries and early hiftorians do all pofitively affure us, that our body of laws is of this compounded nature.

After the decay of the Roman empire, it has been faid, Britain became invaded by three kinds of German people, *viz.* the Saxons, Angles, and Jutes. From the Jutes defcended the men of Kent, and thofe of the Ifle of Wight; from the Saxons came the people called the Eaft, South, and Weft Saxons; and from the Angles came the Eaft Angles, Mercians, and Northumbrians.

Now, as each people had its peculiar cuftoms, fo each inclined to different laws; whereof, thofe of the Weft Saxons and Mercians, who inhabited the midland counties, were, upon the diffolution of the heptarchy, and eftablifhment of a monarchy, preferred to the reft, and acquired the common appellation of *Jus Anglorum.* Their particular names were *Weft Saxon-lage*, and *Merchen-lage.*

The firft Saxon laws publifhed in England were thofe of king Ethelbert, in the fixth century. Three hundred years after, king Alfred, whom our hiftorians call *magnus juris Anglicani conditor*, having united the heptarchy, and rendered himfelf mafter of the whole nation, made a collection from among the numerous laws and cuftoms of the feveral provinces of his domains, which were grown fo various; and commanded them to be obferved throughout his kingdom. This collection was denominated *folk-right*, and foon after the *common law;* as being *common* to the whole nation.

This was written in Alfred's *dome-book*, or *liber judicialis*, which was defigned for the general ufe of the whole kingdom.

This book is faid to have been extant in the reign of king Edward IV.; but has fince been unfortunately loft. It contained, as we may reafonably imagine, the principal maxims of the common law, the penalties for mifdemefnors, and the forms of judicial proceedings.

By thefe laws the nation was governed for a confiderable time, till, being at length fubdued by the Danes, the cuftoms of thofe people were introduced, and incorporated with the reft. Hence the code of Alfred in many provinces fell into difufe, or, at leaft, was mixed and debafed with other laws of a coarfer alloy: and thus a new form of *common* law arofe, called *Dane-lage.*

The three fyftems of law above recited, viz. the *Dane-lage*, principally maintained in feveral of the midland counties and alfo on the eaftern coaft; the *Weft Saxon-lage*, which was much the fame with the code compiled by Alfred, and which obtained in the counties to the fouth and weft of the ifland, from Kent to Devonfhire, being the municipal law of the far moft confiderable part of Alfred's dominions, and particularly of Berkfhire, the feat of his peculiar refidence; and the *Merchen-lage*, obferved in many of the midland counties, and thofe bordering on the principality of Wales, the retreat of the ancient Britons, and therefore probably intermixed with the Britifh or Druidical cuftoms; were in ufe about the beginning of the eleventh century. The northern provinces were at this time under a diftinct government. In procefs of time king Edgar begun what his grandfon Edward the Confeffor, on this account called *legum Anglicanarum reftitutor*, completed; *viz.* to form one digeft or body of laws to be obferved throughout the whole kingdom. This feems to have been only a new edition, or frefh promulgation of Alfred's *dome-book*, with fuch additions and improvements as the experience of a century and a half had fuggefted.

The Danes being afterwards, in their turn, overcome by the Normans; the Conqueror, on a review of the feveral laws and cuftoms that then obtained, abrogated fome, and abolifhed others; adding fome of his own country laws.

His fon, William Rufus, broke through the ancient laws and cuftoms which his father had eftablifhed; but his next fon, Henry I. excluded the civil cuftoms which his brother had introduced, and reftored the laws of Edward the Confeffor, with thofe amendments made by his father, under the advice of his barons. Thefe were afterwards confirmed in fucceeding reigns.

Hence is derived that fyftem of maxims and unwritten cuftoms, now known by the name of the *common law*, which is of Saxon parentage; though the cuftoms and maxims themfelves are of higher antiquity than memory or hiftory reach; many of them being as old as the primitive Britons. The name of common law was given to it, either in contradiftinction to other laws, as the ftatute law, the civil law, the law merchant, and the like; or, more probably, as a law common to all the realm, the *jus commune* or folk-right mentioned by king Edward the Elder, after the abolition of feveral provincial cuftoms and particular laws.

The *common law* of England is, properly, the common cuftoms of this kingdom; which, by length of time, have obtained the force of laws.

The goodnefs of a cuftom depends upon its having been ufed time out of mind; or, in the folemnity of our legal phrafe, time whereof the memory of man runneth not to the contrary. This gives it its weight and authority; and of this nature are the maxims and cuftoms which compofe the common law, or *lex non fcripta*, of this kingdom. This unwritten, or common law, is properly diftinguifhed into three kinds; 1. General cuftoms, which are the univerfal rule of the whole kingdom, and form the common law, in its ftricter and more ufual fignification. 2. Particular cuftoms, which for the moft part affect only the inhabitants of particular diftricts. 3. Certain particular laws; which by cuftom are adopted and ufed, by fome particular courts, of pretty general and extenfive jurifdiction. See Custom.

Some have divided the common law into two principal grounds or foundations; *viz.* 1. Eftablifhed cuftoms; fuch as that, where there are three brothers, the eldeft brother fhall be heir to the fecond, in exclufion of the youngeft; and, 2. Eftablifhed rules and maxims; as, that the king can do no wrong; that no man fhall be bound to accufe himfelf; and the like. But judge Blackftone obferves, that thefe are one and the fame thing. For the authority of thefe maxims refts entirely upon general reception and ufage; and the only method of

proving

proving, that this or that maxim is a rule of the common law, is by ſhewing that it hath been always the cuſtom to obſerve it. See CUSTOM.

It is called *lex non ſcripta*, the *unwritten law:* not but that we have moſt of it written in the old Norman dialect, and the monuments and evidences of our legal cuſtoms are contained in the records of the ſeveral courts of juſtice, in books of reports and judicial deciſions, and in the treatiſes of learned ſages of the profeſſion, preſerved and tranſmitted from times of the higheſt antiquity; but becauſe it does not appear to be made by charter, or parliament; for thoſe are always matters of record. Its original inſtitution and authority are not ſet down in writing, but it receives its binding power and the force of law, by long and immemorial uſage, and by univerſal reception through the kingdom. See AUTHORITIES and REPORTS.

Beſide the *common law* of England in general, there are in divers parts of the nation particular cuſtoms, and common uſages, which have the force of *common law* among thoſe people, who have retained them: ſuch as the Borough-Engliſh, Gavel-kind, &c.—Where the *common law* is ſilent, there the STATUTE-*law* ſpeaks. See STATUTE.

All trials at *common law* are by a jury of twelve men.

Among the ancient and moſt eminent writers on common law we may ſelect and enumerate the following. Britton wrote his learned book of the common law of this realm by the king's command, and it runs in his name, correſponding to the inſtitutions of the civil law, which Juſtinian aſſumes to himſelf, though compoſed by others under his direction. This Britton is mentioned by Gwin to have been biſhop of Hereford. Bracton, a great lawyer in the time of Henry III., wrote a very learned treatiſe of the common law of England, held in great eſtimation; and he was ſaid to be lord chief-juſtice of the kingdom. The famous and learned Glanvil, lord chief-juſtice in the reign of Henry II., wrote a book of the common law, which is ſaid to be the moſt ancient compoſition extant on that ſubject. Beſides theſe, in the time of Edward IV. the renowned lawyer Littleton wrote his excellent book of "Engliſh Tenures." In the reign of king James I., the great oracle of the law, ſir Edward Coke publiſhed his learned and laborious "Inſtitutes" of our law, and commentary on Littleton. About the ſame time likewiſe Dr. Cowel, a civilian, wrote a ſhort inſtitute of our laws. In the reign of king George I., Dr. Tho. Wood, a civilian and common lawyer, and at laſt a divine, wrote an inſtitute of the laws of England, ſomewhat after the manner of the Inſtitutes of the civil law. And to mention no others, the late learned judge Blackſtone, in the reign of George III., publiſhed his "Commentaries" on the laws of England, the beſt analytic and moſt methodical ſyſtem of our laws, which was ever publiſhed; and equally adapted for the uſe of ſtudents, and of thoſe gentlemen who wiſh to acquire that knowledge of our laws, which is, in fact, eſſentially neceſſary for every one. See Biographical articles BRITTON, BRACTON, &c. &c.

COMMON *meaſure diviſor*, in *Arithmetic*, a number that exactly meaſures two other numbers, without a remainder. And the greateſt number that can meaſure any two other numbers, is called their greateſt common meaſure; thus 4 is the greateſt common meaſure of 8 and 12.

To find the greateſt common meaſure of two numbers; divide the greater by the leſs, and if there be no remainder, the leſs number is the meaſure required. If there be a remainder, divide the laſt diviſor by it, and thus proceed, till there be no remainder left, and the laſt diviſor is the greateſt common meaſure.

E. G. To find the greateſt common meaſure of 816 and 1488.

816)1488(1
816
672)816(1
672
144)672(4
576
96)144(1
96
Common meaſure - 48)96(2
96

For algebraic quantities, the remainders are to be divided by their ſimple diviſors, and the quotients will be the quantities required.

E. G. Let the quantities be $a^2 + 2ab + b^2$ and $a^3 + 2a^2b + 2ab^2 + b^2$.

Divide the latter of theſe by the former in the following manner:

$a^2 + 2ab + b^2)a^3 + 2a^2b + 2ab^2 + b^3(a$
$a^3 + 2a^2b + ab^2$

The remainder is - - - $+ ab^2 + b^3$, which being divided by b^2, its greateſt ſimple diviſor, given $a + b$; and by this divide $a^2 + 2ab + b^2$, and the quotient will be $a + b$, exactly, which is the common meaſure required. And if fractions are divided by their greateſt common meaſure, they will thus be reduced to their loweſt terms.

E. G. Let the fraction be $\frac{816}{1488}$: then divide the numerator and denominator by 48, the greateſt common meaſure, and the fraction will be reduced to $\frac{17}{31}$, its loweſt terms.

Let the algebraic fraction be $\frac{a^2 + 2ab + b^2}{a^3 + 2a^2b + 2ab^2 + b^3}$; then, dividing the numerator and denominator by $a + b$ the greateſt common meaſure; and it will be reduced to $\frac{a + b}{a^2 + ab + b^2}$, its loweſt terms.

Theſe operations are founded on this principle, *viz.* that whatever quantity meaſures the whole and one part of another, muſt alſo meaſure the remaining part. For that quantity (whatever it is) which meaſures both the diviſor and dividend, muſt evidently meaſure $a^3 + 2ab + b^2$, being a multiple of the former; whence, by the above-cited principle, the ſame quantity, as it increaſes the whole dividend, muſt alſo meaſure the remaining part of it, $ab^2 + b^3$: but the diviſor, which we are ſeeking, being a compound one, we may caſt off the ſimple diviſor b^2, as not anſwering our purpoſe; whence $a + b$ appears to be the only compound diviſor which the caſe admits of; and this muſt be the common meaſure required, if the propoſed example admits of any ſuch.

COMMON, *Month, Motion, Nuiſance*, and *Object*. See the SUBSTANTIVES.

COMMON of *Paſture*. See PASTURE and COMMON.

COMMON of *Piſcary*. See PISCARY.

COMMON-PLACE *Book, Adverſaria*, among the learned, denotes a regiſter, or orderly collection of things which occur worthy to be noted, and retained in the courſe of a man's

man's reading, or ſtudy; ſo diſpoſed, as that among a multiplicity of ſubjects, any one may be eaſily found.

Common-place-books are of great ſervice: they are a kind of promptuaries or ſtorehouſes, wherein to repoſit the moſt valuable parts of authors, to be ready at hand when wanted. Several perſons have their ſeveral methods of ordering them: but that which comes beſt recommended, is the method of that great maſter of order Mr. Locke. He has thought fit to publiſh it in a letter to M. Toiſnard; determined thereto, by the great conveniency and advantage he had found from it in twenty years experience; as well as by the recommendations and intreaties of many of his friends, who had likewiſe proved it.

The ſubſtance of this method we ſhall here give the reader; whereby he will be eaſily enabled to execute it himſelf.

The firſt page of the book you intend to take down the *common places* in, is to ſerve as a kind of index to the whole; and to contain references to every place, or matter therein: in the commodious contrivance of which index, ſo that it may admit of a ſufficient copia, or variety of materials, without any confuſion, the whole ſecret of the method conſiſts.

In order to this the firſt page, as already mentioned, or for more room, the two firſt pages that front each other, are to be divided by parallel lines, into twenty-five equal parts; whereof every fifth line is to be diſtinguiſhed, by its colour, or ſome other circumſtance. Theſe lines are to be cut perpendicularly by others, drawn from top to bottom; and in the ſeveral ſpaces thereof the ſeveral letters of the alphabet, both capital and minuſcule, are to be duly written. The form of the lines and diviſions, both horizontal and perpendicular, with the manner of writing the letters therein, will be conceived from the following ſpecimen; wherein what is to be done in the book for all the letters of the alphabet, is here ſhewn in the firſt four, A, B, C, and D.

	a			*a*	
	e			*e*	
A	*i*		C	*i*	
	o			*o*	
	u			*u*	
	a			*a*	
	e			*e*	
B	*i*		D	*i*	
	o			*o*	
	u			*u*	

The index of the common-place book being thus formed, matters are ready for the inſertion of any thing in it. In order to this, conſider to what head, the thing you would enter is moſt naturally referred; in this head, or word, regard is had to the initial letter, and the firſt vowel that follows it; which are the characteriſtic letters on which the whole uſe of the index depends.

Suppoſe, *e. gr.* I would enter down a paſſage that refers to the head *beauty;* B, I conſider, is the initial letter, and *e* the firſt vowel; then looking upon the index for the partition B, and therein the line *e* (which is the place for all words whoſe firſt letter is B, and firſt vowel *e;* as *Beauty, Beneficence, Bread, Bleeding, Blemiſhes,* &c.), and finding no numbers down already to direct me to any page of the book where words of this characteriſtic have been entered, I turn forward to the firſt blank page I find, which in a freſh book, as this is ſuppoſed to be, will be page 2, and here I now write what I have occaſion for on the head *beauty;* beginning the head in the margin, and indenting all the other ſubſervient lines, that the head may ſtand out, and ſhew itſelf; this done, I enter the page where it is written, *viz.* 2, in the index, in the ſpace B *e,* from which time, the claſs B *e* becomes wholly in the poſſeſſion of the 2d and 3d pages, which are conſigned to letters of this characteriſtic.

Had I found any page or number already entered in the ſpace B *e,* I muſt have turned to the page, and have written my matter in what room was left therein: ſo, if after entering the paſſage on beauty, I ſhould have occaſion for *benevolence,* or the like, finding the number 2 already poſſeſſed of the ſpace of this characteriſtic, I begin the paſſage on benevolence in the remainder of the page; which not containing the whole, I carry it on to page 3, which is alſo for B *e,* and add the number 3 in the index. When the two pages deſtined for one claſs are full, look forward for the next backſide that is blank; if it be that which immediately follows, write at the bottom of the margin of the page filled, the letter *v* for *verte,* turn over; and the ſame at the top of the next page: and continue from this new page as before. If the pages immediately following be already filled with other claſſes, then write at the bottom of the page laſt filled, the letter *v,* with the number of the next blank page; and at the top of that page, the number of the page laſt filled; then entering that head in this new page, proceed as before. By theſe two numbers of reference, the one at the top, and the other at the bottom of the page, the diſcontinued matters are again connected. It may not be amiſs, every time you put a number at the bottom of a page, to put it likewiſe in the index. Now, if the head be a monoſyllable beginning with a vowel, the vowel is at the ſame time both the initial letter, and the characteriſtic vowel: thus the word *art* is to be wrote in A *a.* Mr. Locke omits three letters of the alphabet in his index, *viz.* K, Y, and W; which are ſupplied by C, I, U, equivalent to them: and as for Q, ſince it is always followed by an *u,* he puts it in the fifth place of Z; and ſo has no Z *u,* which is a characteriſtic that very rarely occurs. By thus making Q the laſt in the index, its regularity is preſerved, without diminiſhing its extent. Others chooſe to retain the claſs Z *u,* and aſſign a place for Q *u* below the index.

If any imagine, that thoſe hundred claſſes are not ſufficient to comprehend all kinds of ſubjects without confuſion, he may follow the ſame method, and yet augment the number to five hundred, by taking in one more characteriſtic to them.

But the inventor aſſures us, that in all his collections, for a long ſeries of years, he never found any deficiency in the

index as above laid down. Other contrivances for common-place books have been propofed; but they are fuch as will naturally occur to perfons converfant with the fubject, and accuftomed to orderly arrangement: and it is, therefore, needlefs to extend this article.

Common *Places, in Rhetoric.* See Arguments and Topics.

Common Pleas. See Court *of Common Pleas.*

Common *Prayer,* is the liturgy of the church of England. Clergymen are obliged to ufe this liturgy in the fervice of the church; and refufing to do fo, or ufing any other public prayers, is punifhable by 1 Eliz. cap. 2. and every incumbent refiding on his living and keeping a curate, is obliged, once every month at leaft, to read the common prayer in his parifh church, in his own perfon, under a forfeiture of 5*l.* for every failure, by the act of uniformity, 13 and 14 Car. II. cap. 4.; and by the fame ftat. every church is to be provided with a book of common prayer, under the penalty of 3*l.* a month, and the common prayer is to be read before every lecture. Every minifter who fpeaks any thing in derogation of this book fhall, if not beneficed, be imprifoned one year for the firft offence, and for life for the fecond; and, if he be beneficed, he is liable to fix months imprifonment, and the forfeiture of a year's value of his benefice; for the fecond offence to deprivation and one year's imprifonment; and for the third offence to deprivation and imprifonment for life: and any perfon convicted of reviling it in plays, fongs, or other open words, or of forcibly preventing its being read, or of caufing any other fervice to be read in its ftead, fhall forfeit for the firft offence an hundred marks; four hundred for the fecond; and for the third offence all his goods and chattels, and fuffer imprifonment for life. Stat. 1 Eliz. cap. 2. See Liturgy.

Common *Receptacle.* See Receptaculum.

Common *Recovery.* See Recovery.

Common, *Right of.* See Common.

Common *Scold.* See Scold.

Common *Seal.* See Seal.

Common *Senfe.* See Sense.

Common *Senfory.* See Sensory.

Common *Serjeant.* See Serjeant.

Common, *Surcharge of.* See Surcharge.

Common, *Tenants in.* See Tenant.

Common *Time.* See Time.

Common *Voucher.* See Voucher.

Common *Ways,* See Way.

Common *Weal* denotes "bonum publicum," or the public good, and is much favoured in our laws; and therefore many things are legally tolerated, with a view to the public good, which otherwife might not be done. Hence it is that monopolies are void in law, and that bonds and covenants to reftrain free trade, tillage, and the like, are adjudged void. 11 Co. Rep. 50. Plowd. 25. Shep. Epit. 270.

Common *Year.* See Year.

COMMONABLE Lands, in *Agriculture,* are fuch lands as are generally in fome meafure arable, and which belong, in property, to individuals who are known, and the limits of whofe property are afcertained: but which, in regard to their culture and mode of cropping, are fubject to certain regulations, which cuftom, for time immemorial, has eftablifhed, fo as gradually to have acquired the force of law, to which rules every individual occupying fuch property muft adhere, until thefe old cuftoms fhall be abrogated, either by the unanimous confent of all the individuals having a right to fuch commonable lands, or by an exprefs ftatute, obtained with their confent, for the purpofe of annulling them. In fome countries, Dr. Anderfon fays, it appears that not much lefs than one half of the whole arable lands are in this ftate; although it is evident, by the concurring teftimony of all the agricultural reports, that taking all thefe lands at an average, they do not afford half the produce the fame lands would do, if they were put under the ordinary management that appropriated farmers are fubjected to in their refpective diftricts: and not perhaps one tenth part of what they might eafily be made to afford, within a very fhort period of time, fhould all other obftructions to improvement be removed. It would be tirefome, he fays, to enumerate all the facts that occur in the different agricultural furveys, tending to point out the pernicious tendency of this mode of tenure: but a few of them may be mentioned. In one place it is ftated, that a few inclofures had been made, feemingly with the concurrence of all the parties concerned; but when the hedges had advanced nearly to become a fence, one of the commonable tenants went deliberately and pulled them up by the roots, and eradicated them entirely. In another cafe the parifhioners having come to an agreement to fow clover, after that practice had been univerfally acquiefced in for the fpace of eighteen years, one of the farmers, occupying fixteen acres of land, bought a large ftock of lean fheep in the month of May, and turned them on the clover crops, which were nearly in bloom, and no one could hinder him. In another cafe, where cuftom had eftablifhed the practice of having one corn crop, and one fallow, alternately, the occupiers of the diftrict came to an agreement to have two crops and a fallow alternately; but before the expiration of ten years, one of the farmers broke through the agreement, and turned his cattle upon the crops of beans, oats, and barley: in which plan he was followed by the reft of his neighbours; and the crops were, in confequence, totally deftroyed on that part of the field, which, agreeable to the ancient cuftom, fhould have been that year in fallow. Thefe notices, while they tend to illuftrate the nature of this particular kind of tenure, at the fame time, he fays, clearly demonftrate its pernicious tendency to the public. No one, who has confidered the fubject for a moment, but will readily admit, that it were much for the intereft of Britain that no fuch practice exifted in it: and that, of courfe, no time fhould be loft in endeavouring to eradicate it; for, were this effectually done, it muft appear evident from the facts ftated, that the total produce of the kingdom would be greatly augmented and improved. See Common.

COMMONALTY, comprehends one diftinction of the civil ftate; the nobility being the other; and like the nobility, includes feveral degrees of rank and condition. In Art. fuper Chartas, 28 Ed. 1. c. 1, the words "Tout le commune de l'Engleterre," fignify all the people of England. 2 Inft. 539. But the term is generally ufed for the middle rank of the king's fubjects, fuch of the commons as are raifed above the ordinary fort, and having the management of offices, are by that means one degree below burgeffes, who are fuperior to them in order and authority:—and companies incorporated are faid to confift of mafters, wardens, and commonalty, the firft two being the chief, and the others fuch as are ufually called of the livery. The ordinary people, and freeholders, or at beft knights and gentlemen, under the degree of baron, have been, of late years, called "communitas regni," or "tota terræ communitas;" yet anciently, if we credit Brady, the barons and tenants in capite, or military men, were the community of the kingdom, and thofe only were reputed as fuch in our moft ancient hiftories and records. Brady's Gloff. to his Introd. to Eng. Hift.

COMMONE, in *Ancient Geography,* the name of an ifland

in the Mediterranean, placed by Pliny on the coast of Ionia.

COMMONER, is used for a student in some universities, entered in a particular rank.

The word is also applied to a member of the house of commons, in contradistinction to a peer.

COMMONI, in *Ancient Geography*, a denomination given by Ptolemy to a people of Gallia Narbonnensis, who inhabited the country, including the town of Tauroentium, the promontory of Citharistes, the town of Olbia, that of Forum Julii, &c.

COMMONS, in a general sense, consist of all such men of property in the kingdom, as have not seats in the house of lords; every one of whom has a voice in parliament, either personally, or by his representatives. In a free state, says judge Blackstone, every man, who is supposed a free agent, ought to be in some measure his own governor; and, therefore, a branch at least of the legislative power should reside in the whole body of the people. And this power, when the territories of the state are small, and its citizens easily known, should be exercised by the people in their aggregate or collective capacity; as was wisely ordained in the petty republics of Greece, and the first rudiments of the Roman state. But this will be highly inconvenient, when the public territory is extended to any considerable degree, and the number of citizens is increased. Thus when, after the Social war, all the burghers of Italy were admitted free citizens of Rome, and each had a vote in the public assemblies, it became impossible to distinguish the spurious from the real voter, and from that time all elections and popular deliberations grew tumultuous and disorderly; which paved the way for Marius and Sylla, Pompey and Cæsar, to trample on the liberties of their country, and at last to dissolve the commonwealth. In so large a state as ours, it is therefore wisely contrived, that the people should do that by their representatives, which it is impracticable to perform in person; representatives chosen by a number of minute and separate districts, wherein all the voters are, or easily may be, distinguished.

COMMONS, in parliament, are the lower house, consisting of knights elected by the counties, and of citizens and burgesses by the cities and borough-towns. See BOROUGH, BURGESS, and KNIGHT.

In these elections, anciently, all the people had votes; but in the 8th and 10th of king Henry VI. for avoiding tumults, laws were enacted, that none should vote for knights but such as were freeholders, did reside in the county, and had forty shillings yearly revenue; equivalent to near 20*l.* a year of our present money: the persons elected for counties to be *milites notabiles*, at least esquires, or gentlemen fit for knighthood; native Englishmen, at least naturalized; and twenty-one years of age: no judge, sheriff, or ecclesiastical person, to sit in the house for county, city, or borough.

The *house of commons*, in Fortescue's time, who wrote during the reign of Henry VI. consisted of upwards of 300 members: in sir Edward Coke's time their number amounted to 493. At the time of the union with Scotland, in 1707, there were 513 members for England and Wales, to which 45 representatives for Scotland were added; so that the whole number of members amounted to 558.

In consequence of the union with Ireland, in 1801, 100 members were added for that country; and the whole house of commons now consists of 658 members: *viz.* 80 knights for 40 counties in England; 50 citizens for 25 cities (Ely sending none, and London four); 334 burgesses for 167 boroughs, and 5 burgesses for 5 boroughs, *viz.* Abingdon, Banbury, Bewdley, Higham Ferrers, and Monmouth; 4 burgesses for the two universities of Oxford and Cambridge; 16 barons for the 8 cinque-ports, *viz.* Hastings, Dover, Sandwich, Romney, Hythe, and their three branches, Rye, Winchelsea, and Seaford; 12 knights for 12 counties in Wales; 12 burgesses for 12 boroughs in that country; 30 knights for the shires of Scotland, and 15 burgesses for its boroughs; 64 knights and 36 burgesses for Ireland. For an account of the privileges of members of the house of commons, and other particulars, see PARLIAMENT.

COMMONS is also used in opposition to *nobles* or *peers*, viz. for all sorts of persons under the degree of a baron; including the orders of knights, esquires, gentlemen, the sons of the nobility, and yeomen. See each under its proper article, ESQUIRE, GENTLEMAN, YEOMAN, &c.

COMMONS, *Doctors*. See COLLEGE *of Civilians*.

COMMONS, *Proctor of the*. See PROCTOR.

COMMONS is also used for the stated and ordinary diet, or eating, of a college, inn of court, or other society. See INN, &c.

COMMONWEALTH. See REPUBLIC.

COMMONWEALTH *of England*, in *History*, a form of government introduced after the dissolution of the monarchy by the death of Charles I., in 1649. The change of government seems to have been suggested in the preceding year by a council of officers, who took into consideration a scheme called "The Agreement of the People;" being the plan of a republic to be substituted in the place of that government which they were demolishing; but the commonwealth was not established till after the tragical event of the king's death. Soon after this event, the house of commons published an act to forbid the proclamation of Charles Stewart, eldest son of the late king, or any other person, on pain of high treason. On the same day the lords desired a conference with the commons about settling the government and the administration of justice, the commissions of the judges having been determined by the king's death. The commons, without answering the message, voted the house of lords to be useless and dangerous, and therefore to be abolished. They only left the lords the privilege of being elected members of parliament, in common with other subjects. Thus, the parliament, which at first was composed of the king, 120 lords, and 513 commoners, was reduced to a house of commons, consisting of about 80 members, few of whom at the beginning had 500*l.* yearly income. Nevertheless, these few and inconsiderable members assumed the name of a parliament, and acted as if their body had been invested with the authority, which had before resided in the king, lords, and commons. But they were previously disposed and prepared for the business which they undertook to execute, and they were awed and supported by an army of near 50,000 men, formidable from its discipline and courage, as well as its number, and actuated by a spirit that rendered it dangerous to the assembly, which had assumed the command over it. It must be confessed, however, that in this parliament there were some men of distinguished capacity and integrity, and that if they adopted erroneous principles, or pursued those that were just and reasonable to an unwarrantable extent, they were destitute neither of talents nor of influence to defend and support them. The sovereign authority, as they maintained, resided originally in the people, by whom a part of it was committed to the kings, chosen to govern them according to law; and they alleged, that the king's abuse of this trust had broken the original contract between king and people, and that, in consequence of this violation, the contract subsisted no longer, but the sovereign power reverted to the people, as to its original source. Considering themselves as the representatives of the people, they conceived that they had

had a right to change the form of the government, without any regard to the original contract annulled by the king in his violation of the laws. Upon these principles, the commons, assuming the name of parliament, voted, and afterwards enacted, that the kingly office should be abolished as unnecessary, burdensome, and dangerous, and that the state should be governed by the representatives of the people in a house of commons without king or lords, and under the form of a commonwealth. The former oaths of allegiance and supremacy were abolished, and a new oath was prepared, called "The Engagement," by which every man swore, that he would be true and faithful to the government established, without king or peers. Justice was no longer to be administered in the king's name, but the name, style, and test of the writs were to be, "custodes libertatis Angliæ, authoritate parliamenti;" a new great seal was to be made; new money to be coined; and, in a word, every thing was to be set aside and abolished, that bore any marks of royalty. A great seal was therefore made, on one side of which was seen the parliament sitting, with this inscription: "the great seal of the parliament of the commonwealth of England;" and on the other side, the arms of England and Ireland, with these words, "the first year of freedom by God's blessing restored." This seal was committed to a certain number of persons, who were styled "keepers of the liberties of England." And it was ordained, that, for the future, all public orders should be dispatched in the name of these keepers, under the direction of the parliament. The parliament also made choice of 39 persons to form a council of state for the administration of public affairs under the parliament; to this council all addresses were made; they gave orders to all generals and admirals, executed the laws, and digested all business before it was brought into parliament. They professed to employ themselves entirely in adjusting the laws, forms, and plan of a new representation; and as soon as they should have settled the nation, they avowed their intention of restoring the power to the people, from whom, they acknowledged, they had wholly derived it. The parliament also erected a high court of justice, consisting of 60 members, to try some persons of distinction, who were in their power. The commonwealth, thus formed and established, found England composed into a seeming tranquillity by the terror of its arms. Foreign powers, occupied in wars among themselves, had no leisure nor inclination to interpose in the domestic dissensions of this island The young king, poor and neglected, living sometimes in Holland, sometimes in France, sometimes in Jersey, indulged the hope, among his present distresses, of better fortune at some future period. The situation alone of Scotland and Ireland occasioned any immediate inquietude to the new republic. As to the Scots, they were allowed for the present to take their own measures in settling their government; but Ireland demanded more immediately their efforts for subduing it. Cromwell, having obtained the appointment of lieutenant in that country by his interest in the council of state, lost no time in passing thither; and he proceeded with such uninterrupted success, that in the space of nine months he had almost entirely subdued it. Afterwards, leaving the command of Ireland to Ireton, who governed that kingdom in the character of deputy, he hastened home, and was declared captain-general of all the forces in England. Having received this honourable appointment, he immediately marched his forces and entered Scotland; where Charles, who had been invited thither, was making considerable progress, with an army of 16,000 men. Cromwell having gained a decisive victory over the Scots in the battle of Dunbar, and having taken possession of Edinburgh and Leith, followed the young prince in his march into England, and falling in with an army of about 30,000 men in the city of Worcester, he either killed or took prisoners the whole Scottish army, and obliged the king to fly; and at length to make his escape from Shoreham in Sussex, to Fescamp in Normandy. The ruling members of the commonwealth were destitute of those comprehensive views which might qualify them for acting the part of legislators. They made slow progress in the work to which they professed themselves devoted, that of settling a new model of representation and fixing a plan of government. The nation therefore began to apprehend, that they intended to establish themselves as a perpetual legislature, and to confine the whole power to 60 or 70 persons, who called themselves the parliament of the commonwealth of England. However, the republicans, by the turn of their disposition, and by the nature of the instruments which they employed, shewed themselves better qualified for acts of force and vigour than for the slow and deliberate work of legislation. Notwithstanding the distressed state of the kingdom, occasioned by contending factions and by the devastation of civil wars, the power of England had never, in any period, appeared so formidable to the neighbouring kingdoms as it did at this time, in the hands of the commonwealth. A numerous army served equally to retain every one in implicit subjection to established authority, and to strike a terror into foreign nations. The power of peace and war was lodged in the same hands with that of imposing taxes. The military genius of the people had, by the civil contest, been rouzed from its former lethargy; and excellent officers were formed in every branch of service. The confusion into which all things had been thrown, had given opportunity to men of low stations to work through their obscurity, and to raise themselves by their courage to commands which they were well qualified to exercise, but to which their birth could never have entitled them. And while so great a power was lodged in such active hands, it is no wonder that the republic was successful in all its enterprizes.

Notwithstanding all the successes that attended the military operations of the commonwealth, both by sea and land, some circumstances occurred which widened the breach that had subsisted for a considerable time between the parliament and the army. Cromwell also saw that the zealous republicans in the government entertained a jealousy of his power and ambition, and were resolved to bring him to a subordination under their authority. He, therefore, without scruple or delay, determined to prevent them. Accordingly he called a council of officers, under the pretence of expediting the establishment of that free and equal government which parliament had so long promised to the people. In this council Cromwell had many friends, and also some opponents. The measure which he proposed was debated by the officers; and during the debate, Cromwell received information, that the parliament was still sitting, and had come to a resolution not to dissolve themselves, but to fill up the house by new elections; and that at this very time it was engaged in deliberations with regard to this expedient. Cromwell in a rage, hastened to the house, taking with him a body of 300 soldiers, whom he arranged about the house. After waiting for some time in seeming suspence, and professing his reluctance in adopting the measure which he had previously determined to execute, that of dissolving the parliament, he carried it into effect in the most rude and violent manner; and, without the least opposition or murmur, though he loaded the parliament with the vilest reproaches, for their tyranny, ambition, oppression, and robbery of the public, he annihilated that famous assembly, which

which had filled all Europe with the renown of its actions, and with astonishment at its crimes, and the commencement of which was not more ardently desired by the people than its final dissolution. Parliament having been thus dissolved, Cromwell might have assumed the administration of the government by an authority similar to that with which he had dismissed the parliament. But he chose to proceed in his assumption of the sovereign power by more cautious steps, and with some appearance of respect for the popular opinion. Accordingly, by the advice of his council of officers, he sent summonses to 128 persons of different towns and counties of England, to five of Scotland, and six of Ireland; and he pretended by his sole act and deed to devolve upon these the whole authority of the state. This legislative power they were to exercise during 15 months; and they were afterwards to choose the same number of persons, who might succeed them in that high and important office. They immediately voted themselves a parliament, called by way of derision from Barebone, a leather-seller, one of their number, "Barebone's parliament;" and having their own consent, as well as that of Oliver Cromwell, for their legislative authori-, they now proceeded very gravely to the exercise of it. The members of this legislative assembly, of which Cromwell himself was ashamed, though he had introduced into it several members entirely devoted to his own interest, found themselves unequal to the burden imposed upon them; and having met, by consent, at an early hour, they agreed to dissolve themselves and to resign the sovereign authority into the hands from which they had received it. They hastened, therefore, to Cromwell, along with Rouse, their speaker; and by a formal deed of assignment restored to him the surpeme authority. The council of officers now proposed to adopt another scheme of government, and to temper the liberty of a commonwealth by the authority of a single person, who should be known by the appellation of protector. Without delay, Lambert, who made this proposition, prepared what was called "the instrument of government," containing the plan of this new legislature; and as it was supposed to be agreeable to the general, it was immediately voted by the council of officers. Cromwell was declared "Protector," and with great solemnity installed in that high office. The chief articles of the forementioned instrument are these: a council was appointed, the number of which was not to exceed 21, nor to be less than 13 persons. These were to enjoy their office during life or good behaviour; and in case of a vacancy, the remaining members named three, of whom the protector chose one. The protector was appointed supreme magistrate of the commonwealth; in his name all justice was to be administered; from him were all magistracy and honours derived; he had the power of pardoning all crimes, excepting murder and treason; to him the benefit of all forfeitures devolved. The right of peace, war, and alliance rested in him, with the advice and assistance of his council. The power of the sword was vested in the protector jointly with the parliament, while it was sitting, or with the council of state in the intervals. He was obliged to summon a parliament every three years, and allow them to sit five months without adjournment, prorogation, or dissolution. The bills which they passed, were to be presented to the protector for his assent; but if it were not obtained within twenty days, they were to become laws by the sole authority of parliament. A standing army for Great Britain and Ireland was established, of 20,000 foot and 10,000 horse; and funds were assigned for their support. These were not to be diminished without the consent of the protector; and in this article alone he assumed a negative. During the intervals of parliament, the protector and council had the power of enacting laws, which were to be valid till the next meeting of parliament. The chancellor, treasurer, admiral, chief governors of Ireland and Scotland, and the chief justices of both the benches, must be chosen with the approbation of parliament; and in the intervals, with the approbation of the council, to be afterwards ratified by parliament. The protector was to enjoy his office during life; and on his death, the place was to be immediately supplied by the council. Such was the instrument of government enacted by the council of officers, and solemnly sworn to by Oliver Cromwell. The council of state, named by the instrument, consisted of 15 persons; men entirely devoted to the protector, and by reason of the opposition among themselves in party and principles, not likely ever to combine against him. The military force of the country was exerted under this government with vigour, conduct, and unanimity; and never did the kingdom appear more formidable to all foreign nations. In September, 1654, a new parliament was summoned. Of 400 members, which represented England, 270 were chosen by the counties; the rest were elected by London, and the more considerable corporations; all the small boroughs having been deprived of their right of election, because they were the most exposed to influence and corruption. The lower populace, so easily guided or deceived, were also excluded from the elections; an estate of 200*l.* value was necessary to entitle any one to a vote. The elections of this parliament, says Mr. Hume, were conducted with perfect freedom; and excepting, that part of the royalists which had borne arms against the parliament and all their sons were excluded, a more fair representation of the people could not be desired or expected. Thirty members were returned from Scotland, and as many from Ireland. This parliament, having heard the protector's speech of three hours length, and having chosen Lenthal for their speaker, immediately entered into a discussion of the instrument of government, and of that authority, which Cromwell, by the title of protector, had assumed over the nation. The greatest liberty was used in arraigning this new dignity; and even the personal character and conduct of Cromwell escaped not without censure. The protector, surprised and enraged at the refractory spirit of the parliament, sent for them to the painted chamber, and authoritatively inveighed against their conduct. He obliged the members to sign a recognition of his authority, and an engagement not to propose or consent to any alteration in the government, as it was settled in a single person and a parliament; and he placed guards at the door of the house, who allowed none but subscribers to enter. Most of the members, after some hesitation, submitted to this condition; but retained the same refractory spirit which they had manifested in their first debate. Cromwell hastened to the dissolution of this dangerous assembly, and having ordered their attendance, he delivered to them a tedious, confused, angry harangue, and dismissed them.

In 1656, Cromwell, having gained by his administration so much lustre and success abroad, and so much order and tranquillity at home, ventured to summon a parliament; having taken previous measures for filling the house with his own creatures and partisans. He found, however, that the majority would not be favourable to him. He, therefore, set guards on the door, who permitted none to enter but such as produced a warrant from his council; and the council rejected about a hundred, who either refused a recognition of the protector's government, or were on other accounts obnoxious to him. These protested against a violence which was subversive of all liberty; but every applica-

tion for redrefs was neglected both by the council and parliament. In this parliament a motion was made to beftow the crown on Cromwell; and no furprife or reluctance was difcovered on the occafion. A formal motion was afterwards made to the fame purpofe; but it produced great diforder, and divided the houfe into parties. The bill was however voted by a confiderable majority; and a committee was appointed to reafon with the protector, and to overcome thofe fcruples which he pretended againft accepting fo liberal an offer. Cromwell's chief difficulty arofe from the oppofition of the foldiers; and he juftly dreaded a mutiny in the army. At length he determined to decline the acceptance of that crown, which the reprefentatives of the nation, in the moft folemn manner, had tendered to him. The parliament, when Cromwell had rejected the royal dignity, found themfelves obliged to retain the name of a commonwealth and protector; and as the government had hitherto been a manifeft ufurpation, it was thought proper to fanction it by a feeming choice of the people and their reprefentatives. Accordingly, inftead of "the inftrument of government," which was the work of the general officers alone, an "humble petition and advice" was framed, and offered to the protector by the parliament. This was reprefented as the great bafis of the republican eftablifhment, regulating and limiting the powers of each member of the conftitution, and fecuring the liberty of the people to the moft remote pofterity. By this deed, the authority of protector was in fome particulars enlarged; in others, it was confiderably diminifhed. He had the power of nominating his fucceffor; he had a perpetual revenue affigned him, of a million a year for the pay of the fleet and army, and 300,000*l.* for the fupport of civil government; and he had authority to name another houfe, the members of which fhould enjoy their feats during life, and exercife fome functions of the former houfe of peers. But he abandoned the power affumed in the intervals of parliament, of framing laws with the confent of his council; and he agreed, that no members of either houfe fhould be excluded but by confent of that houfe, of which they were members. The other articles were much the fame with thofe contained in the inftrument of government. This model of government, the humble petition and advice, was accepted for the voluntary deed of the whole people in the three united nations; and Cromwell, as if his power had juft commenced from this popular confent, was anew inaugurated in Weftminfter Hall, after the moft folemn and pompous manner.

In 1658 the parliament was again affembled; confifting, as in the times of monarchy, of two houfes, the commons and the other houfe: Cromwell, during the interval having fent writs to his houfe of peers, which confifted of 60 members. Upon the death of Cromwell in 1658 (fee CROMWELL) the council recognized the fucceffion of his fon Richard. A parliament was called; and in hopes of obtaining greater influence in elections, the ancient right was reftored to all the fmall boroughs; and the counties were allowed no more than their ufual members. The houfe of peers, or the other houfe, confifted of the fame perfons that had been appointed by Oliver. All the commons, at firft, figned an engagement, without hefitation, not to alter the prefent government; they next proceeded to examine "the humble petition and advice," and after much debate it was confirmed. But though parliament acquiefced, cabals were formed againft the new protector by the army. Richard, who poffeffed neither penetration nor refolution, was prevailed on to give an unguarded confent for calling a general council of officers; but as foon as they were affembled, they voted a remonftrance; and they propofed that the whole military power fhould be entrufted to fome perfon, in whom they might all confide. The protector, who was in his difpofition gentle, humane, and generous, was juftly alarmed at the movements of the officers; nor was the parliament lefs alarmed at the military cabals. They voted that there fhould be no meeting or general council of officers, except with the protector's confent, or by his orders. This enraged the officers, who haftened to Richard, and demanded of him a diffolution of the parliament. The parliament was diffolved; and by the fame act, the protector was, by every one, confidered as dethroned. Soon after he figned his dimiffion in form: and withdrawing into retirement, extended his peaceful life to an extreme old age. The council of officers, now poffeffed of fupreme authority, deliberated what form of government they fhould eftablifh. It was agreed at laft to revive the long parliament, which had been expelled by Cromwell. The members of this parliament did not exceed 70; but they refolved, fince they enjoyed the title of the fupreme authority, and obferved that fome appearance of a parliament was requifite for the purpofes of the army, not to act a fubordinate part to thofe who acknowledged themfelves as their fervants. They chofe a council confifting of 7 perfons, who fhould nominate to fuch commands as became vacant; and they voted, that all commiffions fhould be received from the fpeaker, and be affigned by him in the name of the houfe. The general officers were difgufted by thofe precautions; but the ftate of the country prevented their manifefting their difguft. As foon as an interval occurred, they renewed their hoftility, and expelled the parliament. The officers, again poffeffed of fupreme authority, elected a committee of 23 perfons, of whom 7 were officers, whom they pretended to inveft with fovereign authority; and they called them "the committee of fafety." On the approach of danger, Lenthal the fpeaker was invited by the officers to fummon the parliament, which had twice before been expelled, with fo much reproach and ignominy. But general Monk was advancing with his army, and having fent a meffage to the parliament from St. Alban's, defiring them to remove from London thofe regiments, which had fo lately offered violence to their affembly; he marched towards London and took quarters at Weftminfter. He afterwards required parliament, in the name of the citizens, foldiers, and whole commonwealth, to iffue writs for the filling of their houfe, and to fix the time for their own diffolution, and the affembling of a new parliament. The parliament attempted to conciliate the general, and difpatched a committee to him for this purpofe; but he refufed to hear them, except in the prefence of fome of the fecluded members. Thefe members, upon the general's invitation, were reftored; and the long parliament, after having paffed fome refolutions for the compofure of the kingdom, diffolved itfelf, and iffued writs for the immediate affembling of a new parliament. When the parliament met, meafures were taken for the reftoration of Charles II,; he was proclaimed in the prefence of the two houfes, on the 8th of May, and on the 29th, which was his birth-day, the king entered London. Rapin's Hift. vol. xi. Hume's Hift. vol. vii.

COMMORANCY, in *Law*, an abiding or dwelling in any place; as an inhabitant of an houfe in a vill, &c. Commorancy for a certain time may make a fettlement in a parifh. Commorancy confifts in ufually lying in a certain place. Dalt. Blackft. Com. iv. 273.

COMMORTH, from the Brit. *Cymmorth*, q. d. fubfidium, a contribution which was gathered at marriages, and when young priefts faid or fung the firft maffes, &c. See ftat. 4 Hen. IV. c. 27. But ftat. 26. Hen. VIII. c. 6, prohibits levying any fuch in Wales, or the marches, &c. Cowel.

COM-

COMMOTAU, or Chomston, in *Geography*, a town of Bohemia, in the circle of Saatz. Large quantities of alum are prepared here. It is diſtant 10 miles N. W. of Saatz, 38 S. of Dreſden, and 42 N. W. of Prague.

COMMOTE, an ancient term in Wales, denoting half a cantred, or hundred; containing fifty villages. Stat. Walliæ, 12 Ed. I.

Wales was anciently divided into three provinces; each of theſe ſubdivided into cantreds; and every cantred into two *commotes*, or half hundreds.

Silveſter Girald, however, tells us, in his Itinerary, that a *commote* is but a quarter of a hundred. Commote alſo ſignifies a great ſigniory or lordſhip, and may include one, or divers manors. Co. Litt. 5.

COMMOTION, an inteſtine motion, or luctation in the parts of any thing.

In medicine, the term is chiefly uſed for a blow, or ſhake of the brain. A convulſion is a commotion of the fine medullary fibres of the brain. A fall occaſions a commotion, whence frequently ariſes a counterſtroke on the oppoſite part; which occaſions ſometimes a contrafiſſure, and at other times a rupture of the veſſels, and an impoſthume, by ſhaking the whole maſs of the brain.

COMMUNAM, *Appropriare*. See Appropriare, &c.

COMMUNANCE, a name formerly given to the commoners, or tenants and inhabitants, who had the right of common or commoning in an open field, &c. Cowley.

COMMUNE, in the preſent *organization* of France, denotes the ſubdiviſion of a canton, including ſometimes a ſingle town, and ſometimes an union of ſeveral villages, poſſeſſing a mayor, and a communal municipality. All the conſiderable cities are divided into ſeveral communes.

Commune *Concilium Regni Angliæ*, denotes the common council of the king and people aſſembled in parliament.

Commune *Rectum*. See Rectum.

COMMUNEM *Legem, Writ of Entry ad*. See Legem.

COMMUNIA *Placita non tenenda in ſcaccario*, an ancient writ directed to the treaſurer and barons of the Exchequer, forbidding them to hold plea between "common perſons," (*i. e.* not debtors, to the king, who alone originally ſued and were ſued there) in that court, where neither of the parties belong to the ſame. Reg. Orig. 187. But little obedience would be now paid to ſuch a writ, if any officers were to dare to iſſue it; for the court of Exchequer ſeems, by preſcription, to have attained a concurrent juriſdiction in civil ſuits with the other courts in Weſtminſter-hall.

COMMUNIBUS *Locis*, a Latin term, in frequent uſe among philoſophical, &c. writers; implying ſome medium, or mean relation between ſeveral places.

Dr. Keil ſuppoſes the ocean to be one quarter of a mile deep, *communibus locis, q. d.* at a medium, or taking one place with another.

Communibus *Annis*, has the ſame import with regard to years, that *communibus locis* has with regard to places.

Mr. Derham obſerves, that the depth of rain, *communibus annis, i. e.* one year with another, were it to ſtagnate on the earth, would amount to, at Townly in Lancaſhire, 42½ inches; at Upminſter, in Eſſex, 19¼; at Zurich, 32¼; at Piſa, 43¼; and at Paris, to 19 inches.

COMMUNICANS *Arteria Cerebri*, in *Anatomy*, is a branch of the internal carotid artery, which joins with a branch of the profunda cerebri, to form the circle of Willis. See Arteries.

COMMUNICATING, in *Theology*, the act of receiving the ſacrament of the Eucharist.

Thoſe of the *reformed*, and of the Greek church *communicate* under both kinds; thoſe of the Romiſh only under one.

The oriental communicants receive the ſpecies of wine by a ſpoon; and anciently they ſucked it through a pipe, as has been obſerved by Beat. Rheanus on Tertullian.

COMMUNICATION, the act of imparting a thing to another, or making him a ſharer with us therein.

The uſe of ſpeech is for the communicating of our ideas and ſentiments to each other.

Communication is alſo uſed for the connection of one thing with another; or the paſſage from one place to another. Anciently, it was frequent to have ſubterraneous communications between one place and another.

Communication, *Bridge of*. See Bridge.

Communication, in *Military Language*. Communications are all ſorts of ways or paſſages, above or below ground, which lead from different parts of the works to mines, or from one work to another. Thoſe are beſt, which cannot be annoyed by the enemy, but are ſecure againſt his fire. A place cannot be long or obſtinately defended without good communications; whereas, on the other hand, if theſe be good, it may hold out, if well garriſoned, and ſufficiently furniſhed with every thing neceſſary for defenſive operations, for a length of time. When its ditches are filled with water, or a river runs through it, floating bridges, boats, &c. ſerve as communications.

Communications *in and with a Camp*. In every camp there ſhould be communications between the different parts; and each of the principal, or more neceſſary ones, ought to be wide enough for forty or fifty men to walk abreaſt. As to communications with a camp, ſee the article Camp.

Communications *in the Attack of a Place*. Beſiegers ought to, and generally do, take care to join their works with one or ſeveral communications. All thoſe which they conſtruct in the parallels, on the glacis, and on the counterſcarp, communicate one with another. And as it generally happens, that the beſiegers' quarters in their camp are ſeparated by rivers, great or ſmall, or by marſhes, it is not only neceſſary, but of the firſt importance, to make cauſeways acroſs the marſhes and bridges of communication, acroſs the rivers, either on wooden frames, or on batteaux. It is better, however, to make them on frames or piles, if poſſible, as they are generally ſafer and ſtronger when ſo conſtructed, eſpecially if the place be in a ſituation to open a large ſluice of water capable of breaking thoſe placed on batteaux, as actually happened at the ſiege of Valenciennes, which the beſiegers were obliged to raiſe with loſs. That place was beſieged in 1656 by the French, under the command of the marſhals de Turenne and de la Ferté Senneterre. But the Spaniards, commanded by Don Juan of Auſtria, and the prince of Condé, made them raiſe the ſiege. And their quarters being ſeparated by the breaking of their bridges of communication, one half of their army was entirely routed, and the marſhal de la Ferté was made priſoner. In like manner, when the French were beſieging Turin with 72,000 men, prince Eugene, obſerving that one of their quarters was ſeparated from the reſt by rivers, and that their bridges were bad and neglected, attacked them in that place with 24,000 only, defeated them, and raiſed the ſiege.

The bridges ſhould be made very ſtrong and ſecure; and on every communication of difficulty or importance, there ſhould be at the leaſt four, at the diſtance of forty or fifty fathoms from one another. The avenues to them ought to be rendered as eaſy and practicable as poſſible. Guards ſhould be placed near them for their ſecurity, and to prevent their receiving any injury. And they ſhould always

always be made within the line of circumvallation, for the ſafety of thoſe who paſs and repaſs.

COMMUNICATION *of idioms*, in *Theology*, the act of imparting the attributes of one of the natures in Jeſus Chriſt to the other.

The communication of idioms is founded on the ſuppoſed union of two natures in the perſon of Chriſt: by this communication of idioms it is, that ſome divines ſay, God ſuffered, died, &c. which is ſtrictly underſtood of the human nature; and ſignifies that God ſuffered in his humanity, that he died as to his human nature, &c.

The Lutherans carry the communication of idioms ſo far, as to ſay, that Jeſus Chriſt is not only in his divine nature, and by reaſon of his divine perſon, but alſo really and properly in his humanity, immortal, immenſe, &c.

COMMUNICATION *of motion*, that act of a moving body, whereby another body at reſt is put by it in motion, or a body already in motion is accelerated.

F. Malebranche looks on the *communication of motion* as ſomething metaphyſical; *i. e.* as not neceſſarily ariſing from any phyſical principles, or any properties of bodies, but flowing from the immediate agency of God: there being, according to him, no more connection, or dependence, between the motion or reſt of one body, and that of another, than between the form, colour, magnitude, &c. of one body, and thoſe of another. The motion of one body, therefore, on his principle, is not any phyſical cauſe of that of another. See CAUSE.

The communication of motion reſults from, and is an evidence of the impenetrability and inertia of matter as ſuch: unleſs we admit the hypotheſis of penetrable matter, advanced by M. Boſcovich and Mr. Michell, and aſcribe to the powers of repulſion thoſe effects which have been uſually aſcribed to its ſolidity and actual reſiſtance. See MATTER.

Action, and re-action, ſir Iſaac Newton demonſtrates, are equal and oppoſite; ſo that one body ſtriking againſt another, and thereby occaſioning a change in its motion, does itſelf undergo the very ſame change in its own motion, the contrary way. See MOTION.

Hence, a moving body ſtriking directly againſt another at reſt, the one loſes juſt as much of its motion as it communicates to the other; and they will proceed with the ſame velocity as if united into one maſs. For the laws and quantity of motion ſo communicated, either in elaſtic or non elaſtic bodies; ſee COLLISION.

COMMUNICATION, *communicatio*, in *Rhetoric*. See ANACOINOSIS.

COMMUNI CUSTODIA, in *Law*, a writ which anciently lay for the lord, whoſe tenant holding by knight's ſervice died, and left his eldeſt ſon under age, againſt a ſtranger that entered the land, and obtained the ward of the body. F. N. B. 89. Reg. Orig. 161. Since the ſtat. 12. Car. II. c. 24., hath taken away wardſhips, this writ is of no uſe.

COMMUNION, in *Theology*, an uniform belief in ſeveral perſons; whereby they are united under one head, in one CHURCH. See UNITY, UNIFORMITY, &c.

In this ſenſe, the Lutherans, Calviniſts, &c. are ſaid to have been cut off from the Romiſh *communion*.

This is the primitive uſe of the word *communion*, as appears from the canons of the council of Elvira.

Though the term has been more extenſively applied to denote a general agreement in matters of doctrine, diſcipline, and worſhip. And unleſs the term be underſtood in this large ſenſe, ſo various are the opinions of men, there could be no *communion* among the members of any one church on earth.

COMMUNION is alſo uſed for the act of *communicating* in, or participating of, the ſacrament of the EUCHARIST. The fourth council of Lateran decrees, that every believer ſhall receive the communion, at leaſt, at Eaſter; which ſeems to import a tacit deſire, that they ſhould do it oftener; as, in effect they did it much oftener in the primitive days. Gratian, and the maſter of the ſentences, preſcribe it as rule for the laity to communicate three times a year, at Eaſter, Whitſuntide, and Chriſtmas. But in the thirteenth century, the practice was got on foot, never to approach the euchariſt except at Eaſter; and the council thought fit to enjoin it then by a law, leſt their coldneſs and remiſſneſs ſhould go farther ſtill.

And the council of Trent renewed the ſame injunction, and recommended frequent communion without enforcing it by an expreſs decree.

In the ninth century, the communion was ſtill received by the laity in both kinds; or, rather the ſpecies of bread was dipped in the wine, as is owned by the Romaniſts themſelves. Acta SS. Benedict Sæc. III. M. de Marca obſerves, that they received it at firſt in their hands, Hiſt. de Bern, and believes the communion under one kind alone to have had its riſe in the Weſt under pope Urban II. in 1096, at the time of the conqueſt of the Holy Land. And it was more ſolemnly enjoined by the council of Conſtance in 1414. The twenty-eighth canon of the council of Clermont enjoins the communion to be received under both kinds, diſtinctly; adding, however, two exceptions; the one of neceſſity, the other of caution, *niſi per neceſſitatem, & cautelam;* the firſt in favour of the ſick, the ſecond of the abſtemious, or thoſe who had an averſion from wine.

It was formerly a kind of canonical puniſhment, for clerks guilty of any crime, to be reduced to *lay communion.* i. e. only to receive as the laity did, *viz.* under one kind.

They had another puniſhment of the ſame nature, though under a different name, called *foreign communion;* to which the canons frequently condemned their biſhops, and other clerks. This puniſhment was not any excommunication, or depoſition; but a kind of ſuſpenſion from the function of the order; and a degradation from the rank they held in the church. It had its name becauſe the communion was only granted to the criminal on the foot of a foreign clerk, *i. e.* being reduced to the loweſt of his order, he took place after all thoſe of his rank, as all clerks, &c. did in the churches to which they did not belong. The ſecond council of Agda orders every clerk that abſents himſelf from the church, to be reduced to foreign communion.

COMMUNION, *Infant.* Some inſtances occur in the early ages of the church, of the practice of adminiſtering the euchariſt to infants: and ſome few have imitated this practice in more modern times. Mr. Pierce pleads the uſe of it even to this day among the Greeks, and in the Bohemian churches till near the time of the Reformation; and he refers to the uſage of the ancient churches, recorded by Photius, Auguſtin, and Cyprian. He urges from Scripture the right which children have to all the privileges of which they are capable, as well as the Jewiſh children under the law, who were allowed to eat of the paſſover, and other ſacrifices. To which it has been anſwered, that the ſacrifices, of which they were allowed to partake, were chiefly peace offerings, which became the common food of the family, and were not conſidered as acts of devotion in ſuch a degree as our euchariſt. He replies to the objection founded on the incapacity of infants to examine themſelves and diſcern the Lord's body, by obſerving that the precept extends only to thoſe who were capable of underſtanding and complying with it; on the ſame ground that faith is required previous to baptiſm. Biſhop Bedell ſuggeſts the following inquiry relative to this ſubject; what neceſſity of baptiſing infants,

infants, if their baptifm produces no effect till they come to years of difcretion? To which he replies, though the moft principal effect be not attained prefently, the lefs principal are not to be refufed: fo children were circumcifed, who could not underftand the reafon of it, and the fame alfo did eat the paffover: and fo did children baptized, in the primitive church, communicate in the Lord's fupper: which I know not (fays he) why it fhould not be fo ftill; *de quo alias*. It has been alleged, that the foundation of this practice was a miftaken apprehenfion of the abfolute neceffity of this ordinance in order to falvation, refulting from an erroneous interpretation of John vi. 53. See Bifhop Bedell's Letter to Dr. Ward, in p. 442 of Archbifhop Ufher's Life by Parr. Pierce's Effay on the Euchariſt. Wail's Hift. of Infant Baptifm, part ii. chap. 9. § 15 and 16. Waterland's Review of the Doctrine of the Euchariſt, and preface to his two volumes of Pofthumous Sermons, p. 32, &c. and Inquiry concerning Infant Communion, vol. ii. p. 75, &c.

Communion *fervice*, denotes that part of the liturgy of the church of England which relates to the adminiftration of the facrament. See Liturgy.

Communion-*table*. See Altar.

COMMUNIS Capsulæ. See Capsula.

Communis *ductus choledochus*. See Ductus.

Communis *digitorum manus extenfor*. See Extensor.

Communis *labiorum depreffor*. See Depressor.

Communis *labiorum elevator*. See Elevator.

Communis *mifericordia*. See Misericordia.

COMMUNITY, a fociety or body of men united together under certain common laws, agreed on among themfelves, or impofed by a fuperior.

The Romans, who feem to have given the firft hint of communities to the feveral nations into which their empire was divided, doubtlefs borrowed it from fome rules of their neighbours: they call them *colleges*; which term, among them, had nearly the fame fignification with community among us. For an account of the introduction and eftablifhment of communities in Europe, fee *Charters of* Community and City. See alfo Corporation and Croisade.

Communities now are of two kinds, *ecclefiaftic* and *laic*; the firft are either *fecular*, as chapters of cathedral and collegiate churches; or *regular*, as convents, monafteries, &c.

Lay communities are of various kinds; fome contracted by a fixed abode of a year and a day in the fame place; others formed by the difcharge of the fame office, the profeffion of the fame art, or attending the fame place of worfhip, as thofe of parifhes, fraternities, &c.

Accordingly, the word is commonly underftood of pious foundations for the fupport of feveral perfons, either in a fecular or regular life; as *colleges*, *abbies*, *convents*, *priories*, *feminaries*, *hofpitals*, *inns*, &c.

Community is more particularly ufed in the French law, for the joint property in goods between the hufband and the wife: the refult of which is, that during marriage they are equally intitled to all effects, and liable to all debts, contracted either before or under marriage.

Community is a fpecies of fucceffion, and the acceptance of community refembles an *additio hereditatis*.

Community was fet on foot in favour of the wives, to enter them as fharers in their hufband's effects.

In countries where the civil law obtains, this community has no place, nor even in feveral cuftomary countries, as being reputed a burden on the man.

Anciently, the woman's fhare in the community was only one-third; and this appears ftill the fenfe of the law among us, the widow, at the deceafe of her hufband, being only intitled to one-third part of the moveables.

Community, *continued*, in the *French Law*, is that which fubfifts between the furvivor of two perfons joined in marriage, and the minor children of that marriage, when the furvivor has not made an inventory of the effects in poffeffion during marriage. The widow may either renounce community with her children, or continue it.

Community, *tacit*, is a community contracted between a man and woman, by the mere mingling of their effects, provided they have lived together the fpace of a year and a day: this community, being odious, is now abolifhed.

Community, *Charters of*. See Charters *of Community*.

Community *of Goods*, as it has been fometimes denominated, fignifies a practice which was adopted for a fhort time in the primitive church, and which confifted principally in a common ufe, derived from an unbounded liberality, that induced the opulent to fhare their riches with their indigent brethren. The rich fupplied the wants of their neceffitous brethren with fuch liberality and promptitude, that, as St. Luke tells us (Acts ii. 4. iv. 32.) among the primitive difciples of Chrift, all things were *in common*. This expreffion, however, has been greatly abufed, fays Mofheim (E. H. v. i. p. 60), and has been made to fignify a "community of rights, goods, and poffeffions," than which interpretation nothing is more groundlefs, nothing more falfe. From a multitude of reafons, as well as from the exprefs words of St. Peter (Acts v. iv.) it evidently appears, that the community which is implied in mutual ufe, and mutual liberality, is the only thing intended in this paffage. This is very clearly and fatisfactorily proved by Mofheim, in a differtation concerning the true nature of the community of goods, which is faid to have taken place in the church of Jerufalem. This learned difcourfe is to be found in the fecond volume of his excellent work entitled, "Differtationes ad Hiftoriam ecclefiafticam pertinentes." Mr. Gibbon (fee Hift. Decl. and Fall of Rom. Emp. vol. ii. p. 341) has given a very uncandid and unjuft ftatement of this ancient Chriftian practice, and inftead of confidering it as honourable to the liberality and mutual benevolence of the firft difciples, he feems to attach reproach and cenfure to it; when he fuggefts that the community of women, and that of temporal goods, may be confidered as infeparable parts of the fame fyftem. He alfo obferves that it was of the fame kind with that which had fo agreeably amufed the imagination of Plato, and which fubfifted in fome degree among the auftere fect of the Effenians; although it was undoubtedly of a very different nature. This author further adds, that the progrefs of the Chriftian religion relaxed, and gradually abolifhed this generous inftitution, which, in hands lefs pure than thofe of the apoftles, would too foon have been corrupted and abufed by the returning felfifhnefs of human nature; and the converts who embraced the new religion were permitted to retain the poffeffion of their patrimony, to receive legacies and inheritances, and to increafe their feparate property by all the lawful means of trade and induftry. Bifhop Watfon (fee his "Apology for Chriftianity,") has juftly obferved, that the expreffion "permitted to retain," in ordinary acceptation, implies an antecedent obligation to part with; but, as he adds, we have no account in fcripture of any fuch obligation being impofed upon the converts to Chriftianity, either by Chrift himfelf, or by his apoftles, or by any other authority: nay, in the very place where

where this community of goods is treated of, there is an exprefs proof to the contrary. When Peter was about to inflict an exemplary punifhment upon Ananias (not for keeping back a part of the price, as fome men are fond of reprefenting it, but) for his lying and hypocrify, in offering a part of the price of his land as the whole of it; he faid to him, "Whilft it remained (unfold) was it not thine own? and after it was fold, was it not in thine own power?" From this account it is evident, that Ananias was under no obligation to part with his patrimony; and after he had parted with it, the price was in his own power; the apoftle would have "permitted him to retain" the whole of it, if he had thought fit: though he would not permit his prevarication to go unpunifhed.

Pythagoras not only taught his difciples to be contented with a little, but even deprived them of all command over their own property, by cafting the poffeffions of each individual into a common ftock, to be diftributed by proper officers, as occafion fhould require. From the time of this fequeftration of their goods, as long as they continued members of this fociety, they lived upon the footing of perfect equality, and fat down together daily at a common table. If any one, however, repented of the connection, he was at liberty to depart, and might reclaim, from the general fund, his whole contribution.

Community *of the kingdom.* See Commonalty.

COMMUTATION, in *Aftronomy. Angle of* Commutation, is the diftance between the fun's true place feen from the earth, and the place of a planet reduced to the ecliptic. See Place.

Thus the angle ESR (*Plate* V. *Aftronomy, fig.* 11.) fubtended between the fun's true place, E, viewed from the earth at S, and that of a planet reduced to the ecliptic, R, is the angle of commutation.

The angle of commutation, therefore, is found by fubtracting the fun's longitude from the heliocentric longitude of the planet R; or contrarily.

Commutation, in *Law*, a change of a penalty, or punifhment, *viz.* of a greater for a lefs, &c. as when death is commuted for, by banifhment or perpetual imprifonment, &c. Suits are, and always were, allowable in the fpiritual court, for money agreed to be given as a commutation for penance. Art. Cler. 9 Edw. II. c. 4. F. N. B 53.

Some doubt whether the word be properly applied to any change but that of punifhment: others will have it indifferently ferve for the exchanging, or trucking of any thing.

Commutation *Act*, an act paffed during the feffion of parliament in 1784, as part of a fyftem for the prevention of fmuggling; fo called becaufe, whilft it gave up the exifting duties and excife on teas, it propofed an additional tax on windows, not as a new tax, but as a *commutation* for the portion of the duties on tea which it furrendered. The plan of the framers of this bill was to take off all the excife duty on tea, and impofe a cuftom duty of 12 *l.* 10 *s.* on Bohea tea, which, it was apprehended, would ruin the fmuggling trade in that article. On the finer kinds of tea, a higher duty would be laid; 15 *l.* per cent. on fouchong, &c.; 20 *l.* on finglo and hyfon; and 30 *l.* on congo. The total annual importation of teas into Europe amounted to about 19,000,000 *lbs.*, above two-thirds of which quantity were confumed in Great Britain and Ireland, though the legal importation was not quite 6,000,000; confequently the quantity annually fmuggled muft have been above 7,000,000 *lbs.* According to this calculation, the people of England were confiderably under-rated at the number of 6,000,000. Of thefe it was faid that 2,000,000 would be relieved from the payment of the prefent duty on tea, without being obliged to contribute a farthing towards the tax which would be propofed as a fubftitution; the other 4,000,000, it was calculated, would, one with another, confume 3 *lbs.* of tea each in the year, for each pound of which, they, at this time, paid on an average 2*s.* 7*d.* duty; this duty, or the principal part of it being taken off, they could, of courfe, afford to pay a fubftituted tax, which was propofed to be raifed in the following manner:

On every houfe with feven windows, which houfe was alfo rated to the houfe tax, it was intended to lay an additional tax of 3 *s.* and fo on, charging 8 *s.* for every houfe of eight windows; 9 *s.* for thofe of nine windows; 10*s.* 6*d.* for thofe of ten windows, and fo on, adding 2 *s.* 6 *d.* for each window up to 24, and ftill rifing up to 180 windows, for which 20 *l.* per annum fhould be paid, over and above the duty at prefent paid on windows and houfes. This regulation was calculated to produce above 700,000 *l.*; fo that with the new duty on tea, the produce would be near 900,000 *l.* It was fuggefted that, according to this plan, the public revenue would be a confiderable gainer, and the people at the fame time have no reafon to complain of additional burdens. In England, Scotland, and Wales, it was calculated that there were about 699,058 houfes, which might be divided into the following claffes; 286,293 houfes under feven windows; 211,483 houfes having from 8 to 10 windows; 38,324 of 11 windows; 24,919 from 12 to 13; 67,652, from 14 to 19; 52,652, of 20 windows and upwards; and 17,732 houfes in Scotland. Of thefe about 200,000 as being excufed from the houfe-tax would pay nothing to this new tax, and the inhabitants being of the poorer fort, would be wholly delivered from the duty on tea. This regulation, it was fuppofed, would check, or rather abfolutely ruin, the fmuggling trade; befides being productive of other benefits to the fair trader, and particularly to the Eaft India Company. Againft this bill, which, however, paffed into a law, many objections have been urged. To the Eaft India Company, it has been argued, this act enfured certain advantage; but thofe which the public were to derive from it are lefs obvious and certain. It has been faid that thofe houfholders who were to be charged with the new rate for windows were precifely the perfons who fhould have received the reciprocal benefit of the commutation: but that the reverfe of this is undoubtedly the cafe; they who do not pay the *new* window-tax, or indeed *any* window-tax at all, being the only perfons who fhare among them any little advantages that have accrued from the agreement. The facts are thefe: Of the five different forts of teas confumed by the public, there are *three* which are chiefly ufed by thofe who pay the new window tax, *viz.* congo, fouchong, and hyfon. The price of the two former of thefe (which are the moft ufed of the three) has been fo inconfiderably reduced, as to afford nothing like a pecuniary compenfation for the additional window-tax, and the price of the third fort, hyfon, which is the deareft and the leaft ufed, though rather more reduced, is ftill wholly difproportionate to the promifed commutation. The only two forts of tea, therefore, where the reduction of price is at all confiderable, are bohea and finglo; and thofe are in general confumed by the lower orders of people only. From thefe facts it has been inferred, that they who pay the new tax confume thofe forts of tea, from which not *one-fixth* of the propofed faving arifes; while they who do not pay any tax at all, or at moft a fmall portion of it, confume thofe fpecies of tea upon which almoft *the whole of the faving*, or at leaft upwards of *five-fixths* of it arifes. The act has been deemed, by thofe who

who ſtrenuouſly oppoſed it, unjuſt in its principle, and oppreſſive in its operation.

COMNENA, Anna, in *Biography*, daughter of the emperor Alexius Comnenus, flouriſhed about the year 1118, and wrote fifteen books upon the life and actions of her father, which ſhe called the "Alexiad." She has been accuſed of a too great partiality in favour of her hero, for which, conſidering her near relationſhip, ſhe may claim an indulgence. This work was publiſhed with a Latin tranſlation in 1661, and again in 1670; to this laſt edition are added notes hiſtorical and philological by the learned Du Freſne.

COMNENO, in *Geography*, a town of European Turkey, in the province of Albania; 36 miles S.E. of Albaſano.

COMO, Da, Fra. Emanuello, in *Biography*, ſo called from the place of his nativity, a conſiderable town in the ſtate of Milan, was an hiſtorical painter, whoſe taſte for the art was firſt called forth upon his ſeeing ſome painters at work in the cathedral of Como. Without the direction of any maſter, he afterwards attained ſome degree of eminence. His works, however, are of very unequal merit; he painted in the refectory of a convent at Como a "Laſt Supper," by which but an indifferent idea of his talents could be formed, were not his character retrieved by an excellent picture in the church repreſenting a Pieta with Sainto. He died aged 76, in the year 1701. Orlandi. Lanzi, Storia Pittorica.

Como, in *Geography*, a ſtrong, populous, and commercial town of Italy, and capital of a diſtrict in the Milaneſe, built by the Gauls, under the conduct of Brennus, ſituated at the ſouth end of a lake to which it gives name, in a plain, almoſt ſurrounded with mountains. The town is encompaſſed by a wall, guarded with picturesque towers, and backed by a conical eminence, on which ſtand the ruins of an ancient wall. The houſes are almoſt wholly built of ſtone; and the cathedral is a handſome edifice of white marble, hewn from the neighbouring quarries. The inhabitants have eſtabliſhed ſeveral manufactures of cotton and ſilk, and carry on ſome trade with the Griſons. This town being diſtinguiſhed as the birth-place of Pliny the younger, his ſtatue is placed in a niche on the outſide of the church, and has a Latin inſcription bearing the date of 1499. It is diſtant 20 miles N. of Milan, in N. lat. 45° 44′. E. long. 8° 57′.

Como, *Lake of*, a lake of Italy in the Milaneſe, on the confines of Swiſſerland, about 32 miles long and 88 in circumference. At firſt it is ſcarcely a quarter of a mile broad, but it widens near a neck of land upon which is ſituated the ſmall village of Turnio. Towards the ſouth it is divided into two branches, at the end of one of which ſtands Como, and at the end of the other Lecco. The river Adda paſſes through it, and ſeveral country houſes and villages are ſituated on its banks, which are adorned with vines, cheſnuts, and almond-trees. The neighbourhood of Turnio, and the diſtricts bordering the lake of Como, ſupply, for the moſt part, thoſe Italian emigrants, who wander through Europe vending barometers and thermometers, of whom numbers annually reſort to England.

COMOCLADIA, in *Botany* (from Κομοω, *comatus ſum;* and Κλαδος, *ramus;* ſo called becauſe the branches have a tuft of leaves at the end, bearing a fancied reſemblance to a head of hair.) Linn. Gen. 49. Schreb. 66. Lam. Ill. 65. Willd. 82 Juſſ. 370. Vent. 3. 444. Claſs and order, *triandria monogynia*. Nat. Ord. *Terebintaceæ;* Juſſ. Vent.

Gen. Ch. *Calyx* one-leafed, three or four cleft, ſpreading, coloured; ſegments roundiſh. *Cor.* Petals three or four, roundiſh-egg-ſhaped, acute, flat, widely ſpreading, a little larger than the calyx. *Stam.* Filaments three or four, awl-ſhaped, ſhorter than the corolla; anthers roundiſh, incumbent. *Piſt.* Germ ſuperior, egg-ſhaped; ſtyle none; ſtigma obtuſe, ſimple. *Peric.* Drupe oblong, ſomewhat curved, marked at the top with three dots; nut membranous, the form of the drupe. *Seed* ſingle.

Eſſ. Ch. Calyx three, rarely four-cleft. Petals three or four. Drupe oblong; with one ſeed.

Sp. 1. C. *integrifolia*. Linn. Sp. Pl. 1. Mart. 1. Lam. 1. Ill. 423. Willd. 1. Jacq. Amer. 12. Brown. Jam. 124. Lam. Ill. tab. 27. fig. 1. (Prunus racemoſa; Sloan. Jam. 2. 131. tab. 222. fig 1.) "Leaflets entire, ſmooth on both ſides." A tree, ſeldom more than twenty feet high. *Trunk* erect, of a moderate thickneſs; branches few, leafy at the end in open tufts. *Leaves* unequally winged, two feet long, leaflets not more than ſeventeen, four inches long, ovate-lanceolate, acuminate, ſlightly wrinkled by the tranſverſe veins, a little revolute at the edges. *Flowers* very numerous, ſmall, ſeſſile, without ſcent, of a deep red colour, in panicled racemes; racemes about twenty-four, a foot and a half long, branched, pendulous, always with a few quadrifid tetrandrous flowers intermixed with the others. A native of Jamaica, and St. Domingo. It abounds in a watery, ſlightly glutinous juice, which grows black when expoſed to the air, and ſtains the hands ſo as ſcarcely to be waſhed off. The wood is hard, of a fine grain, and reddiſh colour. 2. C *dentata*. Linn. Sp. Pl. 2. Mart. 2. Lam. 2. Ill. 425. Willd. 2. Jacq. Amer. 13. tab. 173. fig. 4. Pict. 12. tab. 259, fig. 2. "Leaflets egg-ſhaped, acute, toothed, ſomewhat prickly, veined and villous underneath." A tree much like the preceding. *Trunk* upright with few branches. *Leaves* a foot and half long, in tufts at the ends of the branches; leaflets from thirteen to twenty-one, oblong, acuminate, ſhining above, edged with prickly teeth. A native of Cuba. Its juice is milky, glutinous, turning very black in the air, durably ſtaining woollen and linen cloth, corroding the ſkin and rendering it ſcaly, ſmelling like liver of ſulphur, or the human excrement. The natives have an idea that to ſleep under it is dangerous. 3. C. *ilicifolia*. Swartz Prod. 17. Mart. 13. Lam. Ill. 424. Ill. tab. 27. fig. 2. (C. tricuſpidata; Nouv. Act. Acad. Paris, 1784, p. 347. Ilex dodonæa; Linn. Dodonæa; Plum. Gen. 20. tab. 118. fig. 1.) "Leaves roundiſh angular-ſpinous, ſmooth on both ſides." *Leaflets* ſeſſile, rigid, in crowded pairs terminated by an odd one. *Flowers* comparatively few; panicle very ſlender; racemes generally ſimple. A native of the Weſt Indies. La Marck's figure was taken from a dried ſpecimen. Willdenow has both an ilicifolia and an anguloſa, quoting for the latter La Marck's figure in oppoſition to La Marck himſelf. His error ſeems to have been occaſioned by miſtaking the ſynonym from Plumier, given by Linnæus, as a ſpineleſs variety of his ilex dodonæa, which Willdenow read D. aquifolii folio anguloſo *et* aculeato, inſtead of *non* aculeato, as it ſtands in the ſpecies plantarum.

Propagation and Culture.—The firſt two ſpecies have been propagated in England, by ſeeds obtained from their native climate. They require the ſame treatment as other tropical plants.

COMODI, Andrea, in *Biography*, an hiſtorical painter, who was born at Florence in 1560. He became at once the diſciple and companion of Ludovico Cigoli, and was ranked amongſt the beſt Florentine artiſts of his time, but the extreme

treme difficulty which he found in fatisfying himfelf with his own productions, has occafioned their number to be very fmall, confidering the great age to which he lived. After having gone through the regular routine of academic ftudy, he went to Rome, where he fpent many years, and painted feveral frefcoes, particularly one in the tribuna of the church of St. Vitale, a compofition of many figures, reprefenting Chrift bearing his crofs, and on each fide ftories of martyrdoms. One of his moft efteemed eafel pictures was a "Magdalen in the Defert," for which the cardinal Barbarini prefented him with five hundred crowns, a very large price in thofe times. His pictures of "Madonas" are very highly efteemed for the beauty of their colouring and the delicacy with which they are finifhed, and above all for an elegance and lightnefs of form, joined to an expreffion of virgin modefty peculiarly their own. His numerous copies of the pictures of Coreggio, and other great mafters are much efteemed. He died in the year 1638. Baldinucci. Lanzi, Storia Pittorica.

COMOMBO, in *Geography*, or *the hill of Ombo*, anciently *Onebos*, a town of Egypt, fituated to the fouth of Thebes and on the fame fide of the river, where are ftill feen confiderable ruins of an ancient temple. The inhabitants of this place were famous for the worfhip of the crocodile, which they fed in their ponds (according to Ælian), where they became fo tame, as to obey when they were called.

COMONAVA, a town of European Turkey, in the province of Macedonia; 60 miles N.N.E. of Akrida.

COMOPOLIS, in *Ancient Geography*, a town of Afia, in Affyria, according to Ptolemy.—Alfo, a town of Afia Minor, furnamed *Modrena*.—Alfo, a town of Afia Minor, in Phrygia Salutaris, furnamed *Meros*, the fame with *Myré*.

COMORA Isles, in *Geography*, are African iflands in the Indian ocean, between the north-end of the ifland of Madagafcar and the coaft of Zanguebar, generally reckoned five in number, Johanna, Mayotta, Mohilla, Angazi, Comora, though fome enumerate three, others four, and others eight, between the 41ft and 46th degree of E. long. and the 10th and 14th of S. lat., at an equal diftance from Madagafcar and the continent of Africa. The largeft is Johanna, which fee. As the Comora ifles abound in horned cattle, fheep, hogs, a variety of fruits and rice, they ferve to refrefh the European fhipping to and from India. The inhabitants are negroes of the Mahommedan religion; but they entertain the European feamen with great humanity.

Comora, one of the fore-mentioned iflands, which gives name to the whole clufter, about 6 leagues long, and three wide, but little known. S. lat. 11° 50′. E. long. 43°.

COMORIN, Cape, the fouthernmoft part of the fouthern Hindooftan, N.W. of the ifland of Ceylon. Though not above nine miles in extent, this promontory unites the two oppofite feafons of the year, owing to a ridge of mountains called the *Ghauts*, on the fouth fide of which trees are feen loaded with bloffom and fruit, whilft on the north fide, the fame fort of trees are ftripped of all their leaves. N. lat. 8°. E. long. 77° 32′ 30″.

COMORN, Comorra, Lat. a town of Hungary, and capital of a diftrict, to which it gives name. It is fo well defended by a fortrefs that the Turks could never take it. Its chief inhabitants were Hungarians, or Rafcians, who belong to the Greek church. In 1783 it was almoft wholly deftroyed by an earthquake: 36 miles S.E. of Prefburg, and 34 S.E. of Vienna.

COMORTH. See Commorth.

COMOSÆ, in *Botany*, the thirty-fixth natural order in the Philofophia Botanica of Linnæus, which he afterwards abolifhed. It contained only fpiræa, filipendula, and aruncus. Thefe are now all united in fpiræa, and the genus referred to the order pomaceæ.

COMOSANDALOS, in *Antiquity*, a crown of flowers worn in the feftival Chthonia.

COMOUCKS, in *Geography*, the Tartar inhabitants of Comania or Dagheftan in Afia, under the protection of Perfia. They are ferocious robbers. Every town has a chief named *Myrfa*; and the head of thofe chiefs chofen from among themfelves is called *Schmkal*.

COMPACH, a river of Carinthia, which runs into the Moll, near Vellach.

COMPACT, in *Phyfics*, is a relative term, denoting a body to be clofe, denfe, and heavy; having few pores, and thofe fmall ones. The heavieft metals, as gold and filver, are the moft *compact*. See Gravity.

Compact, in a *Legal Senfe*, fignifies an agreement, or a contract, ftipulated between feveral parties. A compact carries with it an obligation equal in point of confcience to that of a law; but the original of the obligation is different. In compacts, we ourfelves determine and promife what fhall be done, before we are obliged to do it; whereas in laws, we are obliged to act without ourfelves determining or promifing at all. See Contract.

Compact is alfo the name of a celebrated bull, confirmed by pope Paul IV. relating to the cardinals.

In virtue of the bull of *compacts*, cardinals can only confer benefices in their natural ftate; i.e. regular benefices on regulars.

COMPAGES *circularis montium*, a term devifed by Kircher to exprefs what he in other places calls the annularity, or annular difpofition of Mountains, which he fays run in continued chains, forming belts or ridges in the manner of fpines, all round the globe of the earth, from north to fouth, and fo on from that point to north again, and in the fame manner from eaft to weft, and from weft to eaft again.

COMPAGNE, Fr. The cabin of the commander or chief of a galley.

COMPAGNIES *aux Gardes*. Thefe were the companies of infantry that compofed the regiment of French guards, making part of the houfehold troops of the king for the exterior guard. And it was ufual to fay *Capitaine aux Gardes, Lieutenant aux Gardes*, &c.

Compagnie *Ecoffoife*. See Gendarmerie or *Gardes du Corps*.

Compagnies *d'Ordonnance*. Thefe were companies that never formed corps or regiments, like the *gendarmes*, the light horfe, the mufketeers, &c.

Compagnies *des Gardes*. The four companies of horfe-guards made part of the troops of the houfehold of the kings of France for the interior guard. Thus, in fpeaking of that corps, it was ufual to fay, a captain of the guards, a lieutenant of the guards, &c. It was cuftomary to fpeak in the fame manner of Swifs guards.

Compagnies *Franches*, Fr. Thefe free companies were not regimented, but in time of war were put on a certain eftablifhment. Each of them had a chief, who commanded it. They were generally compofed of dragoons, huffars, and foot foldiers. All thofe who ferved in thefe corps or companies were called *partifans*. They were employed in making incurfions into the enemy's country, and laying it wafte as much as they could. An officer, who had ferved fome campaigns as a partifan, could not eafily afterwards ferve with regular troops. They are a fort of voluntary pirates, who know no kind of fubordination but that which is peculiar to themfelves. When thefe troops have chiefs that

that are hardy, brave, and intelligent, they render important ſervices to armies.

COMPAGNIE *du Guet a pied.* See the article MARÉCHAUSSEÉ.

COMPAGNIE *du Lieutenant criminel de Robecourte.* See alſo the article MARÉCHAUSSÉE.

COMPAGNIE *d'Ordonnance a cheval.* See the ſame article.

Independent company is one that is not incorporated into a regiment. Two ſuch companies generally belong to each regiment in England, for the purpoſe of ſupplying the regiments with recruits.

COMPAGUS, in *Antiquity*, a kind of ſummer-ſhoe worn by the Roman ſenators, conſiſting only of a ſole at the bottom; it was faſtened with leathern ſtraps, croſſing one another many times about the leg.

Rubenius makes the *compagi* to have been a ſort of caligæ worn by the roman generals as well as ſenators. Under the later emperors, in the middle age, we read of the ſame worn by popes, biſhops, and abbots.

COMPANION *of the Garter*, an appellation diſtinguiſhing one of the knights of that moſt noble order, at the head of which is the king, as ſovereign. Stat. 24 Hen. VIII. c. 13. See GARTER.

COMPANY, a collective term, underſtood of ſeveral perſons aſſembled together in the ſame place, or with the ſame deſign. See SOCIETY.

The word is formed of the French *compagnie*, and that of *companio* or *companies*, which, Chifflet obſerves, are found in the Salic law, tit. 66. and are properly military words, underſtood of ſoldiers, who, according to the modern phraſe, are comrades, or meſs-mates, i. e. lodge together, eat together, &c. of the Latin *cum*, *with*, and *panis*, *bread*. It may be added, that in ſome Greek authors under the Weſtern empire, the word κωμπανια occurs in the ſenſe of *ſociety*.

COMPANY, in *Commerce*, is an aſſociation of ſeveral merchants, or others, who unite in one common intereſt, and contribute by their ſtock, their counſel, and ſtudy, to the ſetting on foot, or ſupporting, of ſome lucrative eſtabliſhment.

Though *company* and ſociety, or fellowſhip, be in effect, the ſame thing, yet cuſtom has made a difference between them; ſociety, or partnerſhip, being underſtood of two, or three dealers, or not many more; and *company* uſually of a greater number. See SOCIETY.

A ſecond difference between *companies* and ſocieties is, that the firſt, eſpecially when they have excluſive privileges, cannot be eſtabliſhed without the conceſſion of the prince; and need letters patent, charters, &c. Whereas, for the latter, the conſent of the members, fixed and certified by acts and contracts, and authorized by bye laws, is ſufficent.

The ſeveral profeſſions and trades exerciſed in the city of London, being incorporated into diſtinct fraternities, governed by their particular laws, a tabular view of them may not be unacceptable.

The abſtract of their incorporations, and particular privileges, is taken from the records of the Tower, &c. and from the Firma-Burgi of Madox, the king's hiſtoriographer; the account of their charities from thoſe eminent hiſtorians Stow and Strype; and the fines of the liverymen on admiſſion, are taken from the returns to the clerk of the parliament, and the ſcrutiny-books made after the ſeveral polls for the magiſtrates and repreſentatives of the city.

The companies are here placed according to their precedence, beginning with the twelve principal ones, of one or other of which the lord mayors have generally made themſelves free at their election, if they were not ſo before; for they are not only the oldeſt, but the richeſt, many of them having had the honour of kings and princes to be their members, and the apartments of their halls being fit to entertain a monarch.

	Companies.	Halls.	Incorporated by	A. D.	Livery fines *l.*	*s.*	*d.*	Charitable Gifts paid yearly *l.*	and Privileges, &c.
1	Mercers	Cheapſide	Richard II.	1393	2	13	4	3000	Excluſive of 20 per cent. paid yearly to the widows of ſubſcribing clergymen during life, purſuant to a propoſal accepted in 1698, when they ſettled a fund of 14,000*l.* a year for that purpoſe.
2	Grocers	Poultry, Groc. alley	Edward III.	1345	20	0	0	700	
3	Drapers	Throgmorton ſtreet	Henry VI.	1439	25	0	0	4000	
4	Fiſhmongers	Thames-ſtreet	Henry VIII.	1536	13	6	8	800	
5	Goldſmiths	Foſter-lane	Richard II.	1393	20	0	0	1000	They had a privilege from Ed. IV. to inſpect, try, and regulate all gold and ſilver wares throughout the kingdom, and to puniſh all workers in either that was adulterated.
6	Skinners	Dowgate-hill	Edward III.	1327	15	0	0	700	
7	Merchant Taylors	Threadneedle-ſtreet	Edward IV.	1466	20	0	0	2000	They were once ſtyled taylors and linen armourers.
8	Haberdaſhers	Maiden-lane	Henry VI.	1407	25	0	0	3500	Were anciently ſtyled Milaners, becauſe they dealt in moſt that came from Milan.
9	Salters	Swithin's-lane	Q. Elizabeth	1558	20	0	0	500	
10	Ironmongers	Fenchurch-ſtreet	Edward IV.	1464	31	10	0	1800	In 1724, Mr Betton, a Turkey merchant, left 26,000*l.* in truſt; one moiety of the profits of it to be always applied to the ranſom of Britiſh captives from Mooriſh ſlavery; the other for the poor of the company, and to the charity-ſchools in its city and its liberty.
11	Vintners	Thames-ſtreet	Henry VI.	1437	31	13	4	600	
12	Clothworkers	Mincing-lane	Edward IV.	1482	31	10	0	1400	

	Companies	Halls.	Incorporated by	A. D.	Livery fines	Charitable Gifts, paid yearly, and Privileges, &c.
					l. s. d.	l.
13	Dyers	Elbow-lane	Edward IV.	1472	15 0 0	
14	Brewers	Addle ſtreet	Henry VI.	1438	6 13 4	
15	Leatherſellers *	Little St. Helens	Henry VI.	1442	20 0 0	* Hen. VII. made their wardens inſpectors of ſheep, lamb, and calves leather throughout the kingdom.
16	Pewterers ‡	Lime-ſtreet	Edward IV.	1474	20 0 0	‡ By act of Parl. 25 Hen. VIII. their wardens had the inſpection of pewter throughout England.
17	Barber-ſurgeons †	Monkwell-ſtreet	Edward IV.	1461	10 0 0	† In the reign of Hen. VIII. the ſurgeons of this company, then but 19, were exempted by parliament from ward and pariſh offices, and from military ſervice. They were incorporated ſeparately by 18 Geo. II. cap. 15. and the company of ſurgeons had an elegant hall in the Old Bailey, with a theatre for the diſſection of human bodies. They now form a royal college, and their houſe is in Lincoln's Inn fields.
18	Cutlers	Cloak-lane	Henry V.	1417	10 0 0	
19	Bakers	Harp-lane	Edward II.	1307	10 0 0	
20	Wax-chandlers	Maiden lane	Richard III.	1483	5 0 0	
21	Tallow-chandlers	Dowgate-hill	Edward IV.	1463	15 0 0	
22	Armourers §	Coleman-ſtreet	Henry VI.	1423	15 0 0	§ The braſiers are united to this company.
23	Girdlers ‖	Baſinghall-ſtreet	Henry VI.	1449	5 0 0	‖ Q. Elizabeth incorporated the pinners and wire-drawers with them.
24	Butchers †	Pudding-lane	James I.	1615	11 11 0	† This is an ancient fraternity; of which we have an account in the reign of Henry II. A. D. 1180.
25	Sadlers	Cheapſide	Edward I.		10 0 0	
26	Carpenters	London-wall	Edward III.	1344	8 0 0	
27	Cordwainers	Diſtaff-lane	Henry IV.	1410	10 0 0	
28	Painter-ſtainers	Little Trinity-lane	Q. Elizabeth	1582	14 0 0	
29	Curriers	Near Cripplegate	James I.	1605	9 13 4	
30	Maſons	Baſinghall-ſtreet	Charles II.	1677	5 0 0	
31	Plumbers	Near Dowgate-hill	James I.	1611	10 0 0	
32	Innholders	Elbow-lane	Henry VIII.	1515	10 0 0	
33	Founders **	Lothbury	James I.	1614	8 0 0	** All braſs weights made in London, or three miles from it, muſt be ſized with the company's ſtandard, and have their mark; the averdupois to be ſealed at Guildhall, and the troy at goldſmith's hall. And the company are empowered by charter, to view and ſearch all braſs weights, and braſs and copper wares made within the ſaid diſtrict.
34	Poulters	No hall	Henry VII.	1504	10 0 0	
35	Cooks	Hall burnt	Edward IV.	1480	10 0 0	
36	Coopers	Baſinghall-ſtreet	Henry VII.	1501	15 0 0	
37	Tylers and bricklayers	Leadenhall-ſtreet	Q. Elizabeth	1568	12 0 0	
38	Bowyers	No hall	James I.	1620	8 0 0	
39	Fletchers ¶	St. Mary Axe	No charter		10 0 0	¶ It is only a company by preſcription.
40	Blackſmiths	Lambeth-hill	Q. Elizabeth	1577	8 0 0	
41	Joyners and cielers	Thames-ſtreet	Q. Elizabeth	1569	8 0 0	
42	Weavers	Baſinghall-ſtreet	Henry II.		6 0 0	
43	Woolmen	No hall	No charter		No livery; but they have a maſter, 2 wardens, and 11 aſſiſtants. They are only a company by preſcription, yet ſuppoſed to have commenced with the wool-trade.	
44	Scriveners	No hall	James I.	1616	5 0 0	
45	Fruiterers	No hall	James I.	1605	5 0 0	
46	Plaiſterers	Addle ſtreet	Henry VII.	1501	8 0 0	
47	Stationers ††	Ludgate-ſtreet	Philip & Mary	1557	20 0 0	†† This company, which alſo includes bookſellers, letter-founders, printers, and book-binders, have a ſtock which is employed in printing almanacks, primers, pſalters, ſchool-books, &c. of which they have the ſole privilege, by virtue of a grant from the crown. This ſtock conſiſts of ſhares, which are diſtributed in different proportions among thoſe who have fined for, or ſerved the office of renter-wardens: whoſe ſhares, if they die married, devolve to their widows. They pay above 200*l.* a year in penſions and other charities. They are likewiſe truſtees for the diſpoſal of the conſiderable legacies of Mr. William Bowyer, a learned printer, (who died Nov. 18, 1778) conſiſting of 30 *l.* a year to the moſt learned journeyman that can be met with; and 180 *l.* a year in annuities of 20 *l.* each to nine neceſſitous printers of ſixty-three years of age or upwards; beſides other charities.
48	Broderers	Gutter-lane	Q. Elizabeth	1591	5 0 0	
49	Upholders	No hall	Charles I.	1627	4 10 0	
50	Muſicians	No hall	James I.	1604	10 0 0	

	Companies.	Halls.	Incorporated by	A. D.	Livery fines. l. s. d.	Charitable Gifts, paid yearly, and Privileges, &c.
51	Turners	College-hill	James I.	1604	8 0 0	
52	Baſket-makers	No hall	No charter			No livery; yet a company by preſcription, governed by 2 wardens and 48 aſſiſtants, with this motto to its arms, *Let us love one another.*
53	Glaſiers ‖	No hall	Charles I.	1637	3 0 0	‖ The glaſs painters are incorporated with them.
54	Horners	No hall	Charles I.	1638		No livery; yet they have a maſter, 2 wardens, and 9 aſſiſtants, with a warehouſe in Spitalfields; where they divide in lots, among themſelves, ſuch horns as are bought up by their members in Leadenhall and other markets: And in 1465, they obtained an act of parliament that none ſhould be exported, but ſuch as they refuſed.
55	Farriers	No hall	Charles II.	1673	5 0 0	
56	Paviours	No hall	No charter			No livery; yet it is a fellowſhip by preſcription, with 3 wardens, and 25 aſſiſtants.
57	Loriners	London-wall	Q. Anne	1712	10 0 0	
58	Apothecaries	Blackfryars	James I.	1617	16 0 0	They are exempt from ward and pariſh-offices, and have a ſpacious phyſic-garden at Chelſea; which in 1721 was granted to the company for ever by Sir Hans Sloane, bart. the lord of the manor, on condition of their paying a quit-rent of 5 *l.* and continuing it always as a phyſic-garden, and of preſenting every year to the Royal Society fifty ſamples of different ſorts of plants, there grown, till they amount to two thouſand. — The latter of theſe conditions hath been long ſince more than completed. This is what may be called a trading company.
59	Shipwrights	No hall	James I.	1605		No livery; yet they have a maſter, 2 wardens, and 16 aſſiſtants.
60	Spectacle-makers	No hall	Charles I.			No livery; yet have a maſter, 2 wardens, and 15 aſſiſtants.
61	Clock-makers	No hall	Charles I.	1632	10 0 0	
62	Glovers	No hall	Charles I.	1638	5 17 4	
63	Comb-makers	No hall	Charles I.	1636		No livery; yet they have a maſter, 2 wardens, and 13 aſſiſtants.
64	Felt-makers	No hall	James I.	1604	5 0 0	
65	Framework-knitters	Red croſs-ſtreet	Charles II.	1663	10 0 0	
66	Silk-throwers	No hall	Charles I.	1630		No livery; yet have a maſter, 2 wardens, and 20 aſſiſtants.
67	Silkmen	No hall	Charles I.	1631		No livery; yet have a governor, and 20 aſſiſtants.
68	Carmen, have no hall, nor charter, nor livery; but are a fellowſhip by act of common council, with the title of Free Carmen of the city of London, and have a maſter, 2 wardens, and 41 aſſiſtants, under the direction of the lord mayor and aldermen. The carts that belong to this fellowſhip, which are betwixt 4 and 500, are, by an act of common council, ſubjected to the rule of the preſident and governors of Chriſt's Hoſpital; to whom the owner of every cart pays 17 *s.* 4 *d.* a year for a licence to work it, and every cart is brought to the hoſpital to have a number in braſs put upon it.					
69	Pin-makers	No hall	Charles I.	1636		No livery; yet have a maſter, 2 wardens, and 18 aſſiſtants.
70	Needle-makers	No hall	O. Cromwell	1656	5 5 0	
71	Gardeners	No hall	James I.	1616		No livery; yet have a maſter, 2 wardens, and 18 aſſiſtants.
72	Soap makers	No hall	Charles I.	1630		No livery; yet have a maſter, 2 wardens, and 18 aſſiſtants.
73	Tin-plate-workers	No hall	Charles II.	1670	10 0 0	
74	Wheelwrights	No hall	Charles II.	1670	15 15 0	
75	Diſtillers	No hall	Charles I.	1638	13 6 8	
76	Hatband-makers	No hall	Charles I.	1638		Incorporated with the company of needle-makers.
77	Patten-makers	No hall	Charles II.	1670	6 0 0	
78	Glaſs-ſellers and looking-glaſs-makers	No hall	Charles II.	1664	5 0 0	
79	Tobacco-pipe-makers	No hall	Charles II	1663		No livery; yet have a maſter, 2 wardens, and 18 aſſiſtants.
80	Coach and harneſs-makers	Noble-ſtreet	Charles II.	1677	10 0 0	
81	Gunſmiths	No hall	Charles I.	1638	10 0 0	
82	Gold and ſilver wire-drawers	No hall	James I.	1623		No livery; yet have a maſter, 2 wardens, and 18 aſſiſtants.
83	Long-bow-ſtring-makers	No hall	No charter			No livery; yet a company by preſcription, and have 2 wardens, and 19 aſſiſtants.

	Companies.	Halls.	Inorporated by	A. D.	Livery fines.	Charitable Gifts paid yearly, and Privileges, &c.
84	Card-makers	No hall	Charles I.	1629		No livery; yet have a mafter, 2 wardens, and 18 affiftants.
85	Fan-makers	No hall	Q. Anne	1709		No livery; yet have a mafter, 2 wardens, and 20 affiftants.

86 Woodmongers were a company incorporated with the carmen by K. James I. 1605, but furrendered their charter in 1668; by an act of common council in 1694, they obtained a privilege of keeping 120 carts, exclufive of the number kept by the carmen, *extinct*.

	Companies.	Halls.	Inorporated by	A. D.	Charitable Gifts paid yearly, and Privileges, &c.
87	Starch-makers, *extinct*	No hall	James I.	1622	
88	Fifhermen, *extinct*	No hall	James II.	1687	
89	Parifh-clerks	Wood-ftreet	Henry III.	1233	By a decree of the Star chamber court in 1625, they obtained a privilege to keep a prefs in their hall, for printing the weekly bills of mortality, by a perfon appointed by the archbifhop of Canterbury. They are, by their charter, to make a report of all the weekly chriftenings and burials in their feveral parifhes every Tuefday, and they have a mafter, 2 wardens, and 17 affiftants.

90 Porters, are another fellowfhip, without hall, or livery; confifting of tackle and ticket-porters. They were conftituted a fraternity by act of common council in 1646, with a power of annually chufing among themfelves twelve rulers, being fix of each denomination. However, the court of lord mayor and aldermen have referved to themfelves a power of appointing one of their own body, as the chief judge in all controverfies. One very laudable cuftom of the mafter tackle-porters is, that fuch of their brethren as happen to be difabled from working, receive their fhare of all profits, as if actually in bufinefs, during life.

91 The watermen, wherrymen, and lightermen of this city and neighbouring places, were by act of K. William III. conftituted a fociety, or company, under the direction of the lord mayor and aldermen. They are to furnifh 1000 men for the navy, upon demand by the admiralty. They have a hall at Coal Harbour, near the Thames; and pay to their poor about 800 *l.* a year; chiefly raifed by ferries over the Thames on Sunday.

N. B. The company of Surgeons, Parifh-clerks, Porters and Watermen, have not the privilege of making their members freemen of the city of London.

From the foregoing lift, it appears on the whole, that there are ninety-one companies, forty-eight halls, and that the number of liverymen, according to the moft exact account that could be procured, in 1779, was 8954, but this number is variable. The fums of money yearly diftributed in charity by only twenty-three of the companies, amounts to more than 23,655 *l.*; and if but fortypounds each be annually given by the remaining fixty-eight companies, the whole will much exceed 26,375*l.* per annum.

Company feems more peculiarly appropriated to thofe grand affociations, fet on foot for the commerce of the remote parts of the world; as the Englifh and Dutch Eaft India company, South Sea company, Miffiffippi company, &c.; the rife and eftablifhment of which, we fhall here fet before the reader.

However injurious companies with joint-ftock, and incorporated with exclufive privileges, may, at this time, be reckoned to the nation in general; it is yet certain that they were the general parent of all our foreign commerce: private traders being difcouraged from hazarding their fortunes in foreign commerce, until the method of traffic had been firft fettled by joint-ftock companies. From this principle it is, that we find feveral nations that are now endeavouring to improve their trade, and to eftablifh or increafe marine power, by the means of joint-ftock companies.

But fince the trade of this kingdom, and the number of traders have increafed, and the methods of affurance of fhipping and merchandife, and the navigation to all parts of the known world have become familiar to us; thefe companies, in the opinions of moft men, have been looked upon in the light of monopolies: their privileges have therefore been leffened from time to time, in order to favour a free and general trade; and experience has fhewn, that the trade of the nation has advanced, in proportion as monopolies have been difcouraged. When companies do not trade upon a joint-ftock, but are obliged to admit any perfon properly qualified, upon paying a certain fine, and agreeing to fubmit to the regulations of the company, each member trading upon his own ftock, and at his own rifk, they are called *regulated companies*. When they trade upon a joint-ftock, each member fharing in the common profit or lofs in proportion to his fhare in this ftock, they are called *joint-ftock companies*. Such companies, whether regulated or joint-ftock, fometimes have, and fometimes have not, exclufive privileges. Regulated companies refemble, in every refpect, the corporations of trades, fo common in the cities and towns of all the different countries of Europe; and are a fort of enlarged monopolies of the fame kind. As no inhabitant of a town can exercife an incorporated trade, without firft obtaining his freedom in the corporation; fo in moft cafes no fubject of the ftate can lawfully carry on any branch of foreign trade, for which a regulated company is eftablifhed, without firft becoming a member of that company. Of companies of this kind we have had, or ftill have, in Great Britain, the Hamburgh company, the Ruffia company, the Eaftland company, the Turkey company, and the African company. Regulated companies, as fir Jofhua Child has obferved, though they had frequently fupported public minifters, had never maintained any forts or garrifons in the countries to which they traded; whereas joint-ftock companies frequently had. And in reality, fays Dr. Smith, (Wealth of Nations, vol. iii. p. 116.) the former feem to be much more unfit for this fort of fervice than the latter; partly, becaufe the directors of a regulated company have no particular intereft in the profperity of the general trade of the country, for the fake of which fuch forts and garrifons are maintained; whereas the private intereft of the directors of a joint-ftock company, is connected with the profperity of the general trade of the company, and with the maintenance of the forts and garrifons which are neceffary for its defence; and partly, becaufe the directors of the latter company have always the management of a large capital, the joint-ftock of the company, a part of which they may frequently employ, with propriety, in building, repairing, and maintaining fuch neceffary forts and garrifons; whilft

the directors of a regulated company, having the management of no common capital, have no other fund to employ in this way, but the casual revenue arising from the admission fines, and from the corporation duties imposed upon the trade of the company.

Joint-stock companies, established either by royal charter or by act of parliament, differ, in several respects, not only from regulated companies, but from private copartneries. 1st. In a private copartnery, no partner, without the consent of the company, can transfer his share to another person, or introduce a new member into the company. Each member, however, may, upon proper warning, withdraw from the copartnery, and demand payment of his share of the common stock. In a joint-stock company, on the contrary, no member can demand payment of his share from the company; but each member can, without their consent, transfer his share to another person, and thereby introduce a new member. 2dly. In a private copartnery, each partner is bound for the debts contracted by the company to the whole extent of his fortune; whereas, in a joint-stock company, each partner is bound only to the extent of his share. The trade of a joint-stock company is always managed by a court of directors, which is frequently subject, in a variety of respects, to the controul of a general court of proprietors; but these proprietors, being for the most part totally exempted from trouble and from risk, beyond a limited sum, receive contentedly such half-yearly or yearly dividends, as the directors think proper to assign; and many persons are encouraged to become adventurers in joint-stock companies, who would, upon no account, hazard their fortunes in any private copartnery. The directors of such companies being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Negligence and profusion must always prevail, more or less, in the management of the affairs of such a company. It is upon this account that joint-stock companies for foreign trade have seldom been able to maintain the competition against private adventurers. They have, accordingly, very seldom succeeded without an exclusive privilege, and frequently have not succeeded with one. Without an exclusive privilege, they have commonly mismanaged the trade; with an exclusive privilege, they have both mismanaged and confined it. For other appropriate and just observations on this subject, in its reference to the African company, the Hudson's bay company, the South Sea company, and the East India company, see Smith's Wealth of Nations, vol. iii. chap. 1.

When a company of merchants undertake, at their own risk and expence, to establish a new trade with some remote and barbarous nation, it may not be unreasonable to incorporate them into a joint-stock company, and to grant them, in case of their success, a monopoly of the trade for a certain number of years. It is the ancient and most natural way in which the state can recompense them for hazarding a dangerous and expensive experiment, of which the public is afterwards to reap the benefit. A temporary monopoly of this kind may be vindicated upon the same principles upon which a like monopoly of a new machine is granted to its inventor, and that of a new book to its author. But upon the expiration of this term, the monopoly ought certainly to terminate; the forts and garrisons, if it was found necessary to establish any, to be taken into the hands of government, their value to be paid to the company, and the trade to be laid open to all the subjects of the state. Without a monopoly, however, a joint-stock company, as experience has shewn, cannot carry on any branch of foreign trade. An eminent French author, of great knowledge in matters of political economy, the abbé Morellet, gives a list of 55 joint-stock companies for foreign trade, which have been established in different parts of Europe since the year 1600, and which, according to him, have all failed from mismanagement, notwithstanding they had exclusive privileges. Although he has been misinformed with regard to the history of two or three of them, which were not joint-stock companies, and which have not failed; yet there have been several joint-stock companies, which have failed, and which he has omitted.

The only trades which it seems possible for a joint-stock company to carry on successfully without an exclusive privilege, are those, of which all the operations are capable of being reduced to what is called a routine, or to such an uniformity of method as admits of little or no variation. Of this kind is, first, the banking trade; secondly, the trade of insurance from fire, and from sea-risk and capture in time of war; thirdly, the trade of making and maintaining a navigable cut or canal; and fourthly, the similar trade of bringing water for the supply of a great city. To render the establishment of a joint-stock company perfectly reasonable, with the circumstance of being reducible to strict rule and method, two other circumstances ought to concur. First, it ought to appear with the clearest evidence, that the undertaking is of greater and more general utility than the greater part of common trades; and, secondly, that it requires a greater capital than can easily be collected into a private copartnery. In the four trades above-mentioned both these circumstances concur.

The joint-stock companies, says this judicious writer, which are established for the public spirited purpose of promoting some particular manufacture, over and above managing their own affairs ill, to the diminution of the general stock of the society, can, in other respects, scarce ever fail to do more harm than good. Notwithstanding the most upright intentions, the unavoidable partiality of their directors to particular branches of the manufacture, of which the undertakers mislead and impose upon them, is a real discouragement to the rest, and necessarily breaks, more or less, that natural proportion which would otherwise establish itself between judicious industry and profit, and which, to the general industry of the country, is of all encouragements, the greatest and the most effectual.

COMPANY, *African*; sometimes called "Royal African Company," the name of the original institution. The first commercial voyage from England to the coast of Guinea was in 1536, but nothing like a company was formed till the year 1588, when queen Elizabeth granted a patent for ten years to come, to some merchants of Exeter, and other persons for an exclusive trade to the rivers Senegal and Gambia. In 1618, king James I. granted a charter for establishing a joint-stock company; but separate traders continuing to resort to the coast, the company was soon dissolved. Another company was erected by charter in 1631, which met with little success; and in 1651, the parliament granted a charter for five years to the East India company, for trading to the Gold coast in their way to India. The demand for negroes in the West India and American plantations increasing considerably, another exclusive African or Guinea company was incorporated in 1662, at the head of which was the duke of York, joined with many persons of rank and distinction. This company, like those that had preceded it, was unsuccessful, and its charter was soon after revoked by consent of the parties associated in the enterprize; in consequence of which another exclusive company was

was incorporated by letters patent in 1672. They raifed a capital of 111,000*l.* and improved the trade confiderably; but at the revolution, the Weft India planters joined the feparate traders in afferting that they were always beft ferved with flaves when the trade was free to all perfons; and exclufive companies, whofe privileges had not been fanctioned by parliament, being confidered inconfiftent with the declaration of rights, the trade became open again; but all private traders were to pay 10 per cent. to the company, towards maintaining the forts and factories on the coaft. This contribution was however found infufficient, and in 1730 parliament granted 10,000*l.* for the purpofe, which was continued annually till 1744, when, in confequence of the war, 20,000*l.* was granted, and in almoft every year fince, a fum has been appropriated by parliament to this purpofe.

As all the joint-ftock companies which had been eftablifhed for this trade had appeared incompetent to carry it on with advantage, it was in 1750 (23 Geo. II. c. 31.) transferred to a regulated company, the members of which are deemed a body corporate and politic, under the title of *The Company of Merchants trading to Africa,* but are prohibited from trading in their corporate capacity, from having any joint or transferable ftock, and from borrowing money under their common feal. Any perfon intending to trade to Africa, may become free of this company on payment of forty fhillings; and out of the monies thus received, a fum not exceeding 800*l*, is allowed for the falaries of clerks and agents at London, Briftol, and Liverpool, the houfe-rent of their office at London, and all other expences of management, commiffion, and agency in England. What remains of this fum, after defraying thefe different expences, they may divide among themfelves, as compenfation for their trouble, in what manner they think proper. The forts, factories, &c. poffeffed by the old company on the coaft of Africa, are vefted in the prefent company, who continue to receive an annual fum from parliament (generally about 13,000*l.*) for the fupport of thefe eftablifhments: the fum granted in the year 1806 was 18,000*l.* For the proper application of this fum, the committee is obliged to account annually to the curfitor baron of the exchequer, which account is afterwards to be laid before parliament.

The company is under the management of a committee of nine perfons, three being chofen for London, three for Briftol, and three for Liverpool, annually. The committee are enjoined to lay an annual account of the application of the money granted to them before parliament.

Although by the 4th of Geo. III. c. 20. the fort of Senegal, with all its dependencies, had been vefted in this company, yet in the year following (by the 5th of Geo. III. c. 44.) not only Senegal and its dependencies, but the whole coaft from the port of Sallee, in South Barbary, to cape Rouge, was exempted from the jurifdiction of that company, and vefted in the crown; the trade to it being declared free to all his majefty's fubjects.

Before the eftablifhment of the Royal African company, there had been three other joint-ftock companies fucceffively erected one after another, for the African trade. They were all equally unfuccefsful. They all, however, had exclufive charters, which, though not confirmed by act of parliament, were in thofe days fuppofed to convey a real exclufive privilege.

Companies, *Englifh.* The *Eaft India Company* was eftablifhed by charter dated Dec. 31, 1600, by which the earl of Cumberland and 215 other perfons were authorized to carry on an exclufive trade to all parts of the Eaft Indies, for 15 years; under the title of "The Governor and Company of Merchants of London trading to the Eaft Indies." They raifed 72,000*l.* in fhares of 50*l.* each, and fitted out five fhips, which accomplifhed their firft voyage very fuccefsfully, in two years and feven months.

Having carried on the trade for about ten years, with different degrees of fuccefs, they obtained another charter dated May 31, 1610, by which the company was made perpetual. They had not yet adopted the mode of trading under one joint ftock, but carried it on in feveral copartnerfhips and leffer ftocks. In 1613 the proprietors of the feveral feparate ftocks, united them into one general joint-capital; and notwithftanding fome oppofition to their trade, both at home, and abroad, they preferved and extended it, having at this time eftablifhed factories at about twenty different places in India. In a vindication of the Eaft India Company before the privy council, at a fubfequent period, among other remarks for fhewing the great difficulties attending an Eaft India trade, it was afferted, that although they had a ftock of 1,500,000*l.* yet in fifteen years time, *viz.* from 1617 to 1632, their whole profit was no more than 12 and one-half per cent.

In 1637, Charles I. eftablifhed a new company to trade to China and Japan, but it was foon ruined. The old company likewife from its differences with the Dutch Eaft India company, the encroachments of private adventurers, and other caufes, fell into decay, and in 1655 it was diffolved by Cromwell, and the trade laid open. The mifchiefs which followed obliged him to re-eftablifh the company about three years after; their joint-ftock was now 739,782*l.*, of which only one half, or 369,891*l.* was paid in, and was properly their capital. The total exports of the company in three years, ending with 1660, was 227,820*l.* in bullion, and 23,763*l.* in merchandize. After the reftoration, they obtained a new charter from Charles II. dated April 3, 1661. By this charter it appears that the company had not then one fole transferable joint-ftock; but that every one, who was free of this company paid a certain fum of money to the company on the fitting out of their fleet, for which he had credit in the company's books, and received his proportionate dividend on the profits of the refpective voyage. The whole inveftments were made by the company in their corporate capacity; but they were not eftablifhed as an irrevocable corporation, as they might be diffolved on three years notice.

In 1664, the company's ftock fold at only 70 per cent., but in confequence of an inquiry into the ftate of their affairs, the refult of which was very favourable, the ftock foon got up confiderably. New charters were granted in 1669 and 1676, confirming all their privileges. In the latter year, the company having made a confiderable profit by their trade, agreed, inftead of making a dividend thereof, to add it to their capital ftock, fo as juft to double the fame, by which their capital became 739,782*l.* 10*s.* In confequence of the extenfion and fuccefs of their trade, which enabled them to make large dividends, their ftock in 1680 fold from 280 to 300 per cent; but thefe great profits, and the doubtful authority on which they held their exclufive privileges, (not having the fanction of parliament) being a great temptation to individual adventurers, interlopers, who had often given them much trouble, became again very numerous, and attempts were made to get the trade laid open, or to have it vefted in a regulated company fimilar to thofe by which the trade with Turkey and with fome other countries was then carried on. The company, however, in 1683 found means to obtain a new charter, by which all their former privileges were confirmed, and they were empowered to feize the fhips and merchandize of all interlopers, to raife and maintain military forces, to exercife martial law,

and to eftablifh a court of judicature for determining all mercantile caufes, within their limits. In 1686 they obtained another charter granting them ftill greater powers and privileges.

Soon after the revolution much popular clamour was raifed againft the Eaft India company; and in 1691 the houfe of commons addreffed the king to diffolve the company and incorporate a new one; an opportunity for which foon occurred, as in 1693, the charter of the company became void, from their not paying the duty which had been impofed on their ftock within the time limited by the act; but a new charter was granted them, on condition of fubmitting to fuch regulations as fhould be ordained before the 29th of September 1694 and which were contained in two charters foon afterwards executed.

In 1698 the complaints of the weavers of London againft the importation of India wrought filks, and the company having been prevented by loffes from making any dividends for feveral years, brought it into much difrepute, and the houfe of commons thought it neceffary to take the ftate of their affairs into confideration. The company thought it prudent to offer to advance 700,000 *l.* for the public fervice at 4 per cent. intereft, provided the exclufive trade was legally fettled on them; but a number of merchants, countenanced by the chancellor of the exchequer, propofed to advance 2,000,000*l.* at 8 per cent. intereft, for fimilar privileges. The latter propofal was approved, and an act paffed by which a new company was eftablifhed; many difficulties however appeared, with refpect to their engaging in the trade, till the expiration of the three years notice for determining the old company. During this unfettled ftate of the Eaft India trade, the old company's ftock had in about nine or ten years fluctuated from 300 per cent. to only 37 per cent.

The great contentions which enfued between the old and new companies, foon rendered it obvious that little benefit would be derived from the trade, unlefs a coalition between the two rival corporations was effected. This was accomplifhed in 1702, by an agreement that the old company fhould purchafe an equal proportion of ftock in the new company, and that the feparate traders, who had fubfcribed to the new company, but not to their joint-ftock, fhould be included in the union. The old company was to keep their ftock in the new company, in their corporate capacity for feven years, then to transfer it to their refpective members, and refign their charter to the crown, from which time the new company comprehending the proprietors of both, affumed their prefent title of "The united Company of Merchants of England trading to the Eaft Indies." In 1708 the term of their exclufive trade to India, which was determinable upon three years notice after 1711, and repayment of the fum they had advanced, was prolonged to three years notice after Lady-day 1726; for which they advanced to government 1,200,000 without any additional intereft. In 1712 they obtained an act for continuing the trade and corporation capacity of the company, although the fums they had advanced to government fhould be repaid; which repayment or redemption of their annual fund, was not to be made till the expiration of three years notice after Lady-day 1733.

The act of parliament being liable to a different conftruction from what was probably intended, and the term granted being near its expiration, a very powerful oppofition to its renewal, was raifed in 1730, and fpecious propofals were made to parliament for redeeming the fund of the company, and transferring the trade to a regulated company, with fimilar privileges. After a very full difcuffion of the fubject, a new agreement was entered into with the company, who agreed to pay 200,000 *l.* towards the fervice of the current year, and to have the intereft payable to them by government reduced from 5 to 4 per cent.; in confideration of which all their exclufive privileges were continued till the expiration of three years notice, to be given after Lady-day 1766, when upon re-payment of their entire capital of 3,200,000*l.* their exclufive privileges were to ceafe, but the company to continue a corporation for ever, to enjoy the Eaft India trade in common with all other fubjects. In confequence of this reduction of the intereft received from government, they thought proper to reduce the dividend payable to their proprietors from 8 to 7 per cent. and foon after to 6 per cent.

In 1743 the company propofed to advance 1,000,000 *l.* for the fervice of the year 1744, at 3 per cent. intereft, on having the term of their exclufive trade enlarged for fourteen years, and being permitted to borrow a million on bonds. This propofal being accepted, the debt from the public to the company became 4,200,000*l.*, and the exclufive trade was now extended to three years notice, to be given by parliament after Lady-day 1780, with the former provifion, that, after fuch determination, the company fhould continue to have a common right with other fubjects in the trade to India.

The company not fubfcribing to the reduction of intereft propofed in 1749, the fpeaker of the houfe of commons was ordered to give them notice that the fum due from government would be paid off, unlefs they fubfcribed before May 30, 1750: with this it was deemed prudent to comply, but a condition was made, that in order to enable the company to reduce their bond debt, they fhould be empowered to raife money by the fale of 3 per cent. annuities, to the amount of the debt of government to the company. The annuities thus fold were known by the title of 3 per cent. India annuities, and were for many years payable at the India houfe, but are now confolidated with the 3 per cent. reduced bank annuities.

Hitherto the company had not afpired beyond their original character of merchants, and merely poffeffed factories at the principal ports to which they traded; thefe factories were, for the fafety of their merchandize and the protection of their fervants, converted into forts, which rendered it neceffary to maintain a military eftablifhment. Thus poffeffed of the means of offence as well as defence, they made confiderable exertions to oppofe the progrefs of the French in thofe parts; and as the two companies each endeavoured to procure the affiftance of the neighbouring native princes, the field of intereft and ambition became much enlarged. In 1751, the company fent a confiderable military force into the province of Arcot to fupport the nabob againft his rival, who was powerfully affifted by the French; in which conteft they were engaged with little intermiffion for feveral years. In Bengal, the company had carried on their commercial intercourfe without any connexion with territorial authority, till the death of the fubah Ali-Verdi-Khan, in 1756. This prince had viewed their increafing opulence and power with great jealoufy, and a fhort time before his death gave a remarkable charge to his fucceffor, in which he cautioned him to keep in view the power of the European nations in his country, and to free himfelf from their influence as foon as poffible. "The power of the Englifh is great; reduce them firft; the others will then give you little trouble. Suffer them not to have forts or foldiers; if you do, the country is not yours." In attempting to put this

this advice into execution, Sou-Rajah-Dowla was completely defeated by the company's forces, and the new fubah of their appointment, befides paying to the company a very large fum for their loffes and expences, ceded to them a confiderable territory in the vicinity of Calcutta. On the coaft of Coromandel, hoftilities were carried on againft the French fettlements with unequal fuccefs, but ultimately to the advantage of the Englifh, upon which the fubah of the Decan concluded a treaty with the company, and ceded to them the entire circar of Mafulipatam. In 1760, the company's forces completely defeated thofe of France, and in the following year captured Pondicherry, the chief of the French fettlements in India; fince which events the power of France in India has been very infignificant.

Such was the commencement of the company's acquifitions of territory, which they have feized every fubfequent opportunity of extending, till the fovereigns of India, whofe protection they formerly courted, have funk into the fituation of their dependents, and hold their precarious dignities at the will and pleafure of a fociety of foreign traders.

The annual fales of the imports of the company for fixteen years preceding 1757, amounted on an average to about 2,055,000*l.*; and for the fame period, the exported goods and ftores amounted annually, at their prime coft, to 238,000*l.*; the bullion exported to 690,000*l.* per annum, and they paid in difcharge of bills of exchange 190,000*l.* per annum.

Early in 1764, on the receipt of fome unpleafant news from Bengal, India ftock fell 14 per cent. The general adminiftration of the company's affairs, both at home and abroad, became foon after the fubject of much difcuffion; and on 29th Auguft 1766, the court of directors received a notice from the fecretaries of ftate, that an inveftigation would take place in the next feffion of parliament. The adminiftration laid claim to the territories which the company had acquired in India, with the revenue arifing from them, as of right belonging to the crown; but as the company were very unwilling to have this new fource of wealth taken out of their hands, a temporary agreement was made for two years, by which the company, in compenfation for this claim, agreed to pay to government 400,000*l.* a year. In 1769, the agreement was renewed for five years, and the territorial acquifitions and revenues in India fecured to the company for that term, with a ftipulation that the company fhould be allowed to increafe their dividend to 12½ per cent., but not to increafe it more than one per cent. in one year.

They now became involved in a war with the famous Hyder Ally, in confequence of which, and of the mifconduct of their fervants in India, the concerns of the company, from the moft flourifhing fituation, were brought into the greateft embarraffments. Select and fecret committees of the houfe of commons were appointed to inveftigate the ftate of their affairs; and in 1773, it appeared, not only that they were unable to make the ftipulated annual payment to government, but that it was neceffary to affift them with a loan of 1,400,000. Till this fum fhould be repaid, the dividend to their proprietors was not to exceed 6 per cent., and afterward not to exceed 7 per cent. till their bond debt was reduced to 1,500,000*l.* From thefe circumftances, the price of the company's ftock fell confiderably from the latter part of 1772 till February 1774, when their affairs began to wear a brighter afpect. In 1776, the loan from government had been repaid, and their fituation being otherwife improved, the dividend on their ftock was raifed to 8 per cent.

Statement of the Company's Revenues, at their different Settlements in India, in the Year ending April 1777.

To expences in Bengal, civil, military, and fortifications	£1,350,000	By nett revenues in Bengal	£2,500,000
To ditto at Fort St. George	560,000	Benares tribute	290,000
To ditto at Bombay	360,000	Oude fubfidy	370,000
	2,270,000	By revenues of Fort St. George and the Circars	560,000
Nett balance of the year's revenues	1,770,000	Tanjore fubfidy	160,000
		By revenues of Bombay, &c.	160,000
	£4,040,000		£4,040,000

On an average of ten years, ending with 1777, the company's exports in goods were about 490,000*l.*; in bullion, 110,000*l.*; and the fum paid in difcharge of bills of exchange, 458,000*l.* per annum. By the aid afforded from the revenues, their inveftments were increafed, fo as to produce about 3,330,000*l.* per annum.

In 1779, an act was paffed for continuing the territories and revenues in India in the poffeffion of the company for one year, which in 1780 was continued for another year. In June 1781, it was agreed to offer to pay into the exchequer 400,000*l.*, in full difcharge of all claims of the public upon the company up to the 1ft of March; and as, in the preceding year, they had received notice that the 4,200,000*l.* due to them from government would be paid off on the 10th of April, 1783, it became neceffary to enter into a new agreement, the conditions of which were, that the company fhould continue to enjoy their exclufive privileges to the 1ft of March, 1794, then to ceafe and determine, upon the former conditions of three years previous notice, and the repayment of all fums due to them. The furplus of their nett profits, after paying their dividends, were appropriated, three fourths for the fervice of government, and one fourth to be retained by the company; and they were reftricted not to increafe the dividend of 8 per cent. more than 1 per cent. in any year. This reftriction was, however, foon found unneceffary; for the nett profits of the company for the year ending 1ft of March, 1782, did not amount to fo much as a dividend of 8 per cent. on their ftock by 22,023*l.*; in confequence of which, it became neceffary for government to allow a farther time for the payment of 396,466*l.* 2*s.* 6*d.*, which was due from the company for cuftoms, befides a part of the fum which they had agreed to pay in 1781; and they were at the fame time empowered, notwithftanding the above deficiency, to continue their dividends at 8 per cent. In the following year, the war in India, and other circumftances, increafed the embarraffment of the company's affairs; and, by a ftatement of their accounts to the 1ft of March, 1783, it appeared that the

the nett profits of that year did not amount to a dividend of 8 per cent. by 255,813*l.*, which dividend they were neverthelefs authorized by parliament to continue; and, to enable them fo to do, government iffued exchequer bills to the amount of 300,000*l.*, which the bank undertook to lend money upon to the company.

The long and expenfive war in which the company had been engaged in India, terminated in March 1784, by the ratification of peace with the Myforean government; but the confequence of this war, in addition to the war in Europe, was the general derangement of the company's affairs both at home and abroad. In December 1783, February and May 1784, the directors laid before parliament fuch accounts as they then poffeffed, refpecting the general ftate of their finances. But the impoffibility of drawing any fatisfactory information from ftatements made up in fuch a fituation of their affairs, with the apprehenfions which the meafures then in agitation, relative to the future government of India, had excited in the public mind, reduced the credit of the company to the loweft ebb. Their ftock fold as low as 118½; their bonds at home, bearing 5 per cent. intereft, were negociated from 2½ to 4 per cent. difcount; their bonds and certificates, at Bengal and Madras, bore from 18 to 40 per cent. difcount; at Bombay 50 per cent.; and orders on the treafury there fold at 65, and upwards, per cent. difcount.

It now became a general conviction, that the company was incompetent to the political government of the extenfive territories which they had acquired. A Board of Controul was therefore eftablifhed, compofed of a certain number of commiffioners to be appointed by the king, and removeable at his pleafure. This board was authorized to check, fuperintend, and controul, the civil and military government and revenues of the company. The difpatches tranfmitted by the directors to the different prefidencies were to be previoufly fubjected to the infpection of the Board. The appointment of governor-general, prefident, or counfellor in the different prefidencies, was made fubject to the approbation and recall of his majefty; and fuch other regulations adopted, as in a great meafure deprived the company of that political and civil authority which they had fuffered to be fo grofsly abufed.

In 1786 fome further regulations were made refpecting the government of India; and, as the company's trade was increafing, particularly in the article of tea, their import of which had been greatly augmented by the arrangement of the commutation act, they were faid to require a greater capital, and were authorized to create 800,000*l.* new ftock, on which they raifed 1,240,000*l.* at the rate of 155 per cent. In 1789 they obtained another act, enabling them to add 1,000,000*l.* to their capital, which thus became 5,000,000*l.*

In the beginning of 1793, the term of the company's exclufive privileges being nearly expired, the fubject of laying open the trade to India was again difcuffed, and though it was not thought proper to rifk the lofs and confufion which muft unavoidably attend any attempt to take fuch an immenfe concern out of the hands in which it has fo long continued, a ftipulation was made in the agreement for the renewal of the charter, that fuch regulations fhould be adopted as to admit of a free exportation by private perfons on their own account, of any goods of the growth, produce, or manufacture of Great Britain or Ireland; and of a free importation of fuch forts of the raw materials of the Eaft Indies as are ufed in the manufactures of Great Britain or Ireland; that the company fhould be obliged to provide fhipping for the carriage of the private trade, at as low a freight as it could be furnifhed by private merchants; and that they fhould licenfe a proper number of agents to refide at the company's fettlements, under their protection, for the management of the private trade. On thefe conditions the company's term in the exclufive trade was enlarged for 20 years, or to the 1ft of March, 1814, with the former provifo, that if, after the expiration of that term, their right to the fole trade fhall ceafe, in confequence of three years previous notice being given by parliament, and the repayment of fuch fums as may be then due from the public, they fhall continue a corporation, with power to carry on a free trade in common with other perfons.

On this occafion, the total income of the company, arifing both from their territorial revenues and their commercial concerns, was ftated as follows:

The nett annual income in rents and profits of trade, taken in the moft unfavourable light to the company, and fuppofed to be confiderably under the mark, was rated at - - -		£2,329,164
Subject to the following payments, *viz.*		
Intereft of 3,200,000*l.* on bond, at 4 per cent. - - -	£128,000	
Ditto of 6,669,082*l.* debt in India, at various rates of intereft, on a medium about 8¾ per cent. - -	561,923	
Dividend of 8 per cent. on their capital of 5,000,000*l.* - - - - -	400,000	
		1,089,923
Leaving a nett annual furplus of - - - -		£1,239,241

Of this furplus it was propofed to appropriate 500,000*l.* per ann. to the reduction of the debt in India, to pay 500,000*l.* per annum to government in half-yearly payments, and to pay an increafed dividend of 10 per cent. to their proprietors on 6,000,000*l.* to which fum their capital was now raifed.

This annual furplus, if it really exifted at the time to which the above account refers, was of very fhort duration. In 1795 the company found themfelves unable to continue the propofed contribution to government; and the intrigues of Tippoo Saib with the French, and with fome of the native powers, which obliged the company to keep up a large military eftablifhment, and foon after to engage in another expenfive war, not only reduced the furplus of their revenues, but occafioned a confiderable increafe of debt in India, which has fince been further augmented in confequence of hoftilities with Dowlut Rao Scindia and Jefwunt Rao Holkar.

In order to furnifh fome idea of the extent of the company's commercial and financial concerns, the following accounts are fubjoined.

The amount of all goods fold at the Eaft India Company's fales, from the 1ft of March 1805 to the 1ft of March 1806.

Company's goods; *viz.*

Teas - - - - - - - - - - -	£3,620,904	
Bengal piece goods - - - - -	621,862	
Coaft and Surat piece goods - -	614,317	
Raw and organzine filk - - - -	274,459	
Nankeens - - - - - - - - -	65,240	
Pepper - - - - - - - - - -	121,844	
Saltpetre - - - - - - - - -	217,769	
Spices - - - - - - - - - -	114,545	
Drugs, fugar, coffee, &c. - - -	348,350	
		5,999,290

Private

Private Trade goods, *viz.*

Teas	£239,215	
Piece goods	772,517	
Raw silk	44,228	
Nankeens	21,489	
Pepper	10,633	
Saltpetre	144	
Drugs, sugar, indigo, &c.	1,693,926	
		2,782,152
Total		£8,781,442

An Estimate of the revenues and charges in India, for the year 1806-7.

Revenues.

Bengal	£9,148,711
Madrass	5,021,325
Bombay	677,203
Total	£14,847,239

Charges.

Bengal, civil and military expences	£6,944,607
Madrass do.	5,379,218
Bombay do.	1,826,516
Commercial charges not added to invoices	192,769
Interest of debts	2,275,300
Supplies to Prince of Wales' island, &c.	185,600
Total	£16,804,010
Deduct estimated revenues	14 847,239
Deficiency	£ 1,956,771

Account of the actual receipts and payments of the East India Company, in Great Britain, for one year, ending the 1st of March 1807.

Receipts.

	£	s.	d.
Cash in the Treasury 1st March 1806	669,794	6	2
For company's goods sold	5,294,384	13	8
Of the board of ordnance for saltpetre	160,000	0	0
Private trade goods sold	2,114,269	8	10
Charges and profit on private trade	163,462	19	2
Customs on do.	73,380	19	5
Freight on do.	119,784	18	10
Interest on red. 3 per cent. annuities	36,266	15	10
Of government, on account of a sum due to the company	1,000,000	0	0
Alms-houses at Poplar	2,416	18	2
Persons returned from India	17,516	0	0
Bonds issued	517,000	0	0
Duty on tea received	3,120,290	12	3
Total	£13,288,527	12	4

Payments.

	£	s.	d.
Customs	161,736	14	0
Freight and demorage	1,689,040	9	4
Goods and stores exported	2,270,793	7	8
India debt	50,223	19	5
Bills of exchange from India	342,885	1	8
Ditto from China	641,994	16	8
Bullion exported	514,432	16	8
Charges of merchandize, including supra cargoes, commission, interest on loans, &c.	623,652	14	11
Dividends on stock and interest on bonds	770,429	19	1
Bonds paid off and paid in on sales	216,600	0	0
Proprietors of private trade	2,169,021	15	0
Pay to marine and military officers on furlough, and retired from service	141,319	15	0
Duty on tea paid	3,184,417	6	7
Cash in the treasury 1st March 1807	511,978	16	4
	£13,288,527	12	4

The vast concerns of this company are under the management of twenty-four directors, who are formed into different committees; each committee having the superintendence of a particular department of the company's business. At the general courts of proprietors, persons possessing 1000*l.* stock have one vote; 3000*l.* two votes; 6000*l.* three votes; and 10,000*l.* four votes. The number of proprietors entitled to vote, on the 8th of April 1800, was 2163, and the number of votes 2832.

Company, *Hamburgh*, is the oldest trading establishment in the kingdom; though not always known by that name, nor restrained to those narrow bounds under which it was afterwards confined. It was first called, the Company of Merchants trading to Calais, Holland, Zealand, Brabant, and Flanders: then it acquired the general title of Merchant-adventurers of England; as being composed of all the English merchants who traded to the Low Countries, the Baltic, and the German ocean. Lastly, it was called the Company of Merchant-adventurers of England trading to Hamburgh.

This company was not a society of dealers, each furnishing a part of the sum to constitute the capital stock of the company; but a mere association, or body of merchants, who had nothing in common, but the grant and privilege of trading to Hamburgh, and some other cities of Germany; each managing his own commerce, and trading on his own foundation; only observing a certain discipline, and some regulations, which none but the company could establish or change.

This company was first incorporated by Ed. I. in 1296; and established again, by charter, in 1406, under the reign of Henry IV. It was afterwards confirmed and augmented with divers privileges, by many of his successors; among the rest, by Henry V. in 1413; Henry VI. in 1422; Henry VII. in 1493, 1505, and 1506; Henry VIII. in 1509, 1517, and 1536; Edward VI. in 1547; queen Mary, in 1553; Elizabeth, in 1564, and 1586; James I. in 1605; and Charles II. in 1661. But of all these charters, none but those of Henry IV. Henry VII. Elizabeth, James, and Charles, were of any importance, or gave the company any thing new; the rest being only confirmations. Before the charter of Henry IV. all the English merchants, who trafficked out of the realm, were left to their own discretion, and managed their affairs with foreigners as might be most for their respective interests; without any regard to the general commerce of the nation.

Henry observing this disorder, endeavoured to remedy it, by uniting all the merchants in his dominions into one body; wherein, without losing the liberty of trading each for himself, they might be governed by a company; and be subject to regulations, which should secure the general interest of the national commerce, without prejudice to the interest of particulars. With this view, he granted all the merchants, of his states, particularly those of Calais, then in his hands, a power of associating themselves into a body politic, with directors,

directors and governors, both in England and abroad; to hold assemblies both for the direction of business and the deciding of controversies among merchants; make laws, punish delinquents; and impose moderate duties and taxes on merchandizes and merchants to be employed in the service of the corporation.

These few articles of the charter of Henry IV. were afterwards much augmented by Henry VII. who first gave them the title of Merchant-adventurers to Calais, Holland, &c. gave them a power of proclaiming and continuing free fairs at Calais; and ordered, that to be reputed a member of the society, each person should pay twenty marks sterling; and that the several members should attend the general meetings, or courts, appointed by the directors, whether at London, Calais; or elsewhere.

The inexecution of this last article and contempt of some of the rest, occasioning great inconveniences to the company's affairs, another charter was procured, whereby the pain of imprisonment was menaced, for those who should absent themselves from the meetings without lawful cause, or should disobey the laws. A petition being made to queen Elizabeth, in 1564, for an explanation of certain articles in the charter of Henry VII. and a confirmation of the rest granted by other kings; that princess, by a charter of the same year, declares, that to end all disputes, they should be incorporated anew under the title of the "Company of Merchant-adventurers of England;" that all who are members of the former company should, if they desire it, be admitted members of this; that they should have a common seal; that they should admit into their society what other persons, and on what terms, they please; and expel them again on misbehaviour; that the city of Hamburgh, and neighbouring cities, should be reputed within their grant, together with those of the Low Countries, &c. in that of the former company; that no member should marry out of the kingdom, nor purchase lands, &c. in any city beyond sea; and that those who do, shall be *ipso facto* excluded for ever.

Twenty-two years after this first charter, queen Elizabeth granted them a second; confirming the former, and further granting them a privilege of exclusion, with a power of erecting in each city within their grant, a standing council.

The woollen manufacture being the principal object of their application, they met with great opposition; first, from the Hanse, who forced them frequently to change their mart, or staple; and afterwards under king James I. who having erected a corporation in 1616, in favour of some private persons, who offered to set up a manufacture for dyeing and pressing cloths, &c. under pretence thereof the company of merchant-adventurers were prohibited dealing therein. But that project not succeeding, and the charter being revoked two years afterwards, the merchant-adventurers, whose company had been dissolved two years before, were restored in 1617, to their ancient privileges, and a new charter was given them, confirming their exclusive rights; and allowing them to have officers in the several custom-houses, to have an eye that they were not prejudiced in their woollens, under pretence of the like merchandizes, which others were allowed to send to other parts. This charter of king James, is the last of those confirmed by Charles II. in the grand charter of 1661.

The revolutions which had happened in the Low Countries towards the end of the sixteenth century, and which laid the foundation of the republic of Holland, having hindered the company from continuing their commerce with their ancient freedom; it was obliged to turn it almost wholly to the side of Hamburgh, and the cities on the German ocean; from which change some people took occasion to change its name to that of the Hamburgh company, though the ancient title of Merchant-adventurers is still retained in all their writings.

This society was greatly reduced, when its trade was laid open by William III. and the company is now extinct.

COMPANY *of Merchants of the Staple* was incorporated by Edward III. Their factory was at Middleburgh, in Zealand; but the staple being removed, in 1389, to Calais, it was soon after, *viz.* in 1390, removed from thence to England.

COMPANY, *Russia.* This was first projected towards the end of the reign of king Edward VI. executed in the first and second years of Philip and Mary; but had not its perfection, till its charter was confirmed by act of parliament, under queen Elizabeth, in 1566. It had its rise from certain adventurers, who were sent in three vessels on the discovery of new countries; and to find out a north-east passage to China; these, falling into the White sea, and making up to the port of Archangel, were exceedingly well received by the Muscovites; and at their return, solicited letters patent to secure to themselves the commerce of Russia, for which they had formed an association.

The charter was promised them by Edward VI. but he dying, was first dispatched by queen Mary, in 1555. By this charter, the association was declared a body politic, under the name of the "Company of Merchant-adventurers of England, for the discovery of lands, territories, islands, &c. unknown or unfrequented." Their privileges were, to have a governor, four consuls, and twenty-four assistants, for their commerce; for their policy, to make laws, inflict penalties, send out ships to make discoveries, take possession of them in the king's name, set up the banner royal of England, plant them; and lastly, the exclusive privilege of trading to Archangel, and other ports of Muscovy, not yet frequented by the English.

This charter, not being sufficiently guarded, was confirmed by parliament in the eighth year of queen Elizabeth; wherein it was enacted, that in regard the former name was too long, they should now be called "Company of English Merchants for discovering new trades;" under which name, they should be capable of acquiring and holding all kinds of lands, manors, rents, &c. not exceeding a hundred marks per ann. and not held of her majesty; that no part of the continent, island, harbour, &c. not known nor frequented before the first enterprize of the merchants of their company, situate to the north, or north-west, or north-east of London; nor any part of the continents, islands, &c. under the obedience of the emperor of Russia, or in the countries of Armenia, Media, Hyrcania, Persia, or the Caspian sea, should be visited by any subjects of England, to exercise any commerce without the consent of the said company, on pain of confiscation. The said company shall use no ships in her new commerce, but those of the nation; nor transport any cloths, serges, or other woollen stuffs, till they have been dyed and pressed. That in case the company discontinue of itself to unload commodities in the road of the abbey of St. Nicolas, in Russia, or some other port, on the north coasts of Russia, for the space of three years, the other subjects of England shall be allowed to traffic to Narva, while the said company discontinues its commerce into Russia, only using English vessels.

This company subsisted with reputation almost a whole century, till the time of the civil wars. It is said, the czar then reigning, hearing of the murder of king Charles I. ordered all the English in his states to be expelled; which the Dutch taking the advantage of, settled in their room

After,

After the reftoration, the remains of the company re-eftablifhed part of their commerce at Archangel, but never with the fame fuccefs as before: the Ruffians being now well accuftomed to the Dutch merchants, and merchandize.

This company fubfifts ftill, nearly on the foot of that of Hamburgh, and the northern and Turkey companies; i. e. each member thereof trafficks for himfelf, and on his own foundation; only paying an acknowledgement as fine for admiffion, which was reduced by 10 and 11 W. III. c. 6, to five pounds; befides fome other dues impofed, from time to time, for the occafions of the company, and the commerce in general. It is under the direction of a governor, four confuls, and affiftants.

COMPANY, *Eaftland*, is eftablifhed on fimilar ground with that of Hamburgh; from whence it appears to have been difmembered.

Its charter is dated in the year 1579. By the firft article the company is erected into a body politic, under the title of the "Company of Merchants of the Eaft;" to confift of Englifhmen, all real merchants, who have exercifed the bufinefs thereof, and trafficked through the Sound, before the year 1568, into Norway, Sweden, Poland, Livonia, Pruffia, Pomerania, &c. as alfo Revel, Koningfberg, Dantzick, Copenhagen, &c. excepting Narva, Mufcovy, and its dependencies. Moft of the following articles grant them the ufual prerogatives, of fuch companies; as a feal, governor, courts, laws, &c.

The privileges peculiar to this company are, that none fhall be admitted a member who is already a member of any other company; nor any retail dealer at all. That no merchant qualified, be admitted without paying 6*l.* 13*s.* 6*d.* By 29 C. II. c. 7. the fee of admiffion into this company was reduced to 2*l.* That a member of another company, defiring to renounce the privileges thereof, and to be received into that of the Eaft, fhall be admitted *gratis;* provided he procures the fame favour for a merchant of the Eaft, willing to fill his place. That the merchant adventurers who never dealt in the Eaft, in the places expreffed in the charters, may be received as members of the company on paying forty marks; that, notwithftanding this union of the adventurers of England with the company of the Eaft, each fhall retain its rights and privileges. That they fhall export no cloths but what are dyed and preffed, except a hundred pieces per annum, which are allowed them *gratis.*

This charter was confirmed by Charles I. in 1629, with this addition; that no perfon of what quality foever, living in London, fhould be admitted a member, unlefs he were free of the city.

This company was complained of as a monopoly, and firft curtailed by legal authority in 1672; and fince the declaration of rights in 1689, exifts only in name; but they ftill continue to elect their annual officers, who are a governor, deputy, and twenty-four affiftants.

COMPANY, *Turkey*, or *Levant.* This once flourifhing body had its rife under queen Elizabeth, who, in 1581, incorporated a fmall number of merchants, with the privilege of an exclufive trade to Turkey for feven years. James I. in 1605, confirmed their charter, with the addition of fome new privileges. During the civil wars fome innovations were made in the government of the company; many perfons having been admitted members, not qualified according to the charter, or who did not conform to the regulations prefcribed, in confequence of which Charles II., upon his reftoration, endeavoured to place it upon its ancient bafis, for which purpofe he gave them a new charter, containing a confirmation of the old one with fome additional articles. By this charter the company was declared to be a body politic, capable of making laws, &c. under the title of "The Company of Merchants of England trading to the Seas of the Levant." The number of members was not limited, but no perfon refiding within twenty miles of London, excepting noblemen and gentlemen of quality, was to be admitted into the company, unlefs firft made free of the city of London: thofe under 26 years of age were to pay 25*l.* for their admiffion, and thofe above that age 50*l.* Thefe fines were reduced by an act paffed in 1753, (26 Geo. II. c. 18.) by which it is directed that every fubject of Great Britain defiring admiffion into the Turkey company, fhall be admitted within thirty days after fuch requeft, and fhall enjoy all the liberties and privileges of the company, on paying for fuch admiffion the fum of 20*l.*

All perfons free of the company may, feparately or jointly, export any goods or merchandize (not prohibited) from any place in Great Britain, to any place within the limits of the company's charter, in Britifh or plantation built fhips, navigated according to law, at any time, and to any perfons whomfoever, being free of the company, or to the fons or apprentices of freemen, fo long as they fhall remain under, and fubmit to, the direction of the Britifh ambaffador and confuls for the time being; and may alfo import, in like manner, any commodities purchafed within the company's limits, on payment of the government duties, and fuch impofitions as fhall be affeffed upon all merchandize fo exported or imported, or upon fhips laden therewith, for defraying the neceffary expences of the company.

The company is under the management of a governor, a deputy governor, and fifteen directors; they have alfo a deputy governor in every city and port where there are any members of the company. They prefent the ambaffador which the king is to keep at the Porte, and elect two confuls for Smyrna and Conftantinople; allowing a fixed falary or penfion to the ambaffador and confuls, and even to their chief officers, as fecretary, chaplain, interpreters, and janizaries, that they may not have any pretence for raifing any fum whatever on the merchants or merchandize. For defraying thefe charges the company have power to levy duties on the merchandize imported or exported by their members; but of late years they have frequently found it neceffary to apply to parliament for pecuniary affiftance.

The commerce of this company was formerly very confiderable, having been eftimated nearly equal to that of the Eaft India company in extent, and much more advantageous to Great Britain; but the convenient fituation of the French ports in the Mediterranean for the Levant trade, gives that country fuch a decided advantage, that the commerce of Great Britain with Turkey has long been on the decline. In 1797, in order to avoid the hazard to which Britifh veffels in the Levant trade were expofed in confequence of the war, an act was paffed giving permiffion to the members of the Turkey company to import the goods ufually brought from Turkey, Egypt, or other parts of the Turkifh dominions in the Levant feas, from any port whatfoever, either in Britifh veffels or veffels belonging to any friendly nation, on paying, if in Britifh veffels, the fame duties which would have been payable if the goods had been imported directly from the place of their growth, and, if in foreign veffels, the duties to which they were before liable; but no entry of fuch goods was to be made at the cuftom houfe till the importer produced a certificate of his being a member of the Turkey company, and that he had paid the company's duties, and in all refpects conformed to the company's regulations.

COMPANY,

Company, *South Sea*, originated in a project for relieving the government from the embarraſſment of a large amount of unfunded debts, and conſiderable deficiencies in the funds appropriated for the payment of others; the proprietors of theſe debts being incorporated for the oſtenſible purpoſe of eſtabliſhing a trade to the ſouth ſeas and the N.W. coaſt of America. The capital of the company was 9,177,967*l.* 15*s.* 4*d.*; but this being ſubſcribed wholly in government ſecurities, they iſſued bonds in 1712, for raiſing 200,000*l.* in caſh in order to fit out their firſt mercantile adventure. In the following year, they obtained the Aſſiento contract, by which they agreed to import into the Spaniſh Weſt Indies 144,000 negroes, within the term of 30 years. at the rate of 4800 in each year, and were allowed to ſend a ſhip of 500 tons yearly to trade with the Spaniſh ſettlements, on condition that the king of Spain ſhould have a fourth part of the gain by ſuch ſhip, and receive five per cent. on the nett gain of the other three parts. See Assiento.

The firſt voyage of their annual ſhip was in 1717, and the company were again empowered to borrow money under their common ſeal, for carrying on their trade, or to enable them to fulfil an engagement with government to advance two millions towards carrying into execution a propoſed reduction of intereſt on the public debts. On the war breaking out in the following year, a ſtop was put to their trade with the Spaniſh Weſt Indies, by the ſeizure of their effects, by which they ſuſtained a very conſiderable loſs.

Soon after this interruption of their commercial concerns, they engaged in a ſcheme for converting ſome of the government terminable annuities into redeemable debts. They had, in 1715, for the accommodation of government, agreed to increaſe their capital to 10,000,000*l.*, which, by the annuities now purchaſed, and an advance to government, became 11,746,844*l.* 8*s.* 10*d.*; and although the ſcheme did not completely ſucceed, it prepared the way for the much more extenſive project of taking in all the public debts, and thus reducing all the public funds which then exiſted into one.

The mere rumour of this mercantile project raiſed the price of the company's ſtock to 126 per cent.; and, in the beginning of 1720, while the bill for carrying it into execution was depending in parliament, their ſtock got up from 137 to 319 per cent. As the tranſaction conſiſted merely in taking the public debts at a fixed price, and giving the proprietors, in exchange, a certain quantity of the company's capital ſtock, at prices agreed upon between the company and the ſubſcribers, it is evident that the great gain which the company expected to make, could ariſe only from the current price of their ſtock being conſiderably above its real value. By a variety of artifices, and a general ſtock-jobbing infatuation, it was carried up to the enormous price of 1000 per cent.: the rapidity of its fall, however, exceeded that by which it roſe, as it was in a few weeks down to 130 per cent.; involving in ruin perſons of all deſcriptions who were engaged in the wild ſpeculations of the time. (See Bubble.) Had the tranſaction completely ſucceeded, the capital of the company would have amounted to 43,411,399*l.* 6*s.* 11$\frac{1}{4}$*d.*, but from ſome of the debts remaining unſubſcribed, it became 37,802,483*l.* 14*s.* 0$\frac{1}{2}$*d.* of which four millions were purchaſed in 1722 by the bank, and in the following year the remainder was divided into two equal parts, one of which was to be called the trading capital of the company, and the other to be diſtinguiſhed by the title of "The joint-ſtock of South Sea annuities," ſince called old South Sea annuities.

In 1724, the company undertook the Greenland whale fiſhery, which turned out very unprofitable: after eight voyages, they ſold their ſhips, ſtores, and utenſils, and found that their whole loſs upon this buſineſs, capital and intereſt included, amounted to 237,142*l.* 6*s.* 2*d.*

In 1733, three fourths of their trading capital, which had been reduced by ſums paid off in 1727, 1729, and 1732, to 14,651,103*l.* 8*s.* 1*d.*, was converted into an annuity ſtock called "New South Sea Annuities," only one fourth remaining as their trading ſtock; and, in the following year, they petitioned the king to be allowed to diſpoſe of the trade and tonnage of their annual ſhip under the Aſſiento contract, on account of the little profit they made by it, and to accept of ſuch equivalent as they could obtain from the king of Spain, who at length, to put an end to the many diſputes which had ariſen from this contract, agreed, in 1750, to pay 100,000*l.* to the company, as a compenſation for all claims under the Aſſiento contract, and from that period they have not carried on any trade whatever. The whole buſineſs of the company, therefore, now conſiſts in the management of the following public funds.

Their capital ſtock - -	£3,662,784	8	6
Old South Sea annuities -	11,907,470	2	7
New South Sea annuities - -	8,494,830	2	10
Three per cents., 1751 - -	1,919,600	0	0

The intereſt received from government on all theſe funds, is 3 per cent., but the dividend paid to the proprietors of the company's ſtock, is 3$\frac{1}{2}$ per cent.; on the old and new annuities, 3 per cent.

The company is under the management of three governors, and 21 directors; the qualification required for governor, is the poſſeſſion of 5000*l.* in the company's ſtock; for ſub-governor, 4000*l.*; for deputy-governor, 3000*l.*; and for a director, 2000*l.* Five hundred pounds ſtock, gives a right to one vote at the general courts; 2000*l.* to two votes; 3000*l.* to three votes; and 5000*l.* to four votes.

Company, *Scotch Darien.* This was eſtabliſhed with good proſpect at Edinburgh, in 1695, for the commerce of South America. In 1698, they ſent an armament and a colony, which they endeavoured to eſtabliſh in the iſthmus of Darien, which parts North and South America; but the Engliſh miniſtry not thinking proper to avow and ſupport the firſt ſucceſſes of the company, which had alarmed Spain, ever jealous of this part of her territories, the Scotch colony was diſperſed by the Spaniards in 1699, and thus vaniſhed the beſt project that ever was formed for diſputing with that nation the poſſeſſion of thoſe countries, from which ſhe pretends to exclude all other nations.

Company, *Hudſon's Bay*, was incorporated by charter, dated the 2d of May, 1670, under the title of "The Governor and Company of Adventurers of England, trading into Hudſon's Bay," with the excluſive privilege of trading to all parts within the entrance of the ſtreight commonly called Hudſon's ſtreights. The charter, however, not being confirmed by act of parliament, the company poſſeſs no excluſive rights whatever, any Britiſh ſubject being at liberty to ſail into Hudſon's Bay, to fiſh or traffick with the Indians as freely as the company; all the advantage the company have over other adventurers thither is merely the benefit of their own forts, ſuch as they are, by which their agents can reſide in ſo inhoſpitable a country during the winter, preparatory to their trading with the Indians againſt the arrival of their ſhips in the ſummer. According to the evidence given before a committee of the houſe of commons in 1749, the company then poſſeſſed four ſmall factories, erected at the mouths of the principal rivers, in which they employed about 130 perſons

fons, and two fmall houfes with only eight men in each; thefe buildings are neceffarily ftrong, as well to guard againft the climate as againft other dangers, and are furnifhed with artillery to command refpect from the Indians; they have therefore been generally called forts, although no military force is kept for defending them: their inutility in refifting any ferious attack, was obvious in 1782, when the French, who at former periods had done the company much injury, deftroyed their fettlements, forts, merchandize, &c. to the eftimated amount of near 500,000 *l.*

The capital of the company, it is faid, does not exceed 110,000 *l.* which is divided among a very fmall number of proprietors. The commerce carried on by them is not of great extent, as it feldom employs above four or five fhips of about 300 tons each. The articles exported by them are coarfe duffle cloth or blanketing, guns, piftols, fword blades, hatchets, powder and fhot, fpirits, tobacco, brafs kettles, buttons, fifh hooks, looking glaffes, &c.; the imports confift of large quantities of beaver fkins, and peltry of all kinds, bed feathers, quills, caftoreum, whalefins, oil, and a few fmaller articles.

The company is under the management of a governor, deputy governor, and a committee of feven members.

Company, *Sierra Leone,* was fet on foot in the year 1791, with the philanthropic view of introducing civilization into Africa. The principal means propofed for effecting this end was the eftablifhment of a fecure factory for carrying on an extenfive commercial intercourfe with the interior; but before the arrangements for this purpofe were completed, the reception into the fettlement of near 1200 blacks, who had taken part with Great Britain in the American war, and had petitioned the government to be removed from Nova Scotia on account of the coldnefs of the climate, involved the company in confiderable difficulties, and gave a new character to the undertaking. Their expences, from various caufes, became much greater than could have been forefeen, amounting in the firft two years and a half to 111,500*l.* and were ftill further increafed in 1793 by the war, which at the fame time greatly interrupted their trade, and fubjected them to depredations. In October 1794, the colony was attacked by a French fquadron, and all the moveable property of the company was either carried off or deftroyed, every building belonging to them burnt, and feveral fhips captured. The company's lofs on this occafion has been eftimated at 52,000 *l.* This calamity, combined with their previous expences, fo greatly diminifhed the company's funds, as to lay them under a neceffity of contracting their trade, and reducing confiderably the fcale of their eftablifhment, which had been at all times fo limited as fcarcely to afford fufficient means of tranfacting the bufinefs and attending to the various wants of an infant fettlement.

In the year 1798 the colony had made confiderable progrefs, notwithftanding the many obftacles to its advancement. The town confifted of about three hundred houfes, with the neceffary public buildings, and had become a place of confiderable refort. It was eftimated that from one to two hundred natives vifited the fettlement every day, many of them coming from a diftance of eighty or a hundred miles, for the purpofe of exchanging articles of African produce, for Britifh manufactures. The total number of inhabitants of the colony at this time was about 1200.

In 1800 the company obtained a charter, creating their fettlement an independent colony, and authorizing the directors to frame laws for its government, to appoint a governor and council, and to make other arrangements for the adminiftration of juftice; a fmall military force was at the fame time fent for the defence of the colony. The fum of 7000*l.* being part of the fum granted by parliament for the maintenance of African forts, was paid to the company for the erection of a fort; 10,000 *l.* was about the fame time received from government as a partial indemnification for the expence to which the company had been put in fettling the Nova Scotians; 4000 *l.* was alfo granted for the fupport of the civil government of the colony. About this time the company agreed to receive in their colony the Maroon Indians, and foon after their arrival, employed them to quell an infurrection among the Nova Scotians, who had endeavoured to poffefs themfelves of the government. A more ferious attack on the colony was afterward made by fome of the native chiefs in the neighbourhood, which rendered it neceffary to adopt additional means of defence.

The fums fince granted by parliament for defraying the charges of the civil eftablifhment of the company, and for the erection of fortifications, have been as follow:

For the year	1801	£ 4,000
	1802	10,000
	1803	14,000
	1804	14,000
	1805	14,000
	1806	18,000

The trade of the company appears to have been fuccefsful, fuppofing it to have been burthened only with thofe charges which are ftrictly commercial, and to have been exempt from the extraordinary loffes by fire, and the deftruction of the fettlement which it has had to fuftain. The abolition of the flave trade will remove fome great obftacles to the fuccefs of this laudable undertaking, and probably enable it to improve and extend its commercial intercourfe with the natives very confiderably.

Company, *for the Manufacture of Flour, Meal, and Bread.* During the diftrefs occafioned by the great fcarcity of corn, in the year 1800, a number of perfons formed themfelves into a company, for the purpofe of eftablifhing in London a manufactory of flour, meal, and bread, to be fold out at reafonable prices. They were incorporated by parliament, and empowered to fubfcribe a joint capital, not exceeding 120,000 *l.* in fhares of 25 *l.* each; their profits being limited to 10 per cent., and the furplus, if any, to be at the difpofal of parliament. They were limited to fell only 120,000 facks of flour, or meal in a year, to make only 200 facks into bread in a week, and to fell not more than 1000 quarters of wheat in any one week. The managers of the company were prohibited from dealing in corn, flour, or bread, for their own private account; and were required to lay before parliament an annual ftatement of their receipts and payments, of the quantities of grain purchafed, with the prices paid for the fame, of the quantities of grain and flour in ftore, of the quantities of flour and bread manufactured by the company, and of the debts and credits of the company, with the names of all the members of it, and the number of fhares held by each. By thefe regulations fufficient publicity is given to the concerns of the company to prevent it from ever being perverted from the original principle of the eftablifhment, and made fubfervient to fchemes of monopoly or fpeculation; and though upon the fcarcity ceafing, they difcontinued making bread, they have carried on the manufacture of flour and meal, and probably contributed to prevent thefe effential articles from being unneceffarily enhanced in price.

The

The total quantity of wheat purchafed by the company in the year 1806, was 9182 quarters, for which they paid 32,655*l.* 19*s.*; the quantity of flour manufactured was 10,536 facks. The number of proprietors of the company was 330.

The king by an order in council may diffolve this company on fix months previous notice being given.

COMPANY, *Dock.* See DOCK.

COMPANY, *Dutch Eaft-India,* had its rife in the midft of the ftruggle which that people had for their liberty; for the Spaniards having forbid all commerce with them, and fhut up all their ports, neceffity infpired fome Zealanders to feek a new north-eaft paffage to China.

This enterprize proving unfuccefsful to three feveral armaments in 1594, 1595, and 1596, a fecond company was formed under the name of the "Company of remote Parts;" which, in 1595, took the ordinary route of the Portuguefe to the Indies, and returned in two years and a half's time, with little gain, but good hopes.

This company, and a new one juft eftablifhed at Amfterdam, being united, equipped other fleets; and thefe occafioned other companies at Amfterdam, Rotterdam, in Zealand, &c, infomuch that the ftates foon began to apprehend they might be prejudicial to each other. Under this concern they called all the directors of the feveral companies together, who all confented to the union, the treaty whereof was confirmed by the ftates in 1602, a very remarkable epocha, as being that of the moft folid and celebrated eftablifhment of commerce that ever was in the world.

At this time they obtained a charter from the ftates; and prevailed upon that body, by adminiftering to its exigencies in the Spanifh war, to grant them the exclufive privilege of trading to the fouthern parts of Africa, for a fhort term of years. The company's capital of 6,500,000 florins (about 541,833 *l.* fterling) was divided into transferable fhares, or *actions,* as they are called on the continent, of 3000 florins (about 250 *l.* fterling each), which were all fpeedily bought up. The fuperiority of their trading capital, together with their greater fkill in commerce and navigation, enabled them to underfell all other nations, even in the foreign markets of Europe. As they alfo fixed the prices of their merchandize to all confumers, their profits for fome years were enormous. The annual dividends for the 6 years ending in 1610 were as high as 36 per cent.; and in a fhort time, the actions rofe from 3000 to 15,000, and at one time ftood as high as 24,000 florins, 8 times the amount of their prime coft. The charter, firft granted in 1602, and fince renewed from time to time, conferred upon them, befides the exclufive right of trading to the Eaft, the fovereignty (under the fuperintendence of the ftates-general) of all the territories which they might acquire in that part of the world, by purchafe, treaty, or conqueft, with the full power of appointing their own fervants; of raifing whatever force they might deem neceffary for the defence of their territories; and of enacting laws for the internal adminiftration of their dominions. In confequence of this charter, the moft extenfive that was ever granted to any trading corporation, the company proceeded to arrange their eftablifhment, both in Europe and the Eaft Indies. Their affairs were under the management of fixty directors, divided into feveral chambers; twenty in that of Amfterdam, twelve in that of Zealand, fourteen in that of Delft and Rotterdam, and a like number in thofe at Sluys and Horn. As each grant expired the company was obliged to procure a new one, which it has already done, four times fince the firft; *viz.* one in 1623, for forty-one years, like the firft; another for twenty-one years, commencing in 1643; and a third in 1665, for forty years; a fourth in advance, commencing in 1698, to end in 1740. Each grant coft the company a confiderable fum; that of 1647 coft 1,600,000 guilders, and the two following ones more; that of 1698 was confirmed by a placard of the ftates general, granted them an exclufive privilege, which was prolonged in 1761, for thirty years more. The average premium paid for thefe renewals was about 270,000 *l.* fterling, or three millions of florins.

Their factories, refidences, &c. in the Eaft Indies, were very numerous; reaching from the Perfian gulf to the coaft of China: the principal was that of Batavia, the centre of their commerce: here refided the general, with the ftate and fplendor of a fovereign prince; making war and peace with the eaftern kings and emperors at pleafure. They had alfo feveral other confiderable factories on the coaft of China, in Japan, Malacca, Surat, Amboyna, Banda, Siam, Moluccas, &c. feveral on the coaft of Coromandel, and at Ifpahan, Cape of Good Hope, &c. in all, they numbered forty factories, and twenty-five fortreffes. They engroffed the whole trade of the fpicery in their own hands.

At fo early a period as the year 1616, this company had no lefs than 45 large veffels engaged in war and trade, with 10,000 foldiers and failors in their fervice, and 4,000 pieces of artillery. However, the flourifhing ftate of their affairs was of fhort duration. The mifmanagement and plunder of the company's fervants, and the difputes in which their cruelties, avarice, and imprudence involved them with the native powers during the 17th century, and the diffenfions which arofe among the different chambers of the general direction at home, greatly reduced the trade, wealth, and power of the inftitution. The expence of the military eftablifhment alfo increafed; fo that at the end of the 18th century, it amounted to 80 veffels, carrying from 30 to 60 guns, and 25,000 men, foldiers included, while the whole dominions in Java, and its dependencies, were farmed for 361,260 dollars. The directors acknowledged that, in 1780, their lofs in the war had exceeded 10 millions of florins, nearly twice the amount of their original capital. In the 18th century the Oftend Eaft India company excited the jealoufy of the Dutch company. In 1721, a law was paffed by the ftates, prohibiting their fubjects from failing under the Oftend colours, upon pain of death: and in 1731, this unfortunate affociation was diffolved in confequence of reprefentations from the different European ftates interefted in the Eaft Indian trade; among which Holland, that is the Dutch company, took the lead. Various precautions have been ufed to fupport the credit of this company, fome of which were oppreffive to the country; neverthelefs, its fhares have continued to fall with augmented rapidity. In the period from 1605 to 1779, the dividends have varied from 75 to 10 per cent.; and in many years no dividend at all was iffued. From 1605 to 1610 (both inclufive), the dividend was, at an average, 36 per cent. From 1610 to 1648, the average was only 21; and from 1771 to 1780, it was no more than $12\frac{1}{2}$ per cent. The price of the actions, which had at firft rifen to 500, and even 800 per cent. of the prime coft, fell, in the period from 1770 to 1780, to about 340 per cent., and during that time continued regularly to fall. The laft dividend this once flourifhing company made to their proprietors was in the year 1796; but it was not paid till 1799, as their commerce, which had been rapidly declining for the laft 30 years, was entirely fufpended.

Company, *Dutch Weſt India*, was eſtabliſhed in 1621, with an excluſive privilege to trade twenty-four years along the coaſts of Africa, between the tropic of Cancer and Cape of Good Hope; and in America, from the ſouth point of Newfoundland, through the ſtraits of Magellan, that of Le Maire, or others, to the ſtraits of Anian, both in the north and ſouth Sea.

Beſides theſe commercial privileges, the ſtates conferred upon the corporation the right of governing and defending any new colonies which it might acquire; and made it a preſent of ſeveral large veſſels, well manned. They retained to themſelves, however, the nomination of the company's governor-general abroad. The original capital of this aſſociation amounted to 72,000 florins, in transferable ſhares, or actions, of 6000 florins each.

The 74 directors were divided into five chambers (as in the Eaſt India company), out of which, eighteen, with a deputy appointed by the ſtates, were choſen for the general direction of affairs. In 1647, the company renewed its grant for twenty-five years; but it was ſcarce able to hold out the term, on account of its great loſſes and expences in taking the bay of Todos los Santos, Fernambuc, and the greateſt part of Braſil, from the Portugueſe. The weakneſs of this company, which had ſeveral times in vain attempted to be joined to that of the Eaſt Indies, occaſioned its diſſolution at the expiration of its grant.

In 1674, a new company, compoſed of the ancient proprietors and their creditors, was ſettled in the ſame rights and eſtabliſhment with the former. It was to undertake the burden of the old company's debt, amounting to ſix millions, but reduced to 30 per cent.; and was to accredit in its books the proprietors of the old company's ſtock, at the rate of 15 per cent. The creditors, on their part, were to advance an addition of 8 per cent. on their loans; and the ſtockholders were to advance 4 per cent. on their ſhares. The new capital, thus ſcraped together, amounted only to 630,000 florins. The excluſive commerce of the company was limited to a certain part of the African coaſt, beſides the conqueſts they ſhould make; and its principal eſtabliſhments were at Cape Verd, on the Gold Coaſt, at Tobago, Curaſſoa, &c. in America. The reſt of the trade monopolized by the former company was now thrown open to all the ſubjects of the republic. In 1730, when the charter was renewed, the African ſlave-trade was made free, on condition of a certain laſtage being paid to the company; and in 1734, the whole African trade was laid open upon the ſame terms. As the united privileges of the company were not ſufficient to counterbalance the various diſadvantages under which all freſh inſtitutions labour, they obtained, in 1682, the excluſive management of the colony of Surinam, for the trifling ſum of 260,000 florins paid to the ſtates-general. This grant was accompanied by certain conditions, framed with the manifeſt view of preventing the abuſes common to trading corporations. Under theſe reſtrictions, the company was not able to defray the expence of the original purchaſe-money paid for the charter; and, therefore, in the next year, one-third ſhare was ſold to the city of Amſterdam, and another to the rich family of Sommelſdyk, reſerving the remaining third to themſelves. Theſe three co-proprietors have ſince continued to form a ſociety or partnerſhip, under the name of the "Surinam Company," regulated by the charter originally granted to the Weſt India company. Except in the government of Surinam, this aſſociation has had no connection with the Weſt India company, which, of courſe, continued to furniſh negroes to the ſettlement, in its capacity of African company, until the year 1730.

The progreſs of the dividends and prices of Weſt India ſtock will enable us to judge concerning the proſperity, not only of the Surinam ſociety, but alſo of the concerns of the Weſt India company. The average dividend in ten years, ending 1690, was 2⅝ per cent.; and from 1773 to 1779 incluſive, nothing at all was divided. The actions have never been at par; their price has varied from 92½ to 18 per cent. ſince the year 1723. The average price during ten years, ending 1732, was about 81½ per cent. During ten years, ending 1779, it had fallen to 32⅘ per cent. The ſettlements of Eſſequibo and Demerary have been always under the charter of the Weſt India company, as well as Surinam, and governed in the ſame manner. Berbice, though within the company's charter, owed its origin to the ſpeculations of the family of Van Peere; and all the cultivated part of the colony belonged to them. In 1678 they obtained a perpetual grant of it from the company, which was confirmed in 1703; and when the French attacked it in 1712, the colony bought them off with a conſiderable compoſition. The money was paid by their great mercantile houſes, and one fourth of it by the Van Peeres, who thus tranſferred three-fourth ſhares of the colony to the other merchants as co-proprietors; and the four houſes together formed a copartnery or company at Berbice, adminiſtered exactly in the ſame manner with the Surinam ſociety. The proprietary governments of North America differed from the company adminiſtrations of Guiana in many important particulars. They were the conſequence of large and thoughtleſs grants, made by the court to favourites, of waſte and uninhabited lands. As the Britiſh colonies were ſubſervient to the legiſlature of the mother-country, the Dutch colonies owed the ſame allegiance, not to the ſtates-general, but to the proprietors. The ill ſucceſs of the Weſt India company furniſhes an uſeful example of the manifold evils of company government. This company muſt of late have been annihilated by the capture of all their ſettlements.

Company, *Dutch North*, has no excluſive privilege; the advantage of its patent being of another kind, and very conſiderable.

There are alſo, in Holland, companies for the Baltic ſea, the fiſhery of Nova Zembla, Davis's Streights, and Greenland: yet none of their fiſheries are interdicted to private traders; all the difference between theſe and the companies conſiſting in this, that the former may not go aſhore to cut their fiſh in pieces, and melt their lard: but muſt bring their luggage to Holland.

Company, *Dutch Levant*. In ſtrictneſs, there is no Levant company in Holland: but the commerce of the private traders is ſo conſiderable, that the ſtate has taken the regulation thereof on itſelf.

To this end, they have eſtabliſhed a chamber of direction at Amſterdam, compoſed of ſix deputies, and a regiſter; who, under the burgomaſters, take care of every thing relating to the commerce of the Mediterranean; eſpecially that of Smyrna and Conſtantinople.

This company names the conſuls, appoints the number and ſtrength of convoys, terminates differences among the traders, and has alſo a right, on occaſion, to add new regulations to the old ones; though thoſe be of no force, till confirmed by the ſtates general.

Company, *French Eaſt India*, was eſtabliſhed in 1664, with an excluſive privilege to trade for fifty years in all the ſeas of the Eaſt Indies and South Sea; no adventurer to be admitted without a thouſand livres in ſtock; and foreigners, who have twenty thouſand livres in ſtock, to be reputed regnicoles.

The patent grants them the iſland of Madagaſcar; and the

the king to be at one fifth of the expence of the three firft armaments, without intereft; the principal to be refunded in ten years: or, if the company finds it lofes on the whole, the lofs to fall on the king's fide.

The capital fund of the company, which was moftly furnifhed by the king, was feven or eight millions of livres, but was to have been fifteen millions.

In effect, though no means were wanting to fupport the company, yet it ftill drooped, and ftill ftruggled; till, having fubfifted ten years without any change in its form, and being no longer able to difcharge its engagements, there were new regulations concerted, but to little purpofe. At length, things not being difpofed for a new Eaft India company, nor much good to be expected from the old one, in 1708, the miniftry allowed the directors to treat with the rich traders of St. Malo, and refign to them their privilege under certain conditions. In the hands of thefe laft, the company began to flourifh.

Its chief factory was at Pondicherry, on the coaft of Coromandel; this was the refidence of the director-general; the other factories were inconfiderable. The merchandizes which the company brought into France were, filks, cottons, fpices, coffee, rice, falt-petre; feveral kinds of gums and drugs, wood, wax, printed calicoes, muflins, &c. The trade was laid open in 1769, which foon reduced the company to a fet of mere holders of the government funds. A new company was eftablifhed in 1785 with the privilege of an extenfive trade to all parts of the Eaft Indies, except the Ifle of France and its dependencies. This exception muft have prevented the company from fucceeding; but the experiment had fcarcely been made when the trade was again laid open by the national affembly in 1790. As for the other French companies, fuch has been the ftate of the country, they are all, we prefume, extinct; and it is needlefs to give any account of them. Such were the *French Weft India company*, eftablifhed in 1664, and poffeffing by their charter the property and feigniority of Canada, Acadia, the Antilles ifland, the ifle of Cayenne, and the Terra Firma of America, from the river of the Amazons to that of Oroonoko; with an exclufive privilege for the commerce of thefe places, as alfo of Senegal, and the coafts of Guinea, for 40 years, on condition of paying half the duties; but in 1674 the grant was revoked, partly on account of the poverty of the company, and partly becaufe it had anfwered the purpofe of its eftablifhment by recovering the commerce of the Weft Indies from the Dutch:—the *French Miffiffippi company*, firft eftablifhed in 1684, in favour of the chevalier de la Salle, who failed in fearch of the Miffiffippi, but mifcarried with his colony, and came to an untimely death. He was fucceeded by M. Hiberville. who found the Miffiffippi and fettled a colony there; but this adventurer being poifoned, M. Crozat obtained in 1712 the fole privilege of trading to the French territories called Louifiana, granted to him for 15 years:—*Company of the Weft*, formed in 1717, when M. Crozat furrendered his grant before mentioned; and obtaining befides every thing granted to the former company the commerce of beaver, enjoyed by the Canada company from the year 1706, but expiring in 1717:—*India company*, formed by a junction of the former company with that of Canada and with that of Senegal in 1718, and alfo by an union with the Eaft India company, and with thofe of China and St. Domingo, with the two firft in 1719, and with the third in 1720;—the *Baftion company*, arifing from the affociation of two merchants of Marfeilles in the 15th century for fifhing of coral in the gulf of Stora-Courcoury on the coaft of Barbary, on the frontiers of Algiers and Tunis; fo called from a fmall fort called the "Baftion of France;" built in 1561, but it funk in 1633;—and feveral other companies, which either fell of themfelves, or upon the expiration of their grants, and which it is therefore needlefs to mention.

Company, *Danifh North*, was eftablifhed at Copenhagen in 1647. Its eftablifhments are very confiderable in Norway; befides which, it fends veffels to Waranger, whence they convey their merchandizes by land into the Danifh Lapland; and by fledges drawn by rein-deer into the Mufcovite Lapland. It alfo fends others for Borandai and Siberia; where its agent takes them up, and conveys them, in like manner, on fledges, to Panigorod, the capital of this part of the Mufcovite empire.

The commodities it fends thither are rix-dollars, tobacco, and linens; it returns nothing but furs and fkins.

Company, *Danifh Iceland*, eftablifhed in the fame year with the North Company, its chief factory is at Kirkebar, a large town in that ifland.

Company, *Danifh Eaft India*, eftablifhed in the year 1616, and invefted not only with the exclufive privilege of trading to the Eaft, but with the powers of civil and military adminiftration; their chief factory was at Tranquebar. In 1634 this corporation was diffolved, and another, with fimilar privileges, fubftituted in its place. This alfo rapidly declined; and in 1686, a third inftitution was tried for the fame purpofes; but this too failed in about 23 years; and the project was tried for the fourth time in 1732. The new company was provided with ample privileges and powers; and the poffeffion of thefe preferved its exiftence, and increafed the profits of the ftock-holder, at the expence of the country, and of the Indian fettlements. In 1772 the charter expired, and was renewed under reftrictions which proved ruinous to the profperity of the company. In 1777, the king purchafed the rights of the company, and the private trade began to flourifh. When the charter was renewed in 1792 for 20 years, the private trade was rendered ftill more free; all Danifh fubjects, and all foreigners were permitted to trade with the Indian fettlements, upon receiving pafsports, either from Copenhagen or the Afiatic feats of government, and upon condition of returning with the cargoes to Copenhagen.

Company, *Levant, of the Genoefe*, eftablifhed in 1664, and confirmed by the Porte; notwithftanding the oppofition of the French. From 1670 this company has languifhed and funk.

For a more particular account of the rife and progrefs of moft of the above mentioned and other companies, fee "Anderfon's Hift. of Commerce."

Company, *New River*. This corporation confifts of a governor, deputy governor, treafurer, and twenty-fix directors, who hold a weekly board for appointing officers, granting leafes, and redreffing grievances. The projector of this canal for bringing water to London, with the affiftance of king James I. and the corporation of London, is fuppofed to have expended 50,000*l.* upon it: the profits, which are divided into feventy-two fhares, for the firft thirty years admitted of little more than five pounds to each fhare; but their value is much increafed, and its original fhares of 100*l.* are now eftimated at upwards of twelve thoufand pounds each.

Company, in French *compagnie*. A certain number of people of war under the infpection and command of a chief called captain. The number, however, is never fixed, but varies. In the guards, as in the artillery, a company confifts of 120 men. In the Auftrian fervice a company confifts of 200 men. A *compagnie d'ordonnance* was originally compofed of fifteen companies of *gens d'armes* of a hundred

hommes d'armes each. In former times the word *enfeigne* denoted the company of infantry, and the word *cornette* the company of cavalry. A company feldom confifts of fewer than 50 men. It generally has three or four ferjeants, three or four corporals, and two drums.

Company, *Artillery*. See Artillery.

Company *of Muficians*, in the city of Weftminfter. See Charter.

Company, in *Sea Language*, denotes the whole crew of a fhip, including her officers.

Company *of Ships*, is ufed for a fleet of merchant veffels, who make a kind of charter-party among themfelves; whereby, under feveral claufes and conditions tending to their common fafety, they engage not to quit one another, but to defend each other reciprocally, during their voyage.

Thefe affociates, in the Mediterranean, are called conferves. The chief conditions of the charter-party are, that fuch and fuch fhall be owned admiral, vice admiral, and rear-admiral; and thofe that bear no guns, fhall pay fo much per cent. of their cargo, for the expences of the admiral; that fuch and fuch fignals fhall be obferved; that if they be attacked, the damages fhall be reimburfed by the company in general, &c.

Company, *Rule of*, or *Fellowfhip*, in *Arithmetic*, is a rule whereby we difcover or afcertain the fhare of the profits, or loffes, belonging to the feveral partners, or affociates, in any enterprize, in proportion to the ftock each contributed thereto, and the time that ftock was in bank. See Fellowship.

COMPARATES, Comparata, in *Logic*, the terms or fubjects of a comparifon; or the two things compared to each other.

COMPARATIONE—*Punctum ex* Comparatione. See Punctum.

COMPARATIONIS *Homogeneum*. See Homogeneum.

COMPARATIVE *Anatomy*. See Anatomy.

Comparative *Degree*, in *Grammar*, is an inflexion between pofitive and fuperlative degrees; whofe effect is, to fet a thing above or beneath the level of another.

The Latins expreffed their comparative degree by a particular termination of their adjectives, and particles; wherein they are followed by the Englifh, though by few others of the modern languages.

The French form moft of their comparatives by adding the particles *plus*, *moins*, and *auffi*; the Italians, by *piu*, *meno*, &c. as the thing is to be raifed, lowered, or equalled to another.

COMPARE, Val di, in *Geography*, an ifland in the Ionian fea, anciently called Ithaca, noted for having been the country and kingdom of Ulyffes.

COMPARISON, the relation of two perfons or things, confidered as oppofed, or fet againft each other, in order to find wherein they agree or differ; or wherein one has the advantage of the other.

Comparison *of Ideas*, an act of the mind, whereby it compares its ideas one with another, in refpect of extent, degree, time, place, or any other circumftances. This operation of the mind is the ground of relations.

Brutes feem not to have this faculty in any great degree: they have, probably, feveral ideas diftinct enough; but cannot compare them farther than as to fome fenfible circumftances annexed to the objects themfelves: the power of comparing general ideas, which we obferve in men, they have not, as we may probably conjecture.

Comparison, in *Rhetoric*, is a figure, or rather place, in fpeech, whereby two things are confidered with regard to fome third, which is common to them both.

Thus, Cicer. Topic. "Catoni licuit fequi bellum civile, igitur et Ciceroni licebit." "It was allowed Cato to engage in the civil wars, therefore it may be allowed Cicero:" where, to engage in the civil wars is common to both.

There are three kinds of comparifon; the firft *a majori*, *i. e.* from the major to the minor, as that of Cicero againft Anthony, "Quid feceris domi tuæ, cum alienæ tam fis infolens?" Or that of Terence, "Quem feret, fi parentem non fert fuum?" From the fame place, Ovid endeavours to appeafe Cæfar.

"Cur ego poffe negem leniri Cæfaris iram
Cum videam mites hoftibus effe Deos?"

The fecond, *à minori*, *i. e.* from the minor to the major: thus Cicero, "Majoris noftri fæpe mercatoribus, ac naviculatoribus injuriofius tractatis, bella gefferunt; vos tot civium Romanorum millibus uno nuntio atque uno tempore necatis, quo tandem animo effe debetis?"

The third *à pari*; as when we contend, that what obtains in one thing, ought to obtain in another of the fame kind: "It was a law that he who killed his father fhould be fewed up in a fack, and thrown into a river; therefore, he who killeth his mother deferves the fame punifhment."

"Capto tuam, pudet heu, fed capto, Maxime, cænam:
Tu capis alterius; jam fumus ergo pares.
Mane falutatum venio, tu diceris effe,
Ante falutatum: jam fumus ergo pares," &c.
Mart. lib. ii.

COMPARTIMENT, or Compartment, a defign compofed of feveral different figures, difpofed with fymmetry, to adorn a parterre, a cieling, pannel of joinery, or the like.

The term of compartiment is alfo ufed in painting. The Turkifh and Moorifh paintings are only compartiments; the fine bindings of books are in compartiments, &c.

COMPARTITION, in *Architecture*, the ufeful and graceful diftribution of the whole ground plot of an edifice, into rooms of office, and of reception, or entertainment. Compartition makes one of the great divifions of the art of building.

COMPARTMENTS, in *Gardening*, are beds, plats, borders, and walks, laid out according to the form of the ground, and depend more on a good fancy, than on any fet of rules, for their conftruction. They are alfo fometimes merely diverfities or knots of flower-gardens or parterres, of which there is an infinite variety, according to the fancy of the defigner. Plain compartments are pieces of ground divided into equal fquares and flower-beds, marked out by lines, and made of regularly equal length and breadth. Some allow to thefe fquares borders of two feet broad, if the plot of ground be fmall, and if larger of three feet, and edge the borders with box, or with upright hardy thyme; the alleys up between are to be laid with fand or gravel, and kept clean weeded.

Compartment *of tiles*, is an arrangement of white and red tiles varnifhed, for the decoration of the covering of a roof.

Compartment, *alley of*. See Alley.

Compartment, in *Heraldry*, is the term for a partition in coat armour, when the arms of feveral families are borne by one, either on account of intermarriages or otherwife.

COMPASS, the *Mariner's* or *Nautical*. A period of about 500 years is now elapfed, fince an admirable property of a natural production was either difcovered by, or introduced

duced amongſt, the nations of Europe. To the ſimple application of this remarkable property, mankind is indebted principally for the diſcovery of a new continent nearly equal to the old one, for an extenſive commerce between the moſt diſtant nations, and for an accurate knowledge of the ſhape and ſize of the world we inhabit. The *magnet* or *loadſtone* is the natural production, and its directive property forms the active part of that wonderful guide, the *mariner's compaſs*, or as it is more commonly called, ſimply the *compaſs*, probably from its moving in a circle, or from its compaſſing the whole horizon. Whatever relates to the hiſtory, the conſtruction, the uſe, and the defects, of this ſingular machine, is rendered extremely important by the curioſity, the intereſts, the ſecurity, and the wants of the human ſpecies.

The time when the attractive property of the magnet was firſt diſcovered, is by no means known. The opinions are various, but they are not eſtabliſhed upon hiſtorical documents of ſufficient accuracy and authenticity. Certain however it is, that mankind was acquainted with it at a very early period. Father Kircher, in his work, *De Magnete*, l. i. cap. v., endeavours to prove that the Hebrews were acquainted with the magnet's ſingular property of attracting iron; and from Plutarch it appears, that the Egyptians were not ignorant of it. Pythagoras, Ptolemy, Hippocrates, Empedocles, Democritus, Leucippus, Epicurus, and ſeveral other ancient philoſophers, knew and admired this wonderful property of the magnet. Thales and Anaxagoras were ſo ſtruck with it, as to imagine that the magnet had a ſoul; and Plato ſaid that the cauſe of its attraction was divine. Ariſtotle, Theophraſtus, Dioſcorides, Galen, and others, were likewiſe acquainted with this property of the magnet. But its directive property (*viz.* that property by which, if placed upon a piece of cork, or wood, &c. to ſwim on the ſurface of water, or if it be ſuſpended by a very flexible thread, ſo as to have ſufficient freedom of motion, it will conſtantly place itſelf in a certain ſituation with reſpect to the cardinal points of the world) does not appear to have been known to the ancients; and though the time of the diſcovery of this property is of a much more recent date, yet this too is involved in much doubt and obſcurity. It ſeems, however, that the uſe of this property, or (what amounts to the ſame thing) the uſe of the magnetic needle, was not known in Europe before the thirteenth century. The honour of its diſcovery has been much conteſted. The Spaniſh Jeſuit Pineda, and Kircher, affirm that Solomon knew the uſe of the compaſs, and that his ſubjects actually uſed it in their navigations. Plautus *in Mercatore*, act v. ſcene ii., has the following remarkable paſſage, *Huc ſecundus ventus eſt, cape modo vorſoriam.* Now ſome authors are of opinion, that by the word *vorſoriam* or *verſoriam*, is meant the mariner's compaſs; but ſome learned critics affirm that *verſoriam* or *verſorium*, meant a particular rope. And Dr. Lorimer is inclined to believe that it only meant the helm.

By the conſent of moſt writers, it ſeems that a certain Flavio, or John, de Gioja, or Giova, or Gira, a Neapolitan, who lived in the 13th century, has the beſt title to the diſcovery. Flavius Blond affirms that about the year 1302, the above-mentioned John de Gioja, a noble citizen of Amalphi, a town of Principato, in the kingdom of Naples, firſt diſcovered the mariner's compaſs; and he quotes the following verſe from Antony of Palermo, recorded by the Neapolitan hiſtorians, *viz.*

Primo dedit nautis uſum magnetis Amalphi.

The arms of the territory of Principato have, it appears, ever ſince been a mariner's compaſs. See *Collinas, et Frombellus de acus magneticæ inventore.* Inſt. Acad. Bonon. tom. ii. p. 3. p. 372.

Dr. Gilbert, an Engliſh writer of the 16th century, in his book *De Magnete*, affirms that Paulus Venetus (the Venetian Marco Paulo) brought the invention of the compaſs to Italy in the year 1260; having learned it of the Chineſe. But this cannot be true; for Marco Paulo did not ſet out for China before the year 1269, nor did he return before the year 1295 (ſee Purchas's Pilgrim, vol. iii.); whereas the directive property of the magnet, and the communication of that property to ſteel, was known in Europe before that time; though in all probability it was not uſed in navigation till ſome time after, which may very reaſonably be attributed to the clumſy mode of ſuſpending the magnetic needle, which muſt at firſt have been practiſed. Ludi Vertomannus aſſerts, that when he was in the Eaſt Indies, about the year 1500, he ſaw a pilot direct his courſe by a magnetic needle, faſtened and formed like thoſe now in uſe. And Mr. Barlow, in his Navigator's Supply, anno 1597, relates, that in a perſonal conference with two Eaſt Indians, they affirmed that, inſtead of our compaſs, they uſed a magnetic needle of about ſix inches in length, ſuſpended upon a pin in a diſh of white China earth filled with water, in the bottom of which there were marked two croſs lines to indicate the principal winds; the reſt of the diviſions being left to the ſkill of their pilots. But theſe two laſt obſervations, being of a date much poſterior to the uſe of the magnetic needle in Europe, conclude nothing with reſpect to its original diſcovery; ſince the uſe of that magnetic property might have been introduced into Aſia by ſome European.

P. Duhalde, in his "General Hiſtory of China," vol. i. in the annals of the Chineſe monarchy, ſpeaking of the emperor *Hoangti*, when he gave battle to *Tchi Yeou*, ſays, "He perceiving that thick fogs ſaved the enemy from his purſuit, and that the ſoldiers rambled out of the way, and loſt the courſe of the wind, made a carr, which ſhewed them the four cardinal points. By this method he overtook *Tchi Yeou*, made him priſoner, and put him to death. Some ſay there were engraven in this carr, on a plate, the characters of a rat and a horſe, and underneath was placed a needle to determine the four parts of the world. This would amount to the uſe of the compaſs, or ſomething very near it, being of great antiquity and well atteſted." And in another part of the ſame book, ſpeaking of certain ambaſſadors, he ſays, "After they had their audience of leave in order to return to their own country, *Tcheou Kong* gave them an inſtrument, which on one ſide pointed towards the north, and on the oppoſite ſide towards the ſouth, to direct them better on their way home, than they had been directed in coming to China. This inſtrument was called *Tchi Nan*, which is the ſame name as the Chineſe now call the ſea-compaſs by: this has given occaſion to think that *Tcheou Kong* was the inventor of the compaſs." This happened in the 22d cycle, above 1040 before Chriſt. Renaudot adduces ſtrong reaſons againſt the knowledge of the mariner's compaſs amongſt the ancient people of China, and of Arabia. See Kircher, *De Magnete, lib.* i. *cap.* v.

In the works of Claude Fauchet, entitled, *Recueil de l'origine de la Langue et Poeſie Francois, fol.* 555, there is a quotation from an old French poem, called *la Bible Guiot*, in which the mariner's compaſs is evidently mentioned. This ſame paſſage is likewiſe quoted by Muſchenbroeck, in his *Diſſertatio de Magnete.* The paſſage in which the compaſs is mentioned forms part of the abovementioned poem, contained in a curious quarto manuſcript of the 13th century, on vellum, belonging to the royal library at Paris, which was never publiſhed. The poem entitled *la Bible Guiot*,

Guiot, forms the firſt article of the volume; the author of which, *viz. Guiot de Provins*, as mentioned in the poem itſelf, was at the court of the emperor Frederic Barbaroſſa, held at Mentz in the year 1181, when the emperor's two ſons were knighted. See Chron. Abbot. Uſperg. p. 311.

Here follows this remarkable paſſage in its antiquated language, to which is ſubjoined a literal tranſlation made by a native of Provence.

Extract from la Bible Guiot.

Icelle eſtoile ne ſe muet,
Une arts font qui mentir ne puet,
Par la virtu de la manete
Une piere laide et brunete,
Ou il fers volenters ſe joint.
Ont regardent lor droit point
Puez c'une aguile lont touchie,
Et en un feſtu lont fiſhie,
En longue la mette ſens plus,
Et il feſtui la tient deſus;
Puis ſe torne la point toute
Contre leſtoile ſans doute,
Quant il nuis eſt tenebre et brune
Con ne voit eſtoile ne lune,
Lor font a laguille alumer;
Puiz ne puent ils aſſorer,
Contre leſtoile vers le pointe;
Par ce font il mariner cointe,
De la droite voie tenir;
C'eſt uns ars qui ne puet mentir.

Literal Tranſlation of the preceding.

This ſame (the pole) ſtar does not move, (and)
They (the mariners) have an art which cannot deceive,
By the virtue of the magnet
An ugly browniſh ſtone
To which iron adheres of its own accord.
Then they look for the right point,
And when they have touched a needle (on it)
And fixed it on a bit of ſtraw
Lengthwiſe in the middle, without more,
And the ſtraw keeps it above;
Then the point turns juſt
Againſt the ſtar undoubtedly,
When the night is dark and gloomy,
That you can ſee neither ſtar nor moon,
Then they bring a light to the needle;
Can they not then aſſure themſelves
Of the ſituation of the ſtar towards the point (of the needle?)
By this the mariner is enabled
To keep the proper courſe;
This an art which cannot deceive.

Francis Cabeus, a jeſuit of Ferrara, ſays, that the firſt thing he knows profeſſedly written reſpecting the directive property of the magnet, was an epiſtle of *Petrus Peregrinus Gallus*, about the latter end of the 13th century. A few years after, this epiſtle was diſguiſed by one John Taſnier, who publiſhed it in his own name, under the title of *Opuſculum perpetuæ memoria digniſſimum de natura et effectibus magnetis*. Some years ago, Mr. Senebier of Geneva ſent the following memorandum concerning this letter to Dr. Lorimer in London.

" *Epiſtola Petri Peregrini de Marcourt,*
Ad Sigerium de Foucancourt, Militem.
De Magnete."

" The work contains a deſcription of that ſtone, the means of finding the poles, its property of attracting iron, and proves that the part of the magnet which is turned to the north, attracts that which is turned to the ſouth. It then teaches the manner of employing the magnet in aſtronomy, and of playing tricks like thoſe of Comus. It deſerves to be remarked, that the author knew not that the magnet could be employed in navigation; for though he frequently ſpeaks *de ſtella nautica*, he never ſpeaks of the uſe that might be made of the magnetic needle in ſea voyages. *Vide Bibliotheca Bibliothecarum, fol.* 11. p. 1400. Catalogue of the manuſcripts in the library of Geneva, by Senebier, p. 207."

Amongſt the manuſcripts of the univerſity of Leyden, there is a volume containing ſeveral ſcientific tracts, one of which is a Latin letter of Peter Adſiger, on the properties of the magnet. It is, in fact, a little methodical treatiſe, divided into two parts, the firſt of which is ſubdivided into ten, and the ſecond into three chapters. This letter, which ſeems intended for the inſtruction of ſome particular friend, is dated in the year 1269. A few years ago, Mr. Cavallo obtained an exact copy of this curious letter, of which he inſerted very ample extracts, both in the original Latin and in Engliſh, in the ſupplement to the ſecond and third editions of his treatiſe on magnetiſm, from which it appears that the writer, at that early time, was acquainted with all the principal properties of the magnet. The following is the tranſlation of the moſt remarkable part of the above-mentioned letter, which deſcribes the compaſs, and mentions the declination of the magnetic needle.

" Part II. Chap. 2. *On the conſtruction of a better inſtrument to anſwer the ſame purpoſe*, viz. *to find out the Azimuth of the Sun, the Moon, or any Star upon the Horizon.*

" In the preſent chapter, you will be informed of the conſtruction of another inſtrument of more certain effect. A veſſel muſt be made of wood, copper, or any other material, and let it be turned like a box of ſmall depth, and competently wide. Let a cover of ſome tranſparent ſubſtance, as glaſs or cryſtal, be adapted to it; and if the whole were made of ſome tranſparent matter, it would be ſtill better. A ſlender axis of copper or ſilver muſt be adapted to the middle of this veſſel, applying its extremities to the upper and lower parts of the box, *viz.* to the cover and to the box; the axis, however, muſt not be ſo firmly faſtened, as not to be capable of moving very freely. Two holes muſt be perforated in the middle of the axis, at right angles to each other, and an iron ſtyle, like a needle, muſt paſs through one of thoſe holes, whilſt another ſtyle of ſilver or copper paſſes through the other hole in a direction croſſing the iron one. The cover muſt firſt be divided into four parts, and each of theſe into ninety parts, agreeably to the inſtructions given concerning the other inſtrument in the preceding chapter, and upon it mark the north and the ſouth, the eaſt and the weſt, points; and let a ruler of ſome tranſparent ſubſtance, with ſights on its extremities, be adapted to it. Then place whichever part of the magnet you pleaſe, *viz.* the north or the ſouth, near the glaſs, until the needle be moved towards the ſaid magnet, and acquires the virtue from it; after which, the magnet being removed, the extremity of the needle will turn itſelf towards the pole. This being done, turn the box until one extremity of the needle remains directed towards the north part of the inſtrument, or the north part of the heaven; then turn the ruler towards the ſun in the day time, and towards the ſtars in the night time, after the manner mentioned in the preceding chapter. By means of this inſtrument, you may direct your courſe towards cities, and iſlands, and all other

other parts of the world, either on land or at fea, provided you are acquainted with the longitudes and latitudes of thofe places; for, if the town or ifland to which I intend to go is in a lower latitude than the place in which I am, I fhall go ftraight before me, towards that end of the ruler which is directed to the fun or ftar; but if the latitude of the place be greater, I fhall proceed in the oppofite way, *viz.* in the direction of the other extremity of the ruler. Obferve, that the fouth part of the needle, which is to be ufed as a guide, muft be made to decline towards the weft by one point; and this muft be done by the declination of the north part towards the eaft, becaufe the fouth part of the inftrument is deftitute of divifions."

"Take notice that the magnet, as well as the needle that has been touched by it, does not point exactly to the poles, but that part of it which is reckoned to point to the fouth, declines a little to the weft; and that part which looks towards the north, inclines as much to the eaft. The exact quantity of this declination I have found, after numerous experiments, to be five degrees. However, this declination is no obftacle to our guidance, becaufe we make the needle itfelf decline from the true fouth by nearly one point and a half towards the weft."

To this letter, Mr. Cavallo, in his treatife, fubjoins the following obfervation. "It appears that the fufpenfion of the needle in the above defcription, is a very clumfy one; and that the beautiful fufpenfion by a cap upon a pin, which is now univerfally ufed, was unknown to the author. It is likely, therefore, that for want of this fufpenfion, the needles at that time not moving fufficiently eafy, were not actually ufed in navigation, at leaft in Europe, though the fufpenfion by means of a cap upon a pin, feems not to have remained long unknown after the date of this letter."

Sir G. Wheeler fays, that he had feen a book of aftronomy older than the year 1302, which mentions the ufe of the needle in aftronomy, but not in navigation.

Gaffendus adduces, as an argument of the French having been the inventors of the mariner's compafs, that the north point of it is always marked with a flower-de-luce. Lib. x. Diog. Laert. t. 1. p. 139. As for Goropius's pretence, that the compafs muft have been invented by the Danes, Dutch, or Germans, becaufe the 32 points on it are written and pronounced in the Dutch, or Teutonic language, it is hardly deferving of a reply. Dr. Wallis attributes it to the Englifh, for no other reafon, but for its being called compafs. Vincentius Bellaucenfis, and Albertus Magnus, who lived about the year 1245, alfo Lavinius Lemnifis, make mention of the direction of the poles of the magnet, as from a tract *de Lapidibus*, which had been attributed to Ariftotle; but is, with more probability, fuppofed to have been written by fome Arabian author, not long before their own time. This tract has been fince loft.

Notwithftanding the foregoing remarks, it is ftill very doubtful whether the ufe of the compafs in navigation, or even the directive property of the magnet, was known by any people before the Europeans, in or about the 13th century; and it appears, that in the fame century, or foon after, the above-mentioned Neapolitan, Flavio, or John de Gioja, if not the original difcoverer, was at leaft the firft who ufed the mariner's compafs, or conftructed it for the ufe of veffels in the Mediterranean.

The principle of the conftruction of the compafs is extremely fimple. A magnet, or a piece of fteel that has been rendered magnetical by means of natural or artificial magnets, muft be freely fufpended, fo as to be able to move without obftruction; for fuch magnet or piece of fteel will, in that cafe, direct itfelf to certain parts of the world, which will of courfe indicate to the obferver the direction of any other place, provided its fituation on the furface of the earth be known. Suppofe, for inftance, that you are at fea near Portfmouth, and wifh to go towards Newfoundland, which lies to the weft. By looking at the magnetic piece of fteel or magnet, one extremity of which looks nearly towards the north, and turning your face to that part of the world, you proceed towards your left hand, at right angles to the direction of the needle; fot in that direction Newfoundland is to be found. And after the fame manner, you may proceed in any other direction. Such is the fimplicity of the principle; but the practical application of it, efpecially in the prefent accurate mode of conftructing inftruments, and of making obfervations, requires a great degree of mechanical nicety, and a confiderable degree of attention to a variety of circumftances, upon which the accuracy of the inftrument, and its various applications, abfolutely depend. On account of thofe particulars, and in confequence of various contrivances made at different times, the compafs or magnetic needle has undergone innumerable alterations, both in fhape and fize; and every kind of conftruction is attended with peculiar advantages, as well as defects; the moft effential of which we fhall endeavour to point out in the fequel. From its various ufes, the compafs has obtained different names and different forms. Thefe are reducible to the four following fpecies, *viz.* 1. The *land compafs*, which is ufed either for the pocket, or is adapted to theodolites, to celeftial and terreftrial globes, &c.; 2. The *fteering compafs* for the ufe of veffels at fea. 3. The *azimuth compafs*, which ferves to find the fun's or ftar's azimuth, whence the actual or true direction of the magnetic needle may be afcertained (this feldom being due north and fouth); and, 4. The *variation compafs*, which, being fituated in a proper place on land, fhews the daily variation of the magnetic needle from its ordinary direction. See MAGNETICAL *Declination*, and MAGNETICAL *Variation*.

A common fewing needle rendered magnetical, and fimply laid upon water, or faftened to a cork, or ftraw, &c. and fo laid upon water, in a glafs, or earthen or wooden cup; or elfe fufpended by a very flexible thread, which muft be faftened to its middle, forms a fimple but imperfect compafs; and fuch, in all probability, was one of the firft modes of conftructing the compafs, whence the magnetized fteel, wire, or bar, has, ever fince, been called the magnetic needle. The defects of the laft-mentioned conftruction are too evident to need any particular remarks. The needle laid upon water is continually running to the fides of the cup, the water is liable to be fpilt, or if a thread be ufed, the ftiffnefs of it will always influence the action of the needle. To avoid thofe inconveniences, an excellent contrivance was fubftituted. It is a conical cavity made in the middle of the needle or fteel bar, as fhewn in *Plate, Magnetifm, fig.* 1. the open of which refts upon a pointed wire *a*, which enables the needle to move with the greateft freedom imaginable. The open of this cavity fhould come as near as poffible to the upper furface of the needle, or rather a little above it, as in *fig.* 2. in which cafe the upper furface of the middle part of the needle is left a little more elevated than the reft. But in order to avoid any irregularity in the fhape of the needle, as well as any difficulty in the mechanical formation, the needles are moftly pierced quite through, with a pretty large hole; a piece of hammered brafs is rivetted into this hole, and the conical cavity is made into the brafs, fo that the open of it may ftand even with, or very little above, the upper furface of the needle. The upper part of the wire upon which the needle refts, is generally made of hard fteel, whilft

whilst the lower part is made of brass. This construction answers very well for a considerable length of time; yet, by continual rubbing, a small prolongation or irregularity of the cavity, is at length produced, which will in some degree obstruct the free motion of the needle; hence, in the best needles, the upper part of the above-mentioned cavity is formed in a piece of agate, which is not in the brass piece, as shewn in *fig.* 3. where AB is the needle, *c d* the brass piece rivetted in a hole in the middle of it, and *e* is the piece of agate. The needles thus constructed are said to have an agate cap. The defect to which those agate caps are subject, is, that on account of the hardness of the stone, the cavity in it seldom runs to a point; the consequence of which is, that the pin which supports the needle is apt to shift from one part of the agate cap to another, and of course the centre of the needle cannot always coincide with the point of suspension.

The forms of the needles have likewise been very numerous. Some are slender and long, others broad and short; several needles of the common sort are made broad towards the end, but tapering towards the middle, or they terminate in two very sharp points. Sometimes that extremity of the needle, which points towards the north, is formed like a cross; but the most objectionable of all, are those which consist of two wires, and may be frequently met with on board of merchant ships. Two pieces of steel wire, each bent in the middle so as to form an obtuse angle, and when fixed under the card, in the centre of which a brass cap is fastened, form a lozenge. All those shapes may, in great measure, answer for common purposes; but they are far from being accurate or regular in their performance, the reason of which is, that a piece of steel of irregular form generally has more than two magnetic poles; almost every corner or protuberance being a south or north magnetic pole; in consequence of which the axis of the needle never coincides with its magnetic axis, the latter of which changes its situation in proportion as some of the above-mentioned poles become stronger or weaker than the rest; and this is continually the case.

In order to avoid every irregularity of shape, and even the perforation, needles, for certain purposes, have been suspended in the following manner: A B (*fig.* 4.) is the magnetic needle of a parallelopipedal form, which is fastened to a piece of brass C E D. In the middle of this piece of brass at *g*, there is a small conical cavity, wherein an agate cap is set. In order to suspend this needle, a bar F H (*fig.* 5.) of brass, or copper, or wood, is made fast to the box K L.; in the middle of this bar a short pointed wire is fixed, which, when the bar is made to pass through the brass piece C E D of *fig.* 4. *viz.* through *g*, enters the agate cap, and supports the needle. *Fig.* 5. represents the whole together, where F H is the bar fastened to the box, A I B is the brass piece, seen lengthways, or in the direction of the needle, which passes through the hole A B, and moves below the bar F H. It is evident that in this construction the needle cannot turn quite round, consequently this sort of suspension is not useful for navigation.

The Chinese method of suspending the magnetic needle is exceedingly ingenious (see *fig.* 6 and 7.), the first of which represents a section of this suspension as viewed in the direction of the needle; and the second exhibits a lateral view of the same. The letters refer to the same parts in both figures. I is a brass cap very thin and light, and towards the edge of it there are two holes, opposite to each other. B B is a very slender slip of brass, the upper part of which A, is shaped like a ring, through which the needle C D passes. The extremities of this slip of brass go through the holes in the lower part of the cap, and are fastened to it by being turned over its edge. The magnetic needle C D consists of a cylindrical steel wire about an inch long, and not above a fortieth part of an inch in diameter; having its northern extremity only painted red by way of distinction. All this is supported by the pin E, which is fastened to the bottom of the box, and upon which it moves very freely. In this construction the needle is above the point of suspension; yet the centre of gravity of all the three pieces (*viz.* cap, needle, and slip of brass) taken together, is below the point of suspension, which prevents the cap, &c. falling off from the pin when the compass is fixed in an horizontal position; but to prevent the cap with the needle being shook off by any sudden jerks, or by inverting the instrument, there is a very thin brass plate fixed to the box, a section of which is indicated by F G. It has a hole through the middle, which, being smaller than the diameter of the aperture of the brass cap, prevents its falling off. It appears, from a variety of experiments, that the perforation through the magnetic needle is not attended with any bad consequences. The external shape of the needle requires to be formed with greater attention, this being more apt to produce a multiplicity of poles. A very broad needle seldom has its magnetic axis coinciding with the axis of its figure. A very slender and long needle almost always has more than two magnetic poles. There is a certain breadth, proportionate to the length of a needle, which is less subject to an irregular disposition of the magnetical virtue; this proportion, however, cannot be accurately determined. The little swelling generally left about the middle of the magnetic needles in order to give them strength, where the perforation for the cap would otherwise weaken them, has not been found to produce multiplicity of poles, provided it be made smooth and free from corners. The lengths of the needles commonly used at sea are from three to six inches, but those that are used as variation needles are generally made longer, though they need not, however, exceed eight or at most nine inches. With respect to the substance of the needle, it must be observed that certain kinds of steel are more apt to acquire the magnetic virtue than others; but this must be determined by actual trial. The common sort of magnetic needles are brought down to what is called by the workmen a blue temper, because in that state they are easily magnetized; but it must be observed that if in that state they are easily magnetized, they are at the same time liable to lose that power very easily; therefore the magnetic needles ought to be made quite hard; for in that case when they are once rendered magnetic, which is easily done, they will retain that power almost for ever after. The magnetic needles, though perfectly balanced before they are magnetized, will, after that operation, incline one of their extremities towards the horizon, which is in consequence of the dipping property of the magnet. See MAGNETISM, and DIPPING *Needle*. Therefore after the communication of the magnetism, it becomes necessary to balance the needle again; but this must not be done either by grinding off part of that extremity of the needle, or by adding a fixed weight to the opposite extremity of it, because the quantity of that dipping varies according to the change of situation on the surface of the earth. The best way of adding this weight is by placing a small piece of brass on one arm of the needle, capable of being slid nearer to, or farther from, the centre of the needle, by which means the balance of the needle when lost may be easily restored. Upon all these considerations, a needle of the best form and size is exhibited at *fig.* 8. and 9.; the former of which represents a vertical, and the latter a lateral, view of it. A D is

is the needle of hard steel, C is the agate cap set in a piece of brass, B a mark made on that extremity which points towards the north, in order to distinguish it from the other, and E is the piece of brass which may be slid upon the arm C D, for the purpose of balancing the needle.

The shapes and sizes of the compasses used upon land are very numerous; some being of the usual size of a watch seal, and they are actually fixed in such seals; others are of the size, and externally in the form of a pocket watch; others again are made in a wooden box, square on the outside, but circular within; some are of a larger size, in a brass box. Sometimes a little sun-dial is affixed to some compass boxes, and so forth. But though the shape be different, the principle of the construction is the same in them all. The box, whether of wood, or brass, or silver, or other substance, must have no particle of iron or steel in its construction; and even the brass, when that metallic substance is used, must be tried by presenting the extremity of a very delicate magnetic needle to every part of it; for if any attraction be observed, that brass must be rejected, otherwise the needle would not move with sufficient freedom. Brass is frequently magnetical, especially after being hammered, which is generally done by the workmen, for the purpose of rendering it hard. A pin of hard steel is fixed in the centre of the box, upon the point of which the needle rests; and a glass plate covers the cavity. This glass plate rests upon a shoulder, and stands very little above the piece C (*fig.* 9.), so as not to touch that piece, whilst at the same time it prevents the needle's falling from over the pin. In several of the compasses a little piece of wire with a button is affixed to the box, which is formed so as to stop the motion of the needle when the compass is not intended to be in action, as when it is carried in the pocket, &c.

The friction which must naturally take place in cleaning the glass cover of a compass, frequently excites its electricity, in which case the needle is attracted more or less by the glass, and its free motion is thereby partly or entirely obstructed, Phil. Trans. N°. 480. p. 243. This inconvenience may be removed by passing a wet finger in various directions over the surface of the glass. Few needles of land compasses are furnished with cards like those which are used at sea. In general the principal points of the horizon are marked in the bottom of the box, and a divided circle is added to the box, so that the edge of it may be even with, and so near as almost to touch, the extremities of the needle.

The compasses used at sea for ascertaining and directing the course of vessels, differ from the former principally by their having a circular card, whose diameter is equal to the length of the needle, fixed upon the needle, so as to turn with it, and by the box being set in a mechanism on four cross centres, called gimbals, the office of which is to keep the compass box always in an horizontal position, whilst the external box moves with the ship, as the latter rolls and pitches. This construction will be easily understood, by observing *fig.* 10, which exhibits a steering compass as viewed by an eye placed perpendicularly over it. A B C D is the external wooden box, which is fastened to and moves with the ship, E F is a brass circle having two pivots or axes, G, H, which turn in two holes in the opposite sides of the wooden box; *i e*, in the compass box, which is likewise furnished with two pivots or axes, *r*, *u*, and these turn in two holes made in the brass ring F E. Now as the direction of these last pivots, *r*, *u*, is at right angles to the direction of the pivots, G, H, it will be easily understood, that in whatever direction the vessel, and the box A B C D, which is fixed to it, may incline, the compass box, *i o*, remains always in an horizontal position, for it will turn either upon the pivots, *r*, *u*, or upon the pivots, G, H. K is the card which is fixed to the magnetic needle and moves with it, under the glass cover, through which it may be distinctly seen. The outer edge of this card is divided into 360 degrees, and within the circle of those divisions it is again divided into 32 equal parts or arches, called *the points of the compass*, or *rhumbs*. These rhumbs are usually divided into quarters. Their names, beginning from the north point, and going all round, are as follow: the letters standing N, for north; E, for east; S, for south; and W, for west.

N.	S. E. by E.	W. S. W.
N. by E.	S E.	W. by S.
N. N. E.	S. E. by S.	W.
N. E. by N.	S. S. E.	W. by N.
N. E.	S. by E.	W. N. W.
N. E. by E.	S.	N. W. by W.
E. N. E.	S. by W.	N. W.
E. by N.	S. S. W.	N. W. by N.
E.	S. W. by S.	N. N. W.
E. by S.	S. W.	N. by W.
E. S. E.	S. W. by W.	

The construction which has been more generally used in the royal navy, is an improvement of the late Dr. Knight, a gentleman of very extensive knowledge in magnetism. In this construction the weight of needle, card, &c. is removed considerably below the point of suspension or centre of motion, by the addition of a brass circle, whose diameter is equal to that of the card, which is made very thin. This ring being fixed below the card, and the needle above it, the centre of gravity of the whole comes low enough to admit of the cap being situated below the needle; hence the needle needs not be perforated. This needle is a perfect parallelopiped. The *figs.* 11 and 12 represent the lower and upper parts of this (Dr. Knight's) card, needle, &c. about one half of the real size. A B is the needle, and C represents the upper part of its cap, situated below it. The under part of the cap is seen at G; A D D B is the card. The brass edge, or circle, is represented by F E O, and is fastened to the extremities of the needle, (the card being interposed) by means of two screws. H, I, are two sliding weights to balance the card.

A few years ago another sort of construction was contrived by Mr. K. M'Culloch, for which he obtained a patent. The *figs.* 13 and 14 represent this compass, the former being a section, and the latter a perspective view of it. In this compass, both the compass-box and the needle, with the card, are suspended upon points, the extremities of which come very near to each other; which construction keeps them horizontal without any gimbals, as will be easily manifested by the following description. *Fig.* 13, A *a a a a*, is the common wooden box, with its lid; *b b* the brass compass box; *c c* the glass cover to it; *d d* the hollow conical bottom; *e* the prop, upon which the compass is supported instead of gimbals; the spherical top of which is finely polished, and the apex of the hollow cone is fitted to receive it; *f f* is a quantity of lead run round the bottom and cone of the compass box, to balance and to keep it steadily horizontal; *g g* is the card, and the magnetic needle, bent in such a manner as to bring the point of the conical pivot, on which it moves and is supported, very near to the centre of gravity, as well as to the centre of motion; *h h* are two guards, which, by means of the two pins *i*, *i*, affixed to the compass-box, prevent its turning round, and deceiving the steersman. In *fig.* 14, both the lid and the

the front of the box are removed; *h h* are the guards; *b* the compafs-box, and *e* is the prop which fupports the box.

The greateft inconvenience that attends the ufe of the compafs at fea is the irregularity of motion induced by fhocks of fudden impulfes. In thofe cafes the veffel is fuddenly moved out of its direction, and the card of the compafs is fet a vibrating for a confiderable time, during which the fteerfman is unable to regain his courfe. Several methods have been tried for the purpofe of removing this inconvenience, and the above defcribed compafs of Mr. M'Culloch's contrivance was fuppofed to accomplifh this end in a confiderable degree; but the experience of fome years fhews that this is not the cafe. The leaft fkilled feamen do not like the needles of their compaffes too powerfully magnetized, becaufe, they fay, then the needles are not fteady. The fact is, that when the needle is not ftrongly magnetic, it follows the irregularities of the fhip's motion in a great degree; which renders it apparently more fteady; but the very fame caufe which enables it to follow the irregular motion of the fhip, prevents at the fame time its placing itfelf in the magnetic meridian. With the fame degree of impropriety, fome perfons have endeavoured to prevent the irregular fhocks or vibrations of the magnetic needle by increafing the friction between the cap of the needle and the pointed wire which fupports it. Sometimes pieces of paper, like wings, have been ftuck to the lower furface of the card, which, by offering a refiftance againft the air in the box, check in fome meafure the irregular movements of the card. In the year 1779, Dr. Ingenhoufz prefented a paper to the Royal Society, which is publifhed in the 69th vol. of the Philofophical Tranfactions, and in which he defcribes fome experiments, made by magnetic needles in water, where he found that a ftrong magnetical needle placed itfelf in the magnetic meridian, nearly as well under water as in the open air, and that by the refiftance of the medium, much of its too great verfatility was taken away. In confequence of thofe experiments the Dr. propofed to enclofe the magnetic needle in fome fluid for the ufe of veffels. "Common water," he fays, "would be, perhaps, the beft medium for thefe different contrivances, if fteel was not fo eafily rufted by it, and if in cold weather water was not fo apt to freeze; therefore, I think, that fome of the thinneft expreffed oils would anfwer the purpofe better. The glafs bafon containing fuch a compafs fhould be full of the liquid to the cover, to obftruct undulating motions." But though this propofal appeared at firft very promifing, and fome eminent philofophical inftrument-makers were much ftruck with it; yet it does not appear that it was ever adopted.

The ufe of the compafs in general is to direct a perfon along any required track, which makes a known angle with the direction of the magnetic needle; and this renders the compafs applicable to a variety of purpofes; thus it guides travellers in deferts, as in Arabia, in the woods of America, &c.; it enables the navigator to proceed in any required track; it is highly ufeful to the miner, by fhewing the direction of fubterranean places; it ferves for meafuring horizontal angles; hence it is ufeful in land-furveying, taking plots, finding bearings in dialling, &c. And laftly it ferves to fet fun-dials, and other aftronomical inftruments when no great accuracy is required. The application of the compafs to thofe purpofes is fo very obvious, as not to require any farther illuftration. But for fome of thefe purpofes, fights muft be applied to it, as in the azimuth compafs.

The *azimuth compafs* is a fteering compafs of any of the above-mentioned conftructions, to which two fights are adapted, through which the fun is to be feen, in order to find its amplitude or its azimuth, whence the declination of the magnetic meridian from the true or aftronomical meridian may be determined; thofe two meridians feldom coinciding. At prefent (1807) in London, the declination of the magnetic needle is about 24° 9′ weft; that is, the northern extremity of the magnetic needle, points to a part of the heavens, which makes an angle of about 24° 9′ with the true North. But this declination is various at different times in the fame place, as well as at different places at the fame time.

The more ufual fort of azimuth compaffes is reprefented in *fig.* 15, where F, G, are the fights, or fight vanes, in one of which, G, there is an oblong aperture, with a perpendicular thread or wire through its middle; and in the other fight, F, there is a narrow perpendicular flit. A thread or wire, H I, is ftretched from one fide of the edge of the box to the other. The ring A B of the gimbals refts with its pivots on the femicircle C D, the foot, E, of which turns in a focket, fo that whilft the box, K L M, remains fteady, the compafs may be turned round, in order to place the fights, F, G, in the direction of the fun, or other celeftial object. The pivots of the gimbals of this, as well as of the fteering compafs in general, fhould lie in the fame plane with the point of fufpenfion of the needle or card, for the purpofe of avoiding the irregularity of its vibrations as much as poffible. In the infide of the box there are two lines drawn on its fides perpendicularly down, from the points where the thread, H I, touches the edge of the box. Thefe lines ferve to fhew how many degrees the north or fouth pole of the needle is diftant from the azimuth of the fun; on which account the middle of the apertures in the fight vanes, F and G, the thread H I, and the above-mentioned two lines muft ftand exactly in the fame vertical plane. The ufe of the thread H I, which is fometimes omitted in compaffes of this fort, is to fhew the degrees between the magnetic meridian and the azimuth, &c. when the eye of the obferver ftands perpendicularly over it. On one fide of the box of the azimuth compafs, there generally is a nut or ftop, which, when pufhed in, bears againft the card and ftops it; and this is done for the purpofe of reading that degree, half degree, &c. of the card, which coincides with one of the perpendicular lines in the infide of the box.

Mr. M'Culloch's azimuth compafs is reprefented in *fig.* 16, where *b* is the compafs-box, *h* one of the guards, *e* the prop, which ftands in a brafs focket, and may be turned round at pleafure, 1 is a brafs bar upon which the fight vanes are fixed; 2, a dark glafs, which moves up or down on the fight vane 3; 4 is a magnifying-glafs, which is alfo moveable on the other fight vane; 5 is the nonius or vernier; 6 a flide for moving the vernier fo as to ftop the card in taking the azimuth; and 7 a double convex glafs, through which the divifions on the vernier may be read with accuracy.

In order to obferve at fea the magnetic amplitude of a celeftial object (*viz.* its bearing by the compafs when in the horizon) with the azimuth compafs, place the inftrument on a fteady place, whence the horizon may be clearly feen; and looking through the fight vanes of the compafs, turn the inftrument round, until the centre of the fun's difk, or other celeftial object, may be feen through the narrow flit in one of the fight vanes, exactly on the thread which bifects the other fight vane; and at the inftant that the centre of the celeftial object, whether rifing or fetting, is in the horizon, pufh the ftop in the fide of the box, fo as to ftop the card, then read the degree, half degree, &c. of the card, which ftands againft one of the perpendicular lines in the infide of the box, and this is the magnetical amplitude fought.—In this obfervation, fome allowance muft be made for the height of the obferver's eye, above the level of the fea,

fea. The true amplitude of the celeftial object is an arch of the horizon contained between the eaft or weft points of the horizon, and that point of the horizon which the centre of that celeftial object cuts in its rifing or fetting. In order to find the true amplitude of the celeftial object, the latitude of the place of obfervation, and the actual declination of that object, muft be known; then fay, as the cofine of the latitude is to radius, fo is the fine of the declination to the cofine of the amplitude fought.

To obferve at fea the magnetic azimuth of a celeftial object, (*viz.* its bearing by the compafs when above the horizon), fituate the inftrument in a fteady place, and looking through the narrow flit in one of the fight vanes, turn the box round until the centre of that object appears to coincide with the thread in the flit of the other fight vane, or till the fhadow of that thread, when the fun is obferved, falls exactly along the line on the furface of the compafs-box, and at that inftant ftop the card; then read the degree, &c. as above directed with refpect to the amplitude, and thus you have the magnetic azimuth of that object.—The true azimuth of that object is an arch of the horizon intercepted between the north or fouth point, and that point in which a plane paffing through the zenith and the celeftial object, cuts the horizon. In order to find this azimuth, the latitude of the place of obfervation, the declination of the celeftial object and its altitude muft be known; and fince to determine the declination of the magnetical needle, this true azimuth of a celeftial object muft be taken at the fame time that its magnetic azimuth is taken; therefore the altitude of that object muft be taken with a fextant, at the very inftant that its magnetic azimuth is taken; *viz.* at the time the card is ftopped; then proceed in the following manner: If the declination and latitude be both north or both fouth, call the co-declination A; but if they be one fouth and the other north, add 90° to the declination, and call the fum A. Call the difference between the co-latitude and co-altitude B. Let the half of the fum of A and B be called D; and the half of their difference be called C; then add together the four following logarithms, *viz.* the arithmetical complement of the logarithmic fine of the co-latitude, the arithmetical complement of the logarithmic fine of the co-altitude, the logarithmic fine of D, and the logarithmic fine of C. Half the fum of thofe four logarithms is the logarithmic fine of half the azimuth fought.

Now, having fhewn how to find the true and the magnetical amplitudes as well as azimuths, we fhall briefly add the method of determining from them, the declination of the magnetic needle for the time and place when and where the obfervations are made. Let the amplitudes, as well as the azimuths, be all reckoned from the north point, which is effected by fubtracting the amplitude from 90° when it is on the northward of the eaft or weft points; or by adding it to 90° when it is fouthward of the faid points. Then the magnetic amplitude is either fmaller or greater than the true amplitude. When the magnetic amplitude is lefs than the true, and they are both on the fame fide of the north point, their difference is the declination of the magnetic needle towards the contrary fide of the north point. But if they be on different fides of the north point, then their fum is the declination towards the fame fide with the true amplitude. When the magnetic amplitude is greater than the true, and they are on the fame fide of the north point, their difference fhews the declination towards the fame fide. But if they be on different fides, then their fum is the declination towards the fame fide with the true amplitude. Thus, for example, if the magnetic amplitude is 80° eaftward of the north point, and the true amplitude is 82° towards the fame fide; then the declination is 2° weft. And if the magnetic amplitude be 76° eaftward of north, whilft the true amplitude is 5° weftward of north, then the declination is 81° weft. The fame directions, *mutatis mutandis*, are to be followed for finding the declination from the magnetical and true azimuths.

Ever fince the difcovery of the declination of the magnetic needle from the true meridian, which appears to have been firft obferved by Columbus in his firft voyage towards the continent of America, in the year 1492, the caufe of that phenomenon has been earneftly fought after by inquifitive perfons in the fcientific world; and efpecially when it was found that this declination varies continually, in a manner, which has not, as yet, been reconciled to any theory. The moft promifing method of inveftigating the fubject appeared to be that of obferving attentively the daily, and even the hourly, variation of the declination, in order to difcover, if poffible, any period in it, or any dependance of it upon other natural phenomena. And in fact, the late ingenious Mr. Canton, who made numerous obfervations relative to the fubject, found a periodical increafe and decreafe of the magnetical variation, in great meafure correfponding with the temperature of the different parts of a natural day. For this purpofe accurate compaffes were fixed in various obfervatories, and the variation of the magnetic needle has been obferved, at leaft once every day, for a great many years; fuch obfervations having frequently been inferted in meteorological journals, and elfewhere.

The variation compafs being intended to fhew the daily variation of the magnetic needle upon land, is generally made longer than thofe that are ufed at fea; and, as it is not neceffary to turn it round, the box generally is of an oblong form, fo that the angular motion of the needle in it may amount to about 40° or 50°. The divided arches are either within the box, concentric with the point of fufpenfion of the needle; or out of it, on a frame, the particular conftruction of which will appear from the defcription of the variation compafs of the Royal Society of London, which will be given prefently. When the divided arches are within the box, in which cafe a nonius is often placed on one extremity of the needle, the variation is known by obferving the divifion which coincides with the axis of the needle. In either conftruction, it is evident that the beginning of the divifions of the arch or arches muft be placed exactly in the meridian of the place; or elfe its deviation from the meridian muft be accurately known and allowed for in reading the degrees of magnetical variation. And it is almoft fuperfluous to add that fuch compaffes muft be fituated in very fteady places, out of the influence of iron; fo much fo that it will be proper for the obferver, when he examines the compafs, &c. to take out of his pockets, keys, knives, or any other article of fteel and iron; for otherwife thefe will fenfibly alter the direction of the needle. We fhall now fubjoin the particular defcriptions of two variation-compaffes of the beft conftruction, *viz.* of that which is ufed at the Royal Society, and is defcribed by the honourable Henry Cavendifh, in the 66th vol. of the Philofophical Tranfactions; and of that which was contrived by Mr. Cavallo, and is defcribed in his "Treatife on Magnetifm;" the former of which, being much larger, is well calculated for a fixed obfervatory, whilft the latter is fmaller, more compact, and may be eafily fixed in any place.

Fig. 17, is a plan of the Royal Society's variation-compafs. "In this inftrument, the box which holds the needle is not fixed, but turns horizontally on a centre, and has an index faftened to it, pointing to a divided arch on the brafs frame on which it turns; and the method of obferving is to

 move

move the box, till a line drawn on it points exactly to the end of the needle; which being done, the angle that the needle makes with the fide of the frame is fhewn by the index. A B *b a* is the brafs frame, the fides A B and *ab* being parallel: E*e* is a circular plate faftened thereto, on which CD*dc*, the box which holds the needle, turns as on a centre; N*n* is the needle, the pin on which it vibrates being fixed in the centre of the plate E*e*; B*b* is the divifion on the brafs frame; and G the index faftened to the box, CD*dc*, furnifhed with a vernier divifion; the divifion and vernier being conftructed fo as to fhew the angle which the line, F*f*, makes with A B, or *ab*. The inftrument is placed in the meridian by the telefcope, M*m*, the line of collimation of which is parallel to A B, and is pointed to a mark fixed due north of it. *Fig.* 18, is a vertical fection of the inftrument paffing along the line F*f*; AB is the brafs frame; CD*dc* is the box which holds the needle; E*e* the circular plate on which it turns; N*n* is the needle; P and *p* are fmall plates of brafs fixed to the ends of it, on each of which is drawn a line ferving by way of index. Thefe pieces of brafs are raifed to fuch a height that their tops are on a level with the point of the pin on which the needle turns. The ufe of them is, that it is much eafier obferving this way, than when the lines, ferving by way of index, are drawn on the needle itfelf, as by this means the inconvenience proceeding from one kind of vibration in the needle is avoided. S, and *s*, are two brafs plates, on each fide of which is drawn a line, to which the index at the end of the needle is to point; there is alfo a line parallel to thefe, drawn on the bottom of the box; thefe three lines form the line, F*f*, in *fig*. 17. R is a double microfcope intended to affift us in judging when the index, P, points exactly to the line, F, that is, to the line drawn on the plate S. It is placed fo that a wire, W*w*, in its focus, appears to coincide with this line; and in obferving, the box is moved till the wire appears alfo to coincide with the index P. The cap in the centre of the needle is made to take on and off readily, and to fit on upon either face; fo that we may on occafion obferve with the under face of the needle uppermoft. The intention of inverting the needle is to fhew whether the axis of the figure of the needle coincides with its magnetic axis.

The *figures* 19 and 20, exhibit a vertical view, and a fection of Mr. Cavallo's variation-compafs, and thofe reprefentations are two thirds of the real fize of the inftrument. The letters of reference indicate the fame parts in both figures. ABD is a brafs bottom with a circular brafs piece, *cei*, fcrewed faft upon it. FGHK is a rim likewife of brafs, that flides on the outfide of the circular piece *cei*, and to which the flat glafs, M, is faftened; fo that when the rim is removed, the glafs comes off with it. The fhape of the needle is clearly indicated by the figures. It has a hole in the middle to receive the agate cap, which is burnifhed into a brafs focket, and is fo fituated into the needle, that the apex of its cavity does not rife higher than the furface of the needle; hence the point of fufpenfion upon the pin, B, is even with the upper furface of the needle. By this means the pendulum-like ofcillations cannot difturb the direction of the fine lines marked on the extremities of this needle. The upper and lower furfaces of this needle are quite alike, and the brafs focket, which contains the agate cap, is made fo as to admit of the needle's being turned with either of thofe furfaces upwards. The hole in the middle of the needle is quite cylindrical, and fo is the outfide of the brafs focket, which fits the faid hole exactly, but projecting a little way beyond the needle, has a fcrew cut on that projection, upon which another circular piece of brafs is fcrewed to fix it, as may be feen in *fig*. 20. It is evident, therefore, that when the laft-mentioned piece of brafs is unfcrewed, the focket with the agate cap, may be put in on either fide of the needle, and may be faftened on the oppofite fide of it. By this means a great fource of error may be avoided, namely what arifes from the magnetical axis of the needle being not in the axis of its figure, which is frequently the cafe; for, if the direction of this needle be obferved with one fide of it upwards and then (the needle being turned) be obferved again with the other fide upwards; either the fecond obfervation coincides with the firft, and then we may conclude that the magnetical axis of the needle is truly in its middle; or the obfervations differ, and thence we fhall know that the magnetical axis of the needle is not in the axis of its figure; but in this cafe we may have the real magnetic direction by taking a mean of the two obfervations; or we may thereby afcertain, once for all, how much the line of direction of the needle deviates from its magnetic axis, which, when once afcertained, becomes a fixed quantity to be either fubtracted from, or added to any other obfervation."

"The upper fide of the circular piece *cei* is filvered, and divided into degrees and half degrees; but thofe divifions, being too minute, are omitted in the figure. The bottom ABD has two projections, A and D, oppofite to each other, and on each of their chamfered edges a line is marked, which, being drawn at the fame time that the circle, *cei*, is divided by the circular dividing engine, coincide exactly with the commencement of the numeration of the degrees on the oppofite fides of the circle, from which places the degrees run on both fides as far as 90°. The needle, therefore, which lies with its upper furface even with the divided circle, points to the fame degree and part of a degree with both its extremities."

"We come now to defcribe the method of meafuring the parts of a degree on the circle, which is only divided into half degrees. This is obtained by means of the microfcope, *fig*. 21, which is furnifhed with one of my mother-of-pearl micrometers. (Phil. Tranf. vol. 81.) The external conftruction of the microfcope, and likewife the manner of placing it perpendicularly upon the compafs box, are indicated by *fig*. 21; at N in *fig*. 19; and by the dotted lines at K. in *fig*. 20. P is a fhort tube fupported by the uprights R, R, the lower parts of which project horizontally. Thefe horizontal projections, O, O, are notched at Y, fo as to fit the mouldings, H, K, of the rim FGHK, when the parts, O, O, reft upon the glafs. By this means the microfcope may be moved all round the compafs-box, whilft it keeps fome of the divifions of the circle always in the field of view. The body of the microfcope may be moved up and down in the tube P, in order to adjuft it for diftinct vifion. It confifts of the tube SS, into the upper part of which flides a fhort eye-tube T, and at its lower extremity, H, a lens is faftened. Two other lenfes are fixed into the tube T, which is about nine-tenths of an inch long, and within it; *viz*. exactly in the focus of the eye lens, the mother-of-pearl micrometer is fituated. Thofe three lenfes are all of the plano-convex fort. The focus of the upper one is about four-tenths of an inch, and the focus of the fecond and third is about fix-tenths of an inch. The divifions of the micrometer are 300ths of an inch, and when viewed through the microfcope, and the microfcope is placed upon the compafs, 15 of them appear to be exactly equal to half a degree on the circle *cei*. But there is no need for thofe divifions to be exactly

300ths

300ths of an inch. It is ſufficient if they are nearly ſo, as, for inſtance, from about 280 to 320 in an inch; becauſe by pulling the tube T more or leſs out of the tube SS, and by moving the laſt mentioned tube up or down into P, the diviſions of the circle may be magnified more or leſs, till 15 diviſions of the micrometer appear to be exactly equal to the ſpace between any two contiguous diviſions on the circle; *viz.* to half a degree. When the microſcope has been once ſo adjuſted, it requires no farther alteration, excepting to be moved round the box until it comes over the end of the needle, in which ſituation the field of view appears as ſhewn in *fig.* 22, where the middlemoſt part is occupied by the micrometers 1, 2, 3, 4; the other large diviſions are the magnified diviſions of the circle, and W is the extremity of the needle, with its directive line pointing to ſome diviſion on the micrometer."

"Fifteen diviſions of the micrometer being equal to half a degree, or to 30′, it follows that each diviſion is equal to two minutes, and as it may be eaſily diſcerned whether the line on the end of the needle is directed exactly to one of thoſe diviſions or midway between two of them, therefore the direction of the needle in this compaſs may be read off to a ſingle minute. In order to obſerve the daily variation, when this compaſs is properly fixed, the microſcope need not be moved, becauſe its field of view takes in about two degrees, which is a much greater ſpace than the needle will go through in ten years time. In moving the microſcope round the box, care muſt be taken to place it ſo that the diviſions of the circle may appear to coincide with ſome of the long diviſions of the micrometer.—N. B. This microſcope inverts the objects; therefore what appears to be on the right hand muſt be underſtood to lie on the left, and *vice verſâ.*"

"In order to obſerve the real direction of the magnetic needle, or the daily variation, the compaſs muſt be placed ſo as that the two lines marked on the projections A and D, *fig.* 19, may coincide with a meridian line drawn upon a board, a ſtone, a block, &c. and then the degrees and minutes, to which the extremity of the needle is directed, will ſhew the required variation."

Having, in the preceding paragraphs, mentioned all the important particulars relating to the diſcovery, the conſtruction, and the uſe of one of the moſt remarkable, and the moſt uſeful, philoſophical inſtruments, we ſhall conclude by mentioning a deception which has ſometimes been offered to the credulous and unſkilled part of mankind. It is a compaſs, or a magnetical needle which was pretended to point due north and ſouth, without any variation at any time or place; and compaſſes apparently of this deſcription have actually been offered for trial and have even been ſent abroad. But upon examination it has been found either that the north and ſouth points of the card were not placed over the north and ſouth points of the needle; or that the needle, having been made purpoſely broad, had been magnetized ſo that the direction of its poles made an angle with the axis of its figure, juſt equal to the magnetical declination at that particular time and place. The conſequence of this artifice is, that though the needle may appear to have no declination at that particular time and place; yet at any other time, or if moved to another place where the magnetical declination is different, its direction will deviate from the true meridian. The declination or variation, like the attraction and repulſion, belongs to every piece of magnet, be it natural or artificial, and the magnetic needle is of the latter ſort; nor can, at the ſame time and in the ſame place, one needle point to one part of the heavens whilſt others point to a different part; provided they be freely ſuſpended, and be uninfluenced by iron or other magnets.

Compass *of voices*, in *Muſic*. In early times of counterpoint, human voices of different compaſs, occaſioned by age, ſex, and natural organ, were claſſed and divided into four diſtinct kinds, at the diſtance only of a third above each other, which the baſe, or F clef, placed from line to line, expreſſed. The loweſt of theſe was called the tenor, the next contratenor, motetus the third, and triplum the higheſt, or treble; of which term this was the origin.

After this, about the middle of the fifteenth century, as different parts began to be multiplied, the ſcale received ſix diviſions: baſe, baritono, tenor, contralto, mezzo ſoprano, and ſoprano. The natural pitch of theſe is about three or four notes above each other, as their ſeveral clefs, which originally ſerved as barriers, will diſcover.

It ſeldom happens that a voice has more than ten real, ſteady, and full, natural notes, in its compaſs, without a mixture of falſet, which, being of a different regiſter, is eaſily diſcovered. The following are the names and uſual extent of the ſeveral ſpecies of human voice.

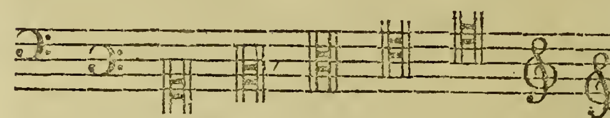
But as there are ſometimes baſe voices which go down to double F, and even lower; ſo there are in the treble, among modern vocal phenomena, ſingers that go higher than F in altiſſimo; which make the whole diapaſon of voices exceed four octaves. And there is at preſent (1802) in England, a German buffo ſinger with a baſe voice that goes down to double gammut in real muſical tones; and in falſet, up to G on the ſecond line in the treble. No public uſe was made of this extraordinary voice. He arrived in autumn, when no theatres were open, and remained but a ſhort time.

But though parts in choral muſic were multiplied, not only to ſix, but even thirty-ſix, before the cloſe of the fifteenth century; yet the general, and eſtabliſhed number, in the pope's chapel, by which probably all other choral ſervice was regulated, amounted to no more than four: cantus, altus, tenor, and baſe; which ſee ſeverally.

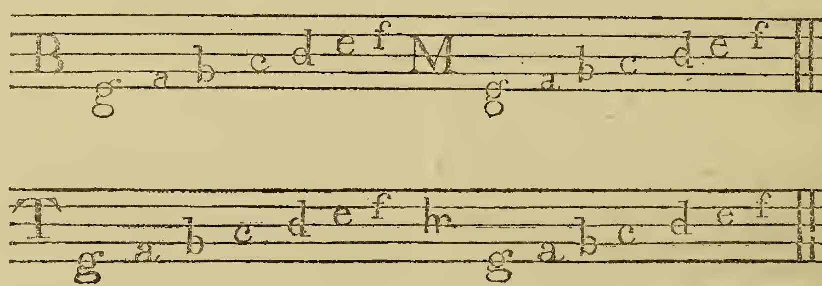
If it be aſked why ſo many clefs are uſed? It may be anſwered, to keep the melody of theſe ſeveral voices within the compaſs of the five line ſtaff; to prevent the perplexity of a great number of leger-lines, which in ſinging and playing at ſight, frequently alarm and embarraſs the performer.

Of all the expedients propoſed by ſpeculative and ingenious men, for the abolition of tenor clefs, the only one that ſeems practicable, and has the merit of great ſimplicity, was publiſhed in our own country in the time of Charles II. under the title of "An Eſſay to the advancement of Muſic, by caſting away the perplexity of different cliffs; and uniting all ſorts of muſic, lute, viols, violins, organ, harpſichord, voice, &c. in one univerſal character, by Thomas Salmon,

Salmon, A. M. of Trinity College, Oxford." London, 1672. This book is well written, and, though very illiberally treated by Lock, Playford, and ſome other profeſſors, contains nothing that is either abſurd or impracticable; nor could I diſcover, ſays Dr. Burney, any other ſolid objection to its doctrines being adopted, than the effect it would have upon old muſic, by ſoon rendering it unintelligible. At preſent the tenor cliff alone is thought an inſuperable difficulty in our country, by Dilettanti performers on the harpſichord; but if Salmon's ſimple and eaſy muſical alphabet were chiefly in uſe, the baſe cliff would likewiſe be ſoon rendered as obſolete and difficult as the tenor; ſo that two parts or cliffs out of three, in preſent uſe, would become unintelligible. The author's plan was ſimply this: inſtead of the eight or nine cliffs that were then in uſe, as,



to expreſs the whole ſcale of ſounds on the five lines and ſpaces in this ſimple manner:



G in every part of the ſcale being on the firſt line, *a* on the firſt ſpace, *b* on the ſecond line, &c. the letters preceding each ſeptenary implying baſe, mean, treble, ſupreme. To this propoſal there ſeems no cogent objection; profeſſors would not be humbled by having any thing to learn. The baſe clef, which every tyro knows, repeated in octaves, without changing a ſingle name or character, would accompliſh the whole buſineſs. The principal evil, and a great evil it would be, is the certainty of ſoon rendering all former muſic, printed or in manuſcript, obſolete and unintelligible. This has been effected in a great meaſure, lately, by new editions of the harpſichord and organ muſic of the laſt century, and the total rejection of every tenor clef in muſic for keyed inſtruments; of which we have already pointed out the inconvenience. See Accompaniment and Clef.

Compass *of proportion.* See Sector and Proportion.

Compass *dials*, are ſmall dials, fitted in boxes, for the pocket, to ſhew the hour of the day by direction of the needle; which indicates how to place them right by turning the dial about, till the cock or ſtyle ſtand directly over the needle, and point to the northward; but theſe can never be very exact, becauſe of the variation of the needle itſelf. See Dial.

Compass *Saw.* See Saw.

COMPASSES, or *pair of* Compasses, a mathematical inſtrument, uſed for the deſcribing of circles, meaſuring lines, &c. The common compaſſes conſiſt of two branches or legs, of iron, braſs, or other metal, pointed at bottom; and joined by a rivet, whereon they move, as on a centre. Thoſe are reckoned the beſt, part of whoſe joint is ſteel, and where the pin on which the joint turns is a ſteel ſcrew. The points ſhould alſo be made of hardened and poliſhed ſteel. In ſome the points are fixed; in others they may be taken off, and a drawing-pen, pencil, or dotting wheel, ſubſtituted in their room.

The invention of compaſſes is aſcribed to Talaus, nephew of Dædalus, by his ſiſter, whom, the poets ſay, Dædalus killed out of envy. We have compaſſes now of various kinds and contrivances, accommodated to the various uſes they are intended for; as,

Compasses *of three legs*, or *triangular compaſſes.* Their ſtructure is like that of the common compaſſes, ſetting aſide the exceſs of a leg, which has a motion every way: their uſe is to take three points at once, and ſo to form triangles: to lay down three poſitions of a map to be copied at once, &c. Two of the legs A, B (*Plate, Compaſſes, fig.* 1.) are jointed together like a common pair; the pin *a*, which connects them, has another leg D, jointed to it; the legs, A, B, are firſt ſet to two of the points, and the leg D is then moved farther from, or nearer to, the other legs by bending its joint; or it is turned round the pin *a* of the other legs as a centre, as occaſion may require.

Fig. 2, is another conſtruction of the triangular compaſſes. A, B, C, are three arms, at whoſe ends are jointed the arms *a*, *b*, *c*, carrying ſteel points; they are of ſuch lengths, that when cloſed they ſhall nearly meet in one point; by opening them as in the figure, they can be made to coincide with any three points within the reach of the arms.

Compasses, *Beam*, conſiſt of a long branch, or beam, carrying two braſs curſors; the one fixed at one end, the other ſliding along the beam, with a ſcrew to faſten it, on occaſion. To the curſors may be ſcrewed points of any kind; whether ſteel, pencils, or the like. To the fixed curſor is ſometimes applied an adjuſting or micrometer ſcrew, by which an extent is obtained to very great nicety. Mr. Ramſden conſtructed compaſſes of this kind whoſe micrometer ſcrew ſhews very perceptibly a motion of $\frac{1}{5000}$th part of an inch. It is uſed to draw large circles, to take great extents, &c. See *Plate, Compaſſes, fig.* 3, which exhibits a common pair of beam compaſſes. A A is a five-ſided bar, of mahogany, made very ſtraight and true; B, D are two frames of braſs, ſliding on the bar, that can be faſtened at any place by a clamp ſcrew *a b*, at the top of each; *e*, *f* are two pieces into which are inſerted the points, and are faſtened by a ſcrew; the ſliding frame B has a collar *g* ſcrewed to it, in which the ſcrew *h*, with a divided head, turns; this ſcrew is tapped into a piece of braſs faſtened at the end of the mahogany bar, ſo as to move the point at *f* very ſlowly when the ſcrew is turned.

Compasses, *Bow*, or *Bows*, are a ſmall ſort of compaſſes,

paffes, that fhut up in a hoop, which ferves for a handle. Their ufe is to defcribe arcs, or circumferences of circles of very fmall radius. *Fig.* 4, is a fmall pair of compaffes, with a fcrew for meafuring fmall diftances very accurately, and defcribing fmall circles: *a* is one of the points faftened to a focket, in which the fcrew *b* works; *d* is a fteel-bar attached to the fame focket; *e* is a piece fliding on the bar *d*, and carrying the other point; it has a projection above it, in which the fcrew works; *f* and *g* are two pieces jointed to the points at one end, and to a fmall handle *h*, at the other, which is ufed to hold them by. The head *l* of the fcrew is divided into equal parts, which divifions are read againft a projecting part of the piece, holding the point *a*, and by turning it round one of the divifions, the points are moved fome fractional part of an inch, as $\frac{1}{100}$, or $\frac{1}{200}$, according to the number of threads in an inch of the fcrew's length, and the number of divifions on the head of the fcrew.

Compasses, *Caliber*. See Caliber.

Compasses, *Clock-makers*, are very fubftantial, ferving to cut pafteboard, brafs, &c. jointed like the common compaffes with a quadrant, or bow, as the *fpring compaffes*, only its ufe is different; as ferving here to keep the inftrument firm at any opening. See Clock.

Compasses, *cylindrical and fpherical*, ufed in taking the diameter, thicknefs, or caliber of round or cylindric bodies; fuch as cannons, balls, pipes, &c. They confift of four branches joined in a centre, two of them circular, and two flat, a little bent at the ends.

To ufe them, one of the flat points is put within the cannon, the other without: the two oppofite points fhew the thicknefs. See Caliber *Compaffes*.

There are alfo *fpherical compaffes*, differing in nothing from the common ones, but that their legs are arched, ferving to take the diameters of round bodies, &c. Another fort of compaffes has been lately invented, for meafuring the diameter of round bodies, as balls, &c. which confift of two flat pieces of metal, fet at right angles, in a ftraight bar or beam of the fame; the one being fixed, and the other fliding along it, fo far as juft to receive the round body between them; and then its diameter, or diftance between the two pieces, is fhewn by the divifions marked on the beam.

Compasses, *Elliptic*. Their ufe is to draw ellipfes, or ovals of any kind: they confift of a beam A B (*Plate, Compaffes, fig.* 5.) about a foot long, bearing three curfors; to one of which may be fcrewed points of any kind: to the bottom of the other two are rivetted two fliding dove-tails, adjufted in grooves made in the crofs branches of the beam. The dove-tails having a motion every way, by turning about the long branch, go backwards and forwards along the crofs: fo that when the beam has gone half-way about, one of thefe will have moved the whole length of one of the branches; and when the beam has got quite round, the fame dove-tail has got back the whole length of the branch. Underftand the fame of the other dove-tail.

Note, the diftance between the two fliding dove-tails is the diftance between the two foci of the ellipfis; fo that by changing that diftance, the ellipfis will be rounder or flenderer. Under the ends of the branches of the crofs are placed four fteel points to keep it faft.

The ufe of this compafs is eafy; by turning round the long branch, the ink, pencil, or other point, will draw the ellipfis required. Its figure fhews both its ufe and conftruction.

Compasses, *German*, whofe legs are a little bent outwards towards the top; fo that, when fhut, only the points meet.

Compasses, *Hair*, fo contrived within fide, as to take an extent to a hair's breadth. The outward appearance of the hair compaffes is like that of a common pair of compaffes; the peculiarity confifts in one of the legs A, being attached to the brafs by a fpring B (*fig.* 6.), whofe action throws the leg inwards, and is counteracted by a fmall fcrew D; by turning which the leg can be moved fmall diftances, and fet to the greateft nicety, without moving the joint.

Fig. 7, reprefents a pair of pocket compaffes, the legs, *a*, *b*, of which are hollow, and contain, the one a pen, *d*, and the other a port crayon *e*, at the oppofite end of each point, *f* and *g*.

Compasses, *Lapidary's*, a piece of wood in form of the fhaft of a plane, cleft a-top, as far as half its length; wherewith they meafure the angles, &c. of the precious ftones, as they cut them. In the cleft is a little brafs rule, faftened there, at one end, by a pin; but fo that it may be moved in the manner of the bevel; with this kind of fquare they take the angles of the ftones, laying them on the fhaft as they cut them.

Compasses, *Proportional*, are thofe whofe joint lies between the points terminating each leg: they are either *fimple* or *compound*. In the former fort the centre is fixed, fo that one pair of thefe ferves only for one proportion.

Compasses, *Compound proportional*, confift of two branches (fee *fig.* 8), each pointed at either end with fteel: the length of the branches is cut through, for a curfor to flide up and down; in the middle of which curfor is a fcrew, ferving to join the branches, and to fix them at any point required.

On the one leg are divifions, ferving to divide lines into any number of equal parts, for reducing of figures, &c. On the other are numbers, for infcribing any regular polygon in a circle propofed.

The ufe of the firft is eafy: Suppofe v. gr. a right line required to be divided into three equal parts; pufh the curfor till the fcrew be juft on the figure 3; where fixing it, take the length of the given line between the two longeft parts of the legs: the diftance between the two fhorteft will be one third of the given line. In the fame manner may the line be divided into any other number of parts.

For the ufe of the line of polygons: Suppofe, v. gr. a pentagon required to be infcribed in a circle: pufh the curfor till the middle of the fcrew be againft 5, the number of fides in a pentagon; between the fhorteft parts of the legs take the femidiameter of the circle: the legs thus opened, the diftance between the points of the longeft parts will be the fide of the pentagon to be infcribed in the circle. And thus for a figure of any other number of fides.

Fig. 9. is a pair of proportional compaffes; the brafs part of the two legs A, B, have longitudinal openings in them, for the pin, round which they move as a centre, to flide in, and can be fixed at any place by a fcrew *a*, fo that the diftance from the centre to the points *c*, *d*, fhall be twice, three times, (or any other aliquot part) of the diftance to the points *e*, *f*, and of courfe the openings at each end will be in the fame proportion.

Fig. 10, reprefents a method of adapting a quick and flow motion to a pair of thefe compaffes; *a* is a brafs bar, with an oblong opening cut in it, to receive a fcrew, *b*, faftened to one leg of the compaffes; the other end of the bar, *a*, is cut into a fcrew, with a fine thread, and has a nut, *f*, on it, turning in a collar jointed to the other leg of the compaffes. When the fcrew, *b*, is loofe, the compaffes can be fet to any opening; but when it is faft, they can only be

be moved by turning the nut *f*. The fcrew, *b*, is put into a hole in one of the legs of the compaffes, fo that it can eafily be removed, and inferted into a hole made in the moveable centre *g*, to give it a flow motion if required.

Compasses, *Proportional, with the fector lines*. The ftructure of thefe is fo like that of the common proportional compaffes, only a little nicer, that it needs no particular defcription. See *fig.* 11.

The lines on the firft face are the line of lines, marked *lines*: it is divided into 100 equal parts, every tenth numbered: and the line of chords, which goes to 60°, is marked *chords*.

On the other face are a line of fines to 90°, and a line of tangents to 45°. On the other fide are the tangents from 45° to 71° 34′; on the other, fecants from 0° to 70° 30′.

For the ufe of thefe compaffes: 1. To divide a line into any number of equal parts, lefs than 100: divide 100 by the number of parts required: flip the curfor till the line on the fliding dove-tail be againft the quotient on the line of lines; then the whole line being taken between the points of the compaffes moft remote from the centre, the aperture of the other will fhew the divifion required. 2. A right line given, fuppofed to be divided into 100 parts, to take any number of thofe parts; flip the line on the fliding dove-tail to the number of parts required; the whole line being taken between the points fartheft from the centre, the aperture of the other two will include the number of divifions required. 3. The radius being given, to find the chord of any arch under 60°; flip the line on the fliding dove-tail to the degrees required on the line of chords; the radius being taken between the points fartheft from the centre of the curfor, the aperture of the other line will be the chord required, provided the number of degrees be greater than 29; if it be lefs, the aperture taken from the radius will leave the chord required. 4. If the chord of an arch under 60° be given, and the radius required, flip the line on the dove-tail to the degrees given on the line of chords; the given chord being taken between the two points next the curfor, the aperture of the other will be the radius required. 5. The radius being given, to find the fine of any number of degrees. Slip the line on the dove-tail to the degree on the line of fines whofe fine is required; the radius taken between the points fartheft from the curfor, the aperture of the other will give the fine of the angle required. But if the fine fought be lefs than 30°, the difference of the apertures of the oppofite points will be the fine required. 6. The radius being given, to find the tangent of any number of degrees under 71°: if the tangent required be under 29° 30′, then flip the line on the dove-tail to the degree propofed on the tangent line; the radius taken between the points fartheft from the curfor, the aperture of the others will be the tangent of the degrees required: if the tangent required be above 29° 30′, but under 45°, the line on the curfor muft be flipped to the degrees given on the tangent line; then the radius being taken between the points fartheft from the curfor, the aperture of the others will be the tangent. If the tangent required be greater than 45°, but lefs than 56° 20′, flip the notch on the tangent fide of the turned cheek to the degree 0 in the tangent line on the fide of the compafs; the radius taken between the points fartheft from the curfor; the difference between the aperture of the other, and thefe, added together, will be the tangent required. Thus, for the tangents of other degrees under 71. After the like manner may the fecant of any number of degrees under 71 be found.

Mr. Heath, a mathematical inftrument maker in London, conftructed a pair of proportional compaffes in 1746, with a curious and ufeful contrivance for preventing the fhorter legs from changing their pofition, when thefe compaffes were ufed. It confifted of a fmall beam foldered to a fcrew, and running parallel to the leg of the compaffes, nearly of the length of the groove; in this beam a flit was made, which admitted of a fliding nut, the other end of which fell into a hole in the bottom of the fcrew, belonging to the great nut of the compaffes. The fcrew-pin of the beam paffed through an adjufter, by means of which the mark on the flider might be brought exactly to any divifion. But the proportional compaffes have been much out of ufe fince the invention of the *fector*, which fee.

Compasses, *Spring*, or *Dividers*, are made of hardened fteel, the head arched; which, by its fpring, opens the compaffes; the opening being directed by a circular fcrew, faftened to one leg, and let through the other, worked with a nut.

Compasses, *Triangular*. See Compasses *of three legs*, and Triangular.

Compasses, *Trifecting*, the invention of M. Tarragon, for the trifection of angles, geometrically.

The inftrument confifts of two central rules, and an arch of a circle of 120 degrees, immoveable, with its radius; the radius is faftened with one of the central rules, like the two legs of a fector, that the central rule may be carried through all the points of the circumference of the arch. The radius and rule muft be as thin as poffible, and the rule faftened to the radius hammered cold, to acquire an elafticity; the breadth of the other central rule muft be triple the breadth of the radius. In this rule there is a groove, with a dove-tail, to be faftened on it, for its motion; in the centre of each rule muft likewife be a hole. See the Journ. des Sçavans, Sept. 1688.

Compasses, *Turn-up*, a late contrivance to fave the trouble of changing the points; the body is like the common compaffes; towards the bottom of the legs, without fide, are added two other points, befide the ufual ones; the one carrying a drawing pen-point, the other a port-crayon; both adjufted fo as to turn round, and fo be in the way of ufe, or out of it, as occafion requires.

The points of fmall compaffes are tempered by a lamp and blow-pipe, heating them red-hot; when cold, they are hard: the larger are tempered by a charcoal fire and a blow-pipe, heating them to a cherry colour, then plunging them in water.

See M. Bion's Conftruction and Ufes of Mathematical Inftruments, by Stone; and Robertfon's Treatife on the fame fubject.

COMPASSEMENT *de feux*, in *Military Language*, a manner of fixing the diftances between the chambers of mines, and difpofing of the fauciffons, fo as to communicate the fire to them at one and the fame inftant of time.

COMPASSING, in *Naval Architecture*, a term ufed to denote fuch pieces of timber as are incurvated into the figure of an arch.

Compassing *the king's death*, in *Law*. See Treason.

COMPASSION, in *Ethics*, a mixed paffion, compounded of love and forrow, and excited by the fight or recital of diftrefs; or, as Dr. Hartley concifely defines it, it is the uneafinefs which a man feels at the mifery of another. Accordingly he traces it to feveral affociations, both in children and adults, upon which it feems to be grounded; and he obferves, that perfons, whofe nerves are eafily irritable, and thofe who have experienced great trials and afflictions, are in general, more difpofed to compaffion than others; and that we are moft apt to pity in thofe difeafes and calamities which

which we either have felt already, or apprehend ourfelves in danger of feeling hereafter. A compaffionate temper, fays this writer, being great matter of praife to thofe who are endued with it, and the actions which flow from it being a duty incumbent on all, men are led to practife thefe actions, and to inculcate upon themfelves the motives of compaffion, by attending to diftrefs, actually prefent, or defcribed in hiftory, real or fictitious.

Hobbes makes this a merely felfifh paffion, and defines it, as being fear for ourfelves; Hutchefon refolves it into Instinct; but Dr. Butler much more properly confiders compaffion as an original, diftinct, particular affection in human nature.

According to Dr. Cogan, in his "Treatife on the Paffions," compaffion is that fpecies of affection, which is excited either by the actual diftrefs of its object, or by fome impending calamity which appears inevitable. It is, fays this writer, a benevolent forrow at their fuffering or approaching mifery. The etymology of the word expreffes this idea with ftrict propriety, as it fignifies "fuffering with the object." Compaffion is always connected with a difpofition to relieve, and will always prompt to vigorous exertion, wherever there is a poffibility of fuccefs; unlefs fome important confiderations fhould render the endeavour improper or unjuft. It has no neceffary connection with the character of its objects; their diftrefs being a fufficient excitement. From the great extent and univerfality of this affection, it may be juftly confidered as a generic name, comprehending feveral other affections which have a more fpecific application, as *mercy*, *commiferation*, *pity*, &c. Dr. Reid remarks, that it feems to be falfe religion alone that is able to check the tear of compaffion. We are told, he fays, that in Portugal and Spain, a man condemned to be burned as an obftinate heretic, meets with no compaffion, even from the multitude; obferving, that they are taught to look upon him as the enemy of God, and doomed to hell-fire. But fhould not this very circumftance, he adds, move compaffion? Surely it would, if they were not taught that, in this cafe, it is a crime to fhew compaffion, or even to feel it. Hobbes of Human Nature, cap. ix. fect. 10. Hutchefon's Enquiry into Moral Good and Evil. Butler's Sermons, ferm. v. and vi. Hartley's Obfervations on Man. Cogan on the Paffions. Reid's Effays on the Active Powers of Man, ch. iv.

COMPATIBLE, fomething that may fuit, or confift with another See Incompatible.

COMPENDIUM, an abftract, epitome, or reduction of a large matter into a little compafs. See Abstract and Epitome.

COMPENSATION, an action whereby any thing is admitted as an equivalent to another.

Compensation, in the *Civil Law*, is a kind of right, whereby a debtor purfued by his creditor, for the payment of a debt, demands that the debt may be *compenfated* with what is owing him by the creditor. *Compenfation* is equivalent to payment, and anfwers to that which is called Set-*off*, in common law.

Compensation-*Balance*, in *Horology*, is the balance of a chronometer, fo ingenioufly contrived, that two oppofite actions counteract each other's natural effects at all times upon it, and equalife its momentum under all the changes of temperature experienced in different climates and feafons. The oppofition of two natural effects, produced by an artificial arrangement of the acting parts, is very properly called the *compenfation*, which has been effected in various ways. The moft fimple compenfation that has been produced in a machine for meafuring time, is that which depends upon the variable fluidity of the oil applied to the pivot holes of the balance arbor, and of the other arbors of a watch; oil, it is well known, however good, is more fluid in hot weather than in cold, and therefore diminifhes the friction at the pivots more in fummer than in winter, the confequence of which variation in the friction of a watch with the ordinary crown-wheel efcapement, would have its rate accelerated in the former feafon, and retarded in the latter, by this fimple caufe, if there were no compenfating property in the ftructure of fome part of the mechanifm; this property naturally exifts in the balance and balance-fpring, both which are fubject to have their dimenfions enlarged by heat, and contracted by cold; and thefe changes alternately occafion retardations and accelerations in the rate of going; but in fuch a way, that when the watch is difpofed to have its rate accelerated by the moft fluid ftate of the oil, it is alfo difpofed to have the fame retarded by the contemporary enlargement of the balance and balance-fpring; hence the quantity that one of thefe difpofitions prevails over the other in any watch, when regulated to mean time at a mean temperature, conftitutes its liability to vary its rate of going in different months of the year. Berthoud, who attempted to proportion the thicknefs of his pivots to fuit the oil with a given balance, fo as to produce an approximation towards a good compenfation, has called this the *natural* compenfation, which is a very proper appellation, as it exifts in a certain degree in all chronometers and watches that have oil applied to them. This natural compenfation, however, is found to be a very imperfect one, and unfortunately interferes with the effects produced by the better compenfations, which, in oppofition to this, may be called the *artificial* compenfations. To banifh the interference of the variable effects produced by oil, is one of the difficulties, and indeed now the principal one, that oppofes the efforts of the chronometer-maker, to make the action of his mechanifm permanently uniform.

The mechanifm of the artificial compenfations may be arranged under three divifions, *viz.* 1ft, That which applies exclufively to the balance-fpring; 2dly, That which applies exclufively to the balance itfelf; and, 3dly, That which applies partly to the fpring and partly to the balance: for the fake of order, we propofe to defcribe the different compenfation-balances agreeably to thefe divifions, which are alfo nearly agreeable to the order of time in which they were invented.

Compenfations at the Spring.

1. *Harrifon's Compenfation Curb.*—We have faid, under our article Chronometer, that Mr. James Harrifon of Barton, in Lincolnfhire, was the firft perfon who applied a felf-compenfating piece of mechanifm to the balance of a watch, which contrivance, according to his provincial dialect, he called a *kirb*, and which we have taken the liberty to name a *curb*. *Fig.* 1. of *Plate* XXVIII. of *Horology*, reprefents the balance, balance-fpring, fmall cocks, and curb, as they would be feen by an eye placed directly over the back of the pillar-plate, when the large cock is taken off, that bears the verge-pivot: AA is the plate on which the mechanifm is placed; B the balance of one uniform metal; C the fpiral fpring of regulation; DE the thermometrical curb, fo contrived as to lengthen the effective length of the fpring in the different degrees of temperature, without manual adjuftment; G*g* a double cock to which the curb D E is attached; and F the fmall cock, or ftud, to which the exterior end of the fpring is pinned. The thermometrical curb, D E, is compofed of two long flender flips, one of brafs and the other of fteel,

pinned together in different places, and is attached to the fmaller half g of the double cock Gg, fo that it may be brought nearer to G, or removed farther from it at pleafure, before g is fixed to G, in order to place it at the requifite point between a and b of the fpiral; the double cock is reprefented in the figure as though it were fixed faft by a fcrew and fteady pin to the plate; but in the original time-keepers, it was adjuftable between two parallel pieces, that allowed it to approach the ftud F, or recede from it, for the purpofe of afcertaining particularly the beft length of the curb, for effecting the requifite compenfation: the fide of the curb next to D was fteel, and the fide next to E brafs, and the effect produced by changes of temperature was thus: when the time-keeper was expofed to heat, the balance, and balance fpring, had their dimenfions enlarged, fo that the momentum of the balance was increafed, fuppofing its arc of vibration unaltered, and the force of the fpring was diminifhed, or at leaft would have been by its elongation, if the curb had not been applied; and the natural confequence would have been, for the piece to retard; but the fame heat, which naturally produces thefe changes in the balance and balance-fpring, produces fuch a change in the fhape of the curb, as counteracts thefe natural effects; in the cafe of heat, the brafs part, E, of the curb becomes more lengthened than the fteel part D, by reafon of its fuperior expanfibility; the confequence is, that the compound piece, DE, becomes convex on the brafs fide E, and concave on the fteel fide D; that is, the remote or free end of the curb, confidered as an index, moves from a towards b, and as this end carries two pins between which the ftraight end of the fpring paffes, thefe pins, and not the ftud, form the limit of length at all times of the regulating fpring, which confequently is curbed as to its effective length, under all the variety of elongations, that it experiences from different degrees of heat; fo that it may be faid to be always both lengthening and fhortening in nearly the fame proportion: on the contrary, when the piece is expofed to cold, or to fpeak more fcientifically, is expofed to a low temperature, the fteel fide, D, becomes convex, and the brafs fide, E, concave from its greater contraction, and the free end of the curb moves from b towards a, thereby mechanically lengthening the fpring, as it naturally contracts, in a degree fufficient to check the velocity which the balance would acquire from its diminifhed dimenfions. Thus, whether it is fummer or winter, in hot or in cold climates, the compenfation-curb is calculated to counterbalance the natural effects of changes of temperature on the dimenfions of the balance and of its regulating fpring.

It has been afferted, that the *elafticity* of the balance-fpring is affected by changes of temperature; but we conceive it to be its *force*, or that power which depends on its *length* that is naturally altered, and not, at leaft in any fenfible degree, that property which depends upon its *temper*. This contrivance, we have faid, in another place, laid the foundation of modern chronometry, though it was afterwards found to be a better application of the compound bar, that the balance itfelf fhould bear it, in order that the dimenfions of the balance and of the compenfation pieces might be affected in a contemporary manner by the variation of atmofpheric temperature, fo that the artificial changes going on in the balance itfelf might compenfate the changes naturally produced in it and in the fpring, inftead of the artificial changes in the fpring being made to compenfate the natural changes in its dimenfions, and in thofe of the balance. We have before faid, that this mechanifm was invented and ufed fo long ago as the year 1726, and that it is incapable of the ufual adjuftment for rate, except at the fixed ftud, from which the faftening pin muft neceffarily be taken, to admit of the fpring's being lengthened or fhortened.

Compenfation by F. Berthoud.

In the year 1760, which was about feven years before the Board of Longitude publifhed the principles of Harrifon's Time-keeper, Mr. F. Berthoud, the famous clock and watch-maker of Paris, contrived and introduced, into No. 1, of his marine clocks, a compenfation-curb, acting on the fpiral fpring of the balance in a manner fimilar to the action of Harrifon's curb, except that the backward and forward motion of his *pince-fpiral*, or curb, was produced by the difference of two direct expanfions agreeably to the difpofition of the grid-iron pendulum, which Harrifon had previoufly invented, (for the defcription of which fee the fection, "Aftronomical clock, by Mr. Reid of Edinburgh," under the article Clock.) The mechanifm by Berthoud, is reprefented in *fig.* 2. of *Plate* XXVIII., the eye being, as before fuppofed, to be directly over the pillar plate of the frame; the circle A A denotes the plate juft mentioned; B B, the grid-iron frame, attached to the faid plate, and compofed of alternate bars of fteel and brafs, joined together by end-pieces like the compenfation-pendulum alluded to, which therefore need not be again minutely defcribed; the pair of brafs bars in the middle of the frame, or grid-iron, are thofe which act by protruding more or lefs in different degrees of heat againft the tail-piece D, of the double lever D E, moveable on an arbor with pivots borne by the plate and cock G, or by G made as a double cock; H is the principal cock, in which the balance pivot runs in the triangular hole, made by three friction-rollers, not fhewn in the figure; the *pince-fpiral b*, and arm a are faft to an arbor which is pivoted into the cock H, and a fmall cock under it, which is attached to it; this arbor is parallel to the balance verge, and is fo contiguous to it, as to be in one of the eccentric points, from which the fpiral of the fpring which it holds is geometrically defcribed; that is, at half the diftance from the verge, that the two neareft fpirals are from each other; on each of thefe two levers, a and b, is a fliding piece of metal; that on a for the lever E to reft againft, and that on b to have a flit for receiving the thread of the fpiral fpring; they are both fixed by preffing fcrews to their refpective levers, when adjufted to their proper places thereon; but b is prolonged to d, which is attached to the graduated L piece by the fcrew e, and this L piece has a pointer, ufed as an index for the graduations on the bridge I, that lies acrofs the grid-iron frame, when attached to the plate A A. K is a fpring, preffing againft a tail-piece of the lever a to keep it always in contact with the lever E; C is the fpiral regulating fpring, as in an ordinary watch, and F an adjuftable ftud, for the exterior end of the fpring, with an oblong perforation for the preffing fcrew; the interior end of the fpring being faft to a collet on the verge, which is adjuftable by friction. The mechanical action is thus produced; the difference of the expanfibilities of the fteel and brafs rods of the grid-iron frame becomes fenfible at the pin D, in the tail-piece of the bent lever D E, moveable in a point of bridge G, between thofe two letters; the part E, being longer from the centre of motion than the part D, which is acted on, moves fafter and carries before it the lever a, and together with it the *pince-fpiral b*, and L piece with the fcrew e; and it is obvious, that, as the fliding piece, borne by lever a, limits its effective length from its place of contact with lever F, the relative lengths of thefe two levers may be varied at pleafure by adjuftment, till the effect produced

duced on the fpring by the grid-iron frame, through the medium of thefe levers, is according to its due quantity; and the pince-fpiral will go and come in a manner fimilar to the motion of Harrifon's curb, though the law of their motion is different, one depending on direct expanfion, and the other on lateral curvature. The graduations of the L piece are for bringing the machine to time, the end, *d*, being the index, and the fcrew, *e*, the inftrument of adjuftment; and the index of the L piece fhows, on the graduated cock I, the fituation of the pince-fpiral under all the variations of temperature. Befides No. 1, Nos. 3, and 8 of the marine-pieces of this author had the compenfation we have here defcribed, which, though complex, would no doubt anfwer its purpofe as well as Harrifon's more fimple contrivance; and though the idea did not originate with the contriver, yet it will be acknowledged, that there is evident ingenuity in the arrangement and adaptation of the acting parts of the mechanifm; the effect alfo produced by the mechanifm before us muft be regular and permanent, when the materials are good, and the work well executed. (See "Traité des Horloges Marines" par F. Berthoud. Paris 1773.)

Harrifon's Compenfation improved by F. Berthoud.

After the Board of Longitude had publifhed the principles of Mr. Harrifon's Time-keeper, Mr. F. Berthoud perceived that Harrifon's compenfation-balance might be improved by introducing the action of a lever, capable of adjuftment for any given quantity of effect, without moving the cock that holds the compenfation bar; the conftruction he adopted was thus; A, in *fig.* 3; of the plate already named, is the cock for the balance pivot, ("Hiftoire de la Mefure du Temps") which balance is not neceffary to be fhewn, B is the curb lever, detached from the compenfation bar, and turning on a fhort arbor pivoted into the cock A, and an under cock borne by this not feen, the centre of its motion being at one fide of the balance verge, as in Berthoud's former balance; the fpring under the cock, that urges it towards the fcrew of C, is concealed from fight; C is the compound or compenfation bar, fixed in the chops of a faft bridge D, and having, at its free end, a fcrew with its point bearing on the tail-piece H of the curb-lever B, which curb-lever has a fliding piece with a narrow groove to admit the thread of the fpring, and is fixed by a preffing fcrew in any given fituation; E is what the French call a *piton*, or adjuftable frame of the ftud, ftanding on four fcrews, as feet, which allow it to be brought into the plane of the fpiral-fpring, fo as not to force it from its natural pofition; the ftud F, that holds the exterior end of the fpring flides in the *piton*, when under adjuftment for diftance, and is then fixed by a preffing fcrew, paffing through the contiguous end of the fpring G, which turns on a ftud or fcrew, at its remote end when loofe. The manner in which this mechanifm acts will be readily apprehended from what we have faid of Harrifon's, and the preceding compenfation curb, of which it conftitutes an union, thus; when the temperature is high, the compound bar, C, is affected exactly in the way we have juft defcribed Harrifon's to be affected, and the chops of the bridge, D, allow the lengths of the curb lever B, and of its tail-piece, preffed by the fcrew, to be adjufted according to any given ratio as they refpect each other; and as the quantity of effect to be produced on the fpiral fpring depends upon this ratio, with a given compound bar balance, efcapement, and maintaining power, it is obvious that the adjuftment for temperature may be brought to the requifite degree of exactnefs by a few fucceffive trials in the oppofite extremes of temperature.

The Application of Harrifon's Curb to a common Watch.

After Berthoud had made the alterations, which we have juft defcribed, in Harrifon's curb, he turned his mind towards fimplifying it fo as to become ufeful in a common watch; the manner in which he fucceeded in doing this is fhewn in *fig.* 4 of our prefent plate, where it will appear by infpection how the action takes place, particularly as we have placed the fame letters of reference to the fame parts, as in *fig.* 3; the difference of the two contrivances confifts chiefly in the ftud, F, being here fixed faft to the circular plate of the frame; in the curb-lever being bent and having its centre of motion on a feparate fmall bridge, H; and in the oppofing fpring, K, being attached to the face of the plate itfelf; otherwife the adjuftment for temperature is performed as in *fig.* 3, and is equally capable of taking in the extreme limits of temperature. (For another difpofition fomewhat fimilar to the prefent one, fee Berthoud's "Supplement au Traité des Horloges Marines." *Plate* III. *fig.* 8.)

Compenfation by Mr. Alexander Cumming.

Mr. Cumming publifhed his book on "The Elements of Clock and Watch-work," in the year 1766, in which he has given an ingenious though complex method of compenfating the effects of heat and cold on the balance and balance-fpring, different from the foregoing ones, and depending on the difference of the direct expanfions of two feparate and different metals, aided, like Berthoud's, by the introduction of adjuftable levers; whether the invention preceded or followed Berthoud's grid-iron frame and lever, is a confideration which does not, perhaps, affect either of their two claims to originality, as Harrifon's curb was moft probably heard of, if not previoufly known, by both the mechanifts in queftion; nor does it appear that either of the two complex methods here fpoken of has been copied by others in practice. *Fig.* 1. of *Plate* XXX. of *Horology*, reprefents a view of Cumming's mechanifm of compenfation, without the balance, as viewed by the eye placed directly above it, when fixed to the back of the pillar-plate of the frame. The outermoft circular rim, A A A, is of fteel, and has eleven fmall rollers revolving on as many pins or ftuds inferted into the plane of the rim, and the interior rim, B B B, which refts againft the rollers, is of brafs, but is not an entire circle: one end of this interior, or brafs rim, is fcrewed faft to the plane of the fteel rim, by means of its enlarged extremity being made to lie upon the plane of the fteel rim, as fhewn in the figure; in this fituation it is clear that the excefs of the brafs rim's expanfibility will make its oppofite ends approach each other in a high temperature, and recede in a low one, while the friction-rollers will prevent jerks; hence any object oppofed to the free end of the brafs rim will be pufhed forwards by it, as the temperature is raifed, which effect affords the means of alternately lengthening and fhortening the fpiral fpring of the balance in the following manner; the free end of the brafs rim preffes againft the end, *a*, of a lever moveable on a ftud about the middle of it, and the oblong flit made in the oppofite end of the fame lever receives a pin inferted into the contiguous end of a fecond lever *b*, moveable about its remote end round a focket concentric with the balance-verge, or nearly fo; the lever, *b*, which may be called the curb-lever, has two pins in underneath, not feen in the drawing, between which the outermoft thread of the fpiral fpring paffes; hence it is plain, from an infpection of the figure, that when the end, *a*, of the flit lever is pufhed outwards, its oppofite end draws inwards the pin of the curb-lever, and with it the curb, fo as to fhorten the effective length of

 the

the ſpring in this caſe.; and on the contrary, when the braſs rim ſhortens by a low temperature, the contrary effect takes place: for the end, *a*, of the ſlit lever follows the free end of the ſaid rim as it retires in contracting, in conſequence of a ſpring, not ſeen, impelling it into contact with this end at all times; the ratio of the two acting ends of the two levers from their reſpective centres of motion is adjuſted by the horizontal arbor, *d*, ſquared at the end to receive a key; for as the interior end of this arbor is formed into a ſcrew that paſſes into a tapped hole in a ſquare nut on which is the centre of motion of the ſlit lever; the ſaid ſquare nut is made to ſlide in an oblong hole of the plate below the lever; and thus the different parts of the ſlit may be made, ſucceſſively, to impel the pin of the curb-lever, as the compenſation may be found on trial to require. The balance, of courſe, is placed above this mechaniſm, and vibrates free from it. We obſerve that in the original drawing given by Cumming, (*fig.* 5 of his *Plate* XIV.) the ſpiral is made to turn the wrong way about, ſo that the effect of heat will be to elongate the ſpring, which conſtruction would double the natural effect of variations of temperature inſtead of compenſating them, as the contrivance is intended to do, and would do, if rightly conſtructed; but we ſee no reaſon to doubt this being as effectual and permanent as any of the foregoing modes of producing a compenſation, when the ſpiral is bent the right way round, as we have placed it.

Berthoud's Compenſation by a Braſs Arch.

Another method of producing a compenſation, different from any of the preceding ones, in its mode of application, comes next under our conſideration, as another production of the French clock and watch maker, whoſe name we have had frequent occaſion to mention with reſpect.

Fig. 5. of *Plate* XXVIII. exhibits the plan of all the eſſential parts of this contrivance, in an intelligible manner; A, as uſual, is the principal cock over the pillar plate; B, the balance of one metal; C, the ſpiral ſpring; D, an arch of braſs with its ends reſting in two ſloping notches filed into the ſteel bar, E, which is fixed by a ſcrew, near E, in the middle, to the plate, ſo that it may be at liberty to yield both ways to the action of increaſed or diminiſhed temperature on its total length; F is, as before, the ſtud to hold the exterior end of the ſpring, while the interior one is faſt to a collet on the balance-verge; G*g*, is a bent lever, with a pin in its ſhort end, *g*, and its long end pointed as an index, to reach to the diviſions, H, made on the plane of the plate, which bears the mechaniſm; the effect is thus produced; the braſs arch, D, is more elongated than the ſtraight ſteel bar, E, with the ſame increaſe of heat; this arch carries a ſmall ſcrew, the head of which is juſt oppoſite the pin, *g*, already mentioned, between which ſcrew and pin the outermoſt coil of the ſpiral ſpring paſſes; now if the ſcrew and pin were made to approach, till they both ſhould touch the ſpring at oppoſite ſides, they would become in place of a curb, and there limit the length of the ſpring that comes into action; on the contrary, if they were made to recede from each other, till the ſpring acted up to the ſtud, F, placed on the plate, they would be ſuperfluous; but when they are placed at ſuch an intermediate diſtance from each other that the ſcrew limits the opening of the ſpiral, and the pin its cloſing, before the part of the ſpring near the ſtud is moved by the motion of the balance, then the natural effective length of the ſpring is controlled, and the pin and ſcrew together become a ſpecies of curb, that limits the effective length of the ſpring from an undiſtinguiſhed point, lying ſomewhere between the ſtud and the ſaid pin and ſcrew; which indiſcriminate point will always be nearer to the ſtud the more the pin and ſcrew are removed from each other, and *vice verſâ*; hence it is eaſy to ſee, that moving the index, G, forwards or backwards, on the graduated portion of a circle, H, will bring the pin, *g*, nearer to, or remove it farther from, the ſcrew head, than a mean diſtance, and will thence affect the rate depending on the effective length of the ſpiral ſpring, with a given balance, maintaining power, and eſcapement; but it is the ſame thing if the index be ſuffered to remain, and the ſcrew be brought nearer to the pin; for the one limits the right hand and the other the left hand excurſion of the balance; this is the preciſe operation of the contrivance; the ſuperior elongation of the braſs arch over the ſteel bar ſhortens the radius of curvature of the arch, and makes the ſcrew-head approach the ſpring, more or leſs, agreeably to the change of temperature, to which the acting parts are expoſed. The law by which the approach is effected is ſomewhat different, however, from that by which an expanſion-rim is guided, with one of its ends at liberty; and the manner alſo in which the effective length of the ſpring is limited, allows a long ſcale of lengths, in a correſponding ſhort ſcale of diſtances between the ſcrew head and pin; the latter of which laws is evidently diſadvantageous to the nicety of the adjuſtment for temperature; beſides, when the braſs arch and the ſteel bar are found on trial not to be in their due proportions to each other, the remedy cannot be applied without varying the original proportions, by lengthening or ſhortening the verſed line, as the caſe may be, which alteration will require the mechaniſm to be diſplaced.

Improvement on the laſt Compenſation.

Berthoud, having diſcovered the inconvenience and objections to the laſt deſcribed compenſation curb, propoſes another in his "Hiſtoire du Temps," tom. ii. p. 101 and 102, thus: A, *fig.* 6, *Plate* XXVIII, is the principal cock, mounted as uſual on the pillar plate behind; B is again the balance of one metal; C, the uſual ſpiral ſpring; D *d h*, a rack moveable on a ſocket concentric with the balance verge, with ſome additional apparatus carried by it; E is a ſecond cock; and F a third, bearing the *piton*, or ſliding ſtud, with its frame and ſecuring ſpring as in *fig.* 3 of the ſame plate already deſcribed; G is a pinion with an arbor ſquared at the projecting end, to receive a key, which pinion has its teeth formed ſuitable to impel the teeth of the rack D *d*; *a* and *b* are two compound bars of braſs and ſteel, ſoldered together with hard ſolder, inſerted at *d* into a bearing piece, and kept faſt by a preſſing ſcrew *e*, urging them together with the looſe piece, *d*, interpoſed, and kept parallel by a clamping piece *c*; the rack has a circular perforated groove, which allows it to paſs backward and forward by the action of the pinion, while the heads of the two ſcrews, *f* and *g*, confine it to the ſame plane on the back of the plate; and, laſtly, the compound bars, *a* and *b*, have each a pin at their free extremities, which contain between them the laſt coil of the ſpiral ſpring, the action of which is limited preciſely in the manner deſcribed in our laſt compenſation mechaniſm; here, however, the law of flexure is again the ſame as in Harriſon's, though the law of limitation in the effective length of the ſpring is different; the latter, as we have ſeen, depends on the quantum of play between the pins, whereas, in the former, there was no play at all, and the curb itſelf was the limit; ſeeing the effective length of the ſpring diminiſhes as the pins approach each other, the exterior laminæ of the compound bars, *a* and *b*, muſt neceſſarily be braſs, and the interior ones ſteel, to ſhorten the ſpring in high temperatures, and the contrary; when the effect produced is too great, the clamping piece, *c*, is carried outwards towards the pins, in order to ſhorten the bars, which have their lengths meaſured from this clamp; but when the ef-

fect produced is too little, the said clamp must be brought inwards towards *d*, to lengthen the bars; so that the scale of adjustments here runs along the length of the two parallel compound bars, as it relates to the variations of temperature; while the adjustment for a mean rate is made by the index *h*, which shews the quantum on the contiguous portion of a divided circle. Still, we think, that while a small variation in the play, between the curbing pins, produces a great variation in the effective length of the spring; this contrivance can have no pretensions to rank in utility with some of the more recent inventions, that place the compensating parts on the balance itself.

Compensation by Breguet.

A compensation similar in effect to the two foregoing ones by Berthoud, but more simple than the latter, is that which Breguet of Paris has applied with success to his common watches; this compensation is shewn in *fig.* 7 of *Plate* XXVIII. where the bounding circle denotes the back plate of the frame; A the principal cock; B the balance of one metal; C the common spiral spring; D *d c* a three armed piece, called by the French a *rateau*, to which is attached the mechanism of compensation thus: the curvilinear fork, *a b*, is composed of two metals: each prong consisting of a slip of steel and a slip of brass, so attached together, that the steel is the exterior, and the brass the interior part in each; the end *a* is screwed to the lever D, and the end *b* is loose, consequently at liberty to approach or recede from the spiral spring, as the changes of temperature affect the fork; the interior end, *a*, of the fork bears a pin near the letter *b*, not seen by reason of the lever D, which lies over it, and a second pin similar to the other is carried by the lever D, between the two largest coils of the spiral: these two pins limit the effective length of the spring exactly in the way that the two preceding compensating contrivances have been explained to do, for which reason we do not repeat what we have already said on this part of the subject; the alternate inward and outward motions of the pin, *b*, regulate the distance between the two pins, on which the play depends, and consequently the length of the spring also, as it has regard to the action; the prong *a* has a tendency to become straight by heat, in consequence of the concave part being brass, but the prong, *b*, has a tendency to become still more convex in consequence of the brass being the convex part; the joint effect of which alterations of shape and position will be, that, as the balance and its spring become enlarged, the space between the curbing pins will become diminished, and the contrary. The watch is regulated for mean time by the index part *d* of the three-armed *rateau*, and the third arm, *c*, contains a pin about the middle of the spiral spring, which we conceive to be the banking pin, though no mention is made of it in the original description. "Histoire de la Mesure du Temps, by Berthoud."

Compensation by Mr. James Scott.

In May of the year 1805, Mr. James Scott, of Grafton Street, Dublin, published an account in Mr. Nicholson's Journal, (vol. XI. p. 19—21., 8vo. series) of a compensation curb which acts in a manner somewhat analogous to that which we have described as the invention of Cumming; but it is evident he had not previously seen the one alluded to, nor yet Berthoud's, otherwise he would not have said in his letter to Mr. Nicholson, that "artists have not been able to invent a compensation-curb adjustable to the exact expansion required." The contrivance now before us is ingenious, and we presume might be applied to an ordinary watch with considerable advantage; though we cannot persuade ourselves that any method of curbing the regulating spring, after it has been adjusted for isochronism, affords so good a compensation, as the mechanism of compensation now usually applied to the balance itself. *Fig.* 2. of *Plate* XXX of *Horology*, shews all the parts of Mr. Scott's compensation-curb, as given by himself in the original account; but as his description did not seem very intelligible to us at the first reading, we hope to be excused the liberty we take of giving our own account of the contrivance: A A is an index of steel, with a circular part embracing a dove-tailed groove that surrounds the balance verge in the upper plate of the frame; to this steel index is attached, by a screw and steady pin, one end of a compound circular bar, B B, so formed, that the steel part is the exterior, and the brass part the interior; to this compound bar is fastened a second compound bar C C, also circular, by means of a clamping piece and screw at D; a loose piece of metal, interposed between the two circular bars, being pressed by the screw, the outer one keeps the inner one close to the shoulder of the clamping piece, which cannot be seen in the figure; but it is easy to conceive that such a clamping piece will apply at any part of the circular bars; the bar, C C, has the brass part exterior, and the steel part interior; E is the stud in the plate, that holds the outward end of the spiral regulating spring, intended to be curbed; and the interior compound bar, C C, passes between two steady pins, inserted in the plate at *a*, a short distance from *b*, where the curbing pins are fixed, that embrace the last coil of the spring: whenever the index, A A, is moved, in regulating for mean time, it carries with it the two concentric compound bars, and the curbing pins slide along the coil of the spring, so as to lengthen or shorten it as the case may be; suppose, now, that the regulation for rate be made, and that the balance has its temperature elevated, the tendency of the outer circular bar will be to open, or enlarge its radius of curvature, which action will bring the interior compound bar and its curbing pins nearer to the index, and shorten the balance spring a little; but this action is not sufficient to produce the whole requisite effect; the tendency of the interior circular bar C C, on the contrary, is to close, that is, to approach the index, in consequence of its radius of curvature becoming shorter, while its end at D is clamped to the free end of B B; and it is the amount of these two contemporary motions, produced in the interior compound bar, C C, that constitutes the motion of the curbing pins at *b*, along the spiral spring, in a direction towards the index A A. In a low temperature, just the reverse takes place; the outer compound bar, B B, has its radius of curvature shortened, and the inner one, C C, has its radius of curvature, on the contrary, lengthened in this case, so that the joint effect is to make the curbing pins retire from the index to lengthen the regulating spring; which alternate lengthening and shortening of the balance-spring's effective length in heat and cold, form the compensation for the corresponding variations in the momentum of the balance and force of the spring. The excellence of the present contrivance consists in its affording a scale of adjustments; for moving the clamping piece, D, forwards, towards the middle of the concentric circular bars of compensation, lessens the effect, and removing them back, towards the open ends, increases the effect to be produced on the balance-spring, by giving a greater or smaller range of motion to the curbing pins. The inventor's rule for the thickness of the compound bars is, that each lamina be of the thickness of an ordinary main spring of a common watch, so that the compound pieces may be each of twice the said thickness.

COMPENSATIONS

Compensations *on the Balance.—Thermometer of Peter le Roy.*

We have faid under our article Chronometer, that Harrifon was the firft perfon who fuggefted the idea of the balance carrying its own compenfation, and Peter le Roy was the firft who in 1766 fucceeded in fuch a conftruction; in our notice of this invention, however, there is a typographical omiffion which we beg leave to correct here before we proceed to our defcription; it is faid under the article juft referred to, that the compenfation was effected "by means of two thermometers, one of mercury and the other of alcohol, attached to, and carried by, the balance itfelf;" inftead of," one end of each bearing mercury, and the other end alcohol, &c." as will now be more clearly underftood. *Figs.* 1 and 2 of *Plate* XIX. of *Horology*, exhibit fo much of the balance of Peter le Roy as is neceffary for explaining its conftruction; A A, in *fig.* 1, is a portion of the arbor or verge to which the balance B is attached by fcrews; C is a fmall ring attached to the inferior part of the verge which holds the two fcrews of regulation for mean time, and which alfo clamps the horizontal parts of the two glafs thermometrical bent tubes, D and E, placed diametrically oppofite to each other, one of which is feen in a detached ftate in *fig.* 2; thefe tubes are alfo held faft by two other clamps, to the middle of the verge, as may be feen in *fig.* 1; the fuperior end of the ftraight vertical part of each tube is open to admit the preffure of the atmofphere on the mercury, which is now feen ftanding at the fame level in both the upright portions of each thermometer, after the inferior or horizontal connecting part is filled; but the bulbs and parts above the letters D, and E, are filled at a mean temperature with alcohol, refpectively refting on the columns of mercury: when the balance and balance-fpring are enlarged by heat, the alcohol has alfo its bulk increafed, and defcends below the letters D and E, for inftance, in very high temperatures as low as the horizontal connecting part, in which cafe the mercury preffed upon by it defcends under the alcohol, but afcends in the fame proportion at the other end, till it reaches nearly the open fuperior end of the vertical ftraight part of the tubes refpectively; the mercury which was before in a column parallel to the verge, but at a diftance from it, is now alfo parallel but contiguous, and, as it is a ponderous fluid, the momentum of the balance is confiderably diminifhed by the approach of the mercury to the centre of motion, which change of pofition of the mercury conftitutes the compenfation required to balance the effect of an enlargement of the balance itfelf, and of an elongation of its regulating fpring taken jointly: in a low temperature the contrary change takes place in the fituation of the mercury, for as the bulk of the alcohol contracts and retires round the acute angular point into the bulb, the exterior vertical branch becomes filled by the mercury. Peter le Roy, we have before faid, was difpofed to prefer this balance to the balances he made entirely of metal, but the frangibility of the bent tubes, and the liability of the fluids to be agitated, if not to be mixed, fometimes conftituted objections to its portability, that prevented its being copied by other chronometer makers. The adjuftment for the extremes of temperature muft have been made by varying the quantity of mercury in a given tube; and probably tubes of various dimenfions were tried fucceffively before the exact effect was produced, both at the extremes, and at all the intermediate degrees of temperature. The balance being heavy, was fufpended by a thread above the fuperior end, A, and the flender cylindrical part, underneath the fame A, rotated in a triangular hole, made by three furrounding friction rollers, not fhewn in our figure; laftly, two regulating fprings, wound in contrary directions, were placed under the ring, C, near the lower pivot of the verge, which fprings are purpofely left out, that the reader may not have to view more parts than are neceffary for explaining the compenfation balance itfelf.

Compound metallic Balance of P. le Roy.

Peter le Roy, however, was not content with trying his thermometrical tubes, only to effect a compenfation on the balance, but he fo far adopted Harrifon's idea on the requifite conftruction of a balance, carrying its own compenfation in motion, that he tried moreover his compound bars of fteel and brafs, not, indeed, as curbs, applied to the fprings according to Harrifon's method, but as rims to the balance itfelf: *fig.* 3 of *Plate* XXIX. fhews a balance of this contrivance, where A is the diametrical bar fixed to the verge, and B B and C C two feparate femicircular portions of the compound rim, which were each compofed of laminæ of fteel and brafs refpectively rivetted together in different places, in fuch a way that the brafs pieces were the exterior or concave ones, and the fteel pieces the interior or convex ones; the loads are not given in the drawing, but the inventor fays "Memoire fur la meillure maniere, &c." that his contrivance made a confiderable portion of the circumference to approach the centre of the balance in a high temperature; fo that either he muft have had loads on the ends of the femicircular parts of the rim, or otherwife thefe parts themfelves muft have been thick, which would prevent their due obedience to the variations of temperature. *Fig.* 4 is a kind of regifter contrived to examine the law by which the flexure of a compound bar was guided, as compared with a mercurial thermometer, thus; A is the croffes and rim of a balance of one metal, fteel, we will fuppofe, and the compound piece B, fcrewed at the end *a*, to the plane of the rim, has its end, *b*, at liberty to obey the changes of temperature; near *b* is a fmall cock into which a roller, bearing the index C, is pivoted above, againft which roller the free end, *b*, of the compound bar, B, acts, whilft the interior end of the index points at the divifions made on the portion of a circle, D, near the centre of the balance: the experiments that were made with this inftrument, according to P. le Roy's account, fhewed that the rim of the index, fo circumftanced, correfponded very well with the rim of a mercurial thermometer, in all the different parts of the fcale; and if this was found to be really the cafe, we cannot help thinking it extraordinary that the contriver of the compound metallic balance, which has ftability and portability to recommend it, did not prefer it, in actual practice, to the mercurial balance, which was liable to the objections we have ftated.

Arnold's Balances.

Some pains have been taken to prove that Mr. Arnold, fenior, did not invent his compenfation balances himfelf, but borrowed them from Peter le Roy; we confefs that we have not met with any conclufive argument in favour of fuch a fuppofition, but, on the contrary, have afferted under our article Chronometer, that, "a variety of different fhapes were given by Arnold to his balances, and actually tried in practice, before he adopted the one in prefent ufe, fome of which balances are yet in exiftence;" and we have it now in our power to fay further, that many of the balances here alluded to are yet in ufe, as ourfelves have witneffed very lately; which balances have been proved to be excellent regulators, and fome of which have public teftimonies in their favour. We propofe therefore now to defcribe them in fucceffion, or at leaft fuch of them as have fallen in our way.

No.

No. 1. In his preface to his printed certificates, Mr. Arnold, fenior, fays, that his firft attempt to improve clocks and watches commenced in the year 1764; but we find it was not till the year 1767, that he turned his mind ferioufly to the conftruction of chronometers; the firft compenfation balance that he actually brought into ufe, was the one reprefented in *fig.* 5. of *Plate* XXIX. which was taken from one of the original balances while in our poffeffion. The rim is 2.4 inches in diameter, and is, together with the three radial arms, of flender brafs: the compenfation bar is of brafs and fteel coiled round the balance verge, at a little diftance from the mechanifm which lies between it and the plane of the balance; the exterior part of this compound fpiral bar is brafs, and the interior part fteel; *a b* is a piece of fteel moveable round a tube furrounding the balance verge, and having a longitudinal aperture or flit, each way from the centre to nearly each extremity, *a* and *b* refpectively; the end, *a*, is turned up a little, and has the exterior end of the compound fpiral bar of compenfation attached to it, fo as to partake of its motion under all the changes of temperature; *c d* and *c d* are two bracket pieces of metal carrying each a pin under them, that exactly fit the longitudinal flit of the piece, *a b*; confequently thefe bracket pieces alfo partake of the motion produced by the compound fpiral bar; the ends, *c* and *c*, of the bracket pieces are attached to the balance rims at the points, *e* and *e*, by the ftraight flender fprings, *e c*, and *e c*, refpectively; to the ends *d* and *d*, of the faid brackets are attached the long pins, *d f* and *d f*, which pafs through the fmall fteady bridges on the rim, and carry the fectoral loads of temperature, *f* and *f*; the action produced on this mechanifm by the changes of temperature may be thus explained; when the temperature is elevated, the exterior end of the compenfation fpiral bar, moves in a direction from *a* towards *c*, and carries with it the end, *a*, of the crofs-piece, *a b*, at the fame time the oppofite end of this piece moves from *b* towards the *c* which is contiguous to it; thefe oppofite motions of the ends, *a* and *b*, of the crofs piece carry the two brackets in fuch direction that the loads of temperature, *f* and *f*, are both made to approach the balance, fo as to leffen its momentum when in motion; which is the effect required in the above-named temperature; on the contrary, when the temperature is low, the motion of the ends, *a* and *b*, is towards *d* and *d* refpectively, and the loads of temperature are thrown outwards, to increafe the momentum of the moving balance. The quantum of effect is regulated by enlarging or diminifhing the loads, *f*, *f*, of temperature, as compared with the fcrews, *g* and *g*, or weights of adjuftment for mean time; or otherwife, by fcrewing them into a new fituation, out or in, as the cafe may be; the fprings, *e c* and *e c*, do not interfere with the inward and outward motions of the loads of temperature, but only confine the brackets to the plane of their action, and limit the direction of their motion. This compenfation-balance was applied to ten or twelve different chronometers, between the years 1775 and 1778, but we have not been able to afcertain its comparative merit; its principle is fimple, in that there is but one compound bar, to move two loads of temperature, but its mechanifm is complex, which was probably the principal reafon why it came into difufe.

No. 2. The next balance, which Mr. Arnold contrived. was that which is reprefented in *fig.* 6. of *Plate* XXIX, in which the mechanifm is much more fimple than in its predeceffor; the rim and diametrical bar, by which it is attached to the verge-collet, are both fteel, the parallel bars, *a b* and *a b*, are compofed of brafs and fteel refpectively, the brafs being here interior and the fteel exterior, and are inferted into pivot holes made in the rim of the balance; in fome of the chronometers, the end, *b*, was faft to the balance, and the end, *a*, of the fame bar loofe, while the end, *a*, of the other bar was faft, and the end, *b*, of the fame was loofe, but in other chronometers both the ends of each bar were formed into pivots with fhoulders, and were inferted loofely by bending the bars about the middle; the crofs pieces, *c* and *c*, which carry the loads of temperature, are of fteel, and the rim itfelf is fo notched as to admit of the loads being contiguous, that they may meet with very little refiftance from the air, when in motion; the mode of action is obvious from a view of the figure, and from what has been previoufly faid of a ftraight compound bar, being liable to become convex on the brafs fide by an elevated temperature, and the reverfe in an oppofite temperature; the bars, *a b* and *a b*, becoming convex, with increafed heat, towards the centre of the balance, draw the loads, *d* and *d*, nearer to the rim, than they are when the bars are ftraight at a mean temperature, and, on the contrary, as the heat diminifhes, the fame parallel bars become convex on the fides next the rim, and carry the loads from the balance; and thefe alternations of motion, keeping pace with the changes made in the dimenfions of the balance itfelf and of the balance-fpring, conftitute the compenfation for the effects of temperature: the exact quantum of effect is adjufted as before, by altering the magnitude of the loads, *d* and *d*, as compared with the weights of the adjuftment-fcrews, *e* and *e*, for mean time; or otherwife have their relative pofitions altered in regard to their diftances from the centre. About twenty of thefe balances were made and applied as regulators, all of which performed their office, we are told, very well; the famous gold chronometer, No. 36, tried for 18 months by Dr. Mafkelyne, at the Royal Obfervatory, while worn in the pocket, under the different degrees of temperature, agitations of the body, and changes of pofition, had, and ftill has, one of thefe balances; and its rate, which has been publifhed, eftablifhed its credit fo highly, that it was fold for 1000 *l.* or guineas, notwithftanding the detent of its efcapement, after the fafhion adopted by the French, is fixed to an arbor revolving on pivots. The balances of the prefent conftruction were made from the year 1778 to the year 1780, and the only objection we have heard alleged againft them, was the play they neceffarily had in their pivot-holes, which we think muft have been fcarcely perceptible when the pivots were well made and fitted tight into their holes.

No. 3. The objection to the motion at the pivot holes in the laft balance, (No. 2.) was attempted to be remedied by the conftruction exhibited in *fig.* 7. of the fame plate, where the expanfion pieces are of brafs and fteel, arranged in the form of a long S, which form was afterwards adopted by Emery, the Swifs watch-maker, who fettled in London, and who has been the reputed inventor of this arrangement; the two halves of the S are joined at the middle, and the brafs, as before, is interior throughout; the rim and diametrical bar of fteel, in the balance we examined, which was 1.2 inches only in diameter, by reafon of its having been ufed in a pocket-chronometer; the exterior end, *a*, of the S is attached to one of the fhortened croffes of the balance, and the interior end of the fame bears the long pins, *c* and *c*, that carry the loads of compenfation *d* and *d*; the long pins, *c* and *c*, do not pafs through the rim, but are held to their proper pofitions by the two flender fprings, *e c* and *e c*, as in No. 1, or *fig.* 5. as before, the relative weights of the loads of compenfation, *d*, *d*, and *f*, *f*, the loads of adjuftment for mean time, conftitute the limit of effect to be produced by the expanfion bars,

fup-

fuppofing their diftances from the centre fixed; but if the loads remain unaltered, the effect to be produced may be adjufted by varying the diftances of the fcrews refpectively as they regard the centre of the balance. Of thefe balances about forty were made and applied to ufe between the years 1779 and 1782, and have been found to perform well.

No. 4. The length of the S pieces in the laft balance having been found difficult to execute of uniform thicknefs and fhape, by reafon of their great length, the conftruction reprefented by *fig.* 8. was fubftituted, which is very nearly allied to its predeceffor, and indeed differs from it only as the bends are united by an interpofed piece of folid metal, thereby dividing what was before one half of the S, into two parallel compound bars; in all other refpects, the defcription juft given of No. 3, together with the letters of reference, will equally apply to our prefent balance; which circumftance renders a further detail fuperfluous.

Of thefe balances not more than fix or eight were conftructed, by reafon of the more fimple form, which is now in general ufe, having been adopted in 1782, when a patent was taken out for it. The fpecification, however, contains the drawings of Nos. 2 and 3 (*figs.* 6 and 7), as well as of the common balance, which we have fully defcribed under our article Chronometer, to which the reader is refpectfully referred, and which was known to the workmen by the name of the Z balance, by way of diftinction from the S balance. Befides the above-defcribed conftructions of the compenfation balance, Arnold, we are affured, contrived various others which never came into ufe, one of which had the expanfion pieces parallel to the verge of the balance, and borne by it; and others had platina in the expanfion pieces, inftead of fteel; but we conceive it to be unneceffary to purfue the fubject of his inventions further, than merely to obferve, that fo regular a fucceffion of different balances actually made and ufed, where fo many were conftructed, and where each was evidently meant to be an improvement on the laft preceding, may be taken, if not as a pofitive, at leaft as a prefumptive proof, that the imputation of plagiarifm, unlefs otherwife fairly made out againft him, is in contradiction to the facts we have here adduced; which are all facts open to ftill further inveftigation.

For the defcription of the compenfation-balance as made by the Brockbanks and Earnfhaw, the reader is defired to turn to the article Chronometer, where this part of our prefent article has been anticipated. The defcription of Earnfhaw's balance and efcapement, however, which we have quoted as the production of this chronometer-maker, it may be proper to ftate, was not his, but the production of Mr. Firminger, the late affiftant of Dr. Mafkelyne at the Royal Obfervatory, as we have been affured by the author himfelf, fince the publication of the pamphlet in which it appeared oftenfibly as Mr. Earnfhaw's own account. And now that we are on the fubject of Mr. Earnfhaw's balance and efcapement, we beg leave to add further here, an acknowledgment of our mifinformation refpecting the patent, which we were credibly informed, and faid, was never taken out; but which we now find, on more minute examination, was actually taken out and regiftered. How far his pretenfions to originality of invention are warranted by his conftruction, is not the object of our prefent enquiry.

A Compenfation balance by F. Berthoud.

Berthoud informs us, "Hift. de la Mefure, &c." p. 104 tom. ii., that he had propofed a means of compenfation by the balance itfelf, fo long ago as in the year 1754; but that it was not until 1787 that he effected his purpofe. The reader is led to fuppofe, that he was not indebted to P. le Roy, or any other maker, for the contrivance, but that it was the refult of his own inventive genius; and that the contrivance was his own is rendered fomewhat probable from this confideration, that in his "Traité des Horologes Marines," two balls only were propofed to be ufed with two compound bars; but after a calculation of the effect to be produced, contained in page 195 of the Supplement, four balls were found to be neceffary with as many compenfating bars. The propofed arrangement is fhewn in *fig.* 9. of plate XXIX, and is certainly original; A, A, A, and A are four radial bars of metal attached to the verge collet of the balance by two fcrews, as feen in the figure; the flender bars, *a*, *a*, *a*, and *a*, attached refpectively to the exterior ends of the four radial bars by fcrews and fixing pieces, are four compound bars of fteel and brafs, the exterior laminæ being of brafs; and each of thofe compound bars has at its free end a ftem formed into a fcrew, upon each of which a ball, B, with a long focket, fcrews towards or from the verge, to adjuft the momentum to the maintaining power, and regulating fpring, and alfo to effect the equilibrium, when the machine is brought to time. From what we have repeatedly faid of the flexure of a compound bar, it is eafy to fee, that the brafs portions being exterior, will caufe the balls to approach the centre of motion in hot weather, and the reverfe in cold; which effect conftitutes the compenfation. The author acknowledges that the exact effect to be produced depends on the relative length and thicknefs of each compound bar, and that many trials are neceffary to come at the due proportion; confequently, the want of an adjuftment for temperature, after the balance is tried, is in this conftruction a fundamental objection to its general adoption; otherwife we fee no reafon to doubt its accuracy of performance.

This balance was ufed in No. 8. of Berthoud's marine pieces.

Another Compenfation-balance by F. Berthoud.

The compenfation-balance which we have juft defcribed being found liable to objection, the fame author contrived and ufed, in his No. 63, a different arrangement of the compenfation bars, which he again reduced to two, and introduced two additional fcrews for adjuftment of mean time, placed at right angles to the former; the contrivance is fhewn in perfpective in *fig.* 10. of *Plate* XXIX., where all the effential parts may be viewed at once: A A is the balance, made light and of the beft brafs, having four croffes; B and B are the two compenfation bars fixed to the rim of the balance at one end, and bearing the fcrews or weights of temperature, C and C, at the other refpectively; and D and D are the fcrews or weights of adjuftment for mean time, borne by two of the oppofite croffes, as fhewn diftinctly in the figure. The balance as ufual is attached to the verge collet by a couple of fmall fcrews; the exterior laminæ of the two compound bars, B and B, are of brafs, and the interior ones of fteel, fo that a high temperature brings them towards the centre of motion, as the balance itfelf enlarges, and as its fpring elongates and becomes weaker. The adjuftment for temperature may be made in two ways; either by altering the relative fizes of the fcrews of temperature and fcrews of mean time; or otherwife, which is more readily done, by fcrewing one pair in and the other out, fo as to produce a fimilar effect without taking either of the pairs entirely out; it is hardly neceffary to explain that, in all the conftructions, when the momentum of the balance confifts more of the moving weights of temperature, than of the moving weights of mean time, the effect of the compenfation

compenſation bars will be the greater in the ſame proportion, and the contrary; ſtill, however, the quantity of flexure of the compound bars in the preſent balance remains unaltered, and conſequently the velocity of their inward and outward motions is not capable of adjuſtment in any other way, than by altering the ratio of their length to their thickneſs reſpectively, which may be called an alteration rather than an adjuſtment.

Compenſation balance by Joſias Emery.

We have ſaid, under our article CHRONOMETER, that Emery's balance is one of the varieties previouſly conſtructed by the ſenior Arnold, (ſee his N° 3.) and the reader will now judge for himſelf how far our aſſertion was founded in fact. We take our drawing from Berthoud's figure of Emery's balance, which Sarron took over into France, and which was much admired for the accuracy and permanency of its regulation. *Fig.* 11 of *Plate* XXIX, preſents the plane of Emery's balance to the eye placed over it; A A is the balance made with four croſſes, the rim of which is braſs; B B is a ſteel flat ring ſcrewed to two of the croſſes; C and C are the two compenſation bars, each bent twice over into the ſhape of a long narrow S; D and D are the weights for mean time, formed into adjuſting ſcrews to ſuit the female ſcrews of the protuberances made on the plane of the balance; the ſcrews, E and E, are the adjuſtable weights for temperature, but are tapped only at the parts neareſt their heads; the points being faſt to the exterior ends of the compound bars, and the intermediate pins being without threads and moving ſteadily in the two ſockets reſpectively fixed to the rims, or rather formed out of them in the ſolid; the S pieces have the braſs laminæ as uſual on the exterior ſides, ſo that at the middle of the S of each compound bar, the poſition begins to be reverſed, in order that the condition may be fulfilled; the interior end of each compound bar preſſes againſt the circumference of the ſteel ring B B, which we have ſaid is faſt to two of the croſſes; conſequently, whenever a change takes place in the temperature of the parts, the whole motion takes place at the foot of the ſcrew of temperature, at each oppoſite ſide of the balance. The ſmall interior circle F is the upper end of the cylindrical ſpring of the balance, together with the pin that holds one end of it, and the part that forms the banking, which have nothing to do with the compenſation. In this balance, as in Berthoud's latter one, the adjuſtment for temperature muſt neceſſarily be made, by altering the relative momenta of the ſcrews of mean time, and of the ſcrews of temperature.

Mr. W. Hardy's Compenſation-balance.

Among the moſt recent improvements in chronometry, may juſtly be reckoned the new compenſation-balance of Mr. W. Hardy of Clerkenwell, communicated to the Society of Arts in the Adelphi, in March 1805, and renumerated with thirty guineas. The balance in common uſe, that brings the weights of temperature alternately towards and from the verge, by ſimple flexure of the compound rim-pieces, is objectionable, in the opinion of Mr. Hardy and others, on account of theſe conſiderations: 1ſt, The two metals of the compound pieces of the rim, when united by fuſion of the braſs, are liable to partial ſeparations, which affect the permanency of the adjuſtment for temperature; 2dly, The variation of the centrifugal force of the weights of temperature in large and ſmall arcs of vibration overpower the elaſticity of the expanſion pieces, and affect the momentum of the balance, as adjuſted for mean arcs of vibration; the weights being thrown from the centre more in the long arcs than in the ſhort ones; and, 3dly, The adjuſtments for rate and temperature, however carefully made, will affect the equilibrium of the balance, and the rate of the machine placed in different poſitions, without ſubſequent rectifications; to remove theſe objections, Mr. Hardy has availed himſelf of the direct expanſion of two different metals, where their difference of expanſion produces a mechanical action on the loads of temperature, ſuch as bids fair for general introduction in practice.

Fig. 3. of *Plate* XXX. of *Horology*, exhibits a lateral view of the balance before us, and *fig.* 4. the balance inverted; A A is the balance arbor or verge of the ordinary conſtruction; B B is a ſteel diametrical bar, borne by the collet of the verge, 1.6 in. long, 0.232 broad, and 0.032 thick; this ſteel bar is made uniformly except at the two extremities, which are made narrow, and in each of which a notch is cut in the inferior ſurface, ſo far, that the remaining thin metal conſtitutes a ſpring above each notch; beyond theſe ſprings, which we have ſaid form a part of each end of the diametrical bar of the balance, are attached two ſtems at right angles, ſo as to be parallel to the verge when the ſmall ſprings are not acted on by any force; the upper parts of the ſtems, in the original drawing, are formed into ſcrews with threads adapted to the tapped holes of the two balls C, C, which they ſupport, and which are weights of adjuſtment for temperature, but in our more recent drawing, the weights ſlide and are fixed by ſide ſcrews; D, D, are two ſimilar ſcrews for rate which ſcrew reſpectively into the inferior or thicker parts of the ſtems, ſo as to be capable of increaſing or diminiſhing the effective momentum of the balance according to circumſtances; and E, E, are ſcrews of adjuſtment for equilibrium; each end of the ſteel diametrical bar has, moreover, a ſtud or ſhoulder, pointing downwards under the ſtem juſt deſcribed, which ſtud cannot be ſeen in the figure in a ſeparate ſtate; underneath the ſteel bar, and exactly parallel to it and to each other, are placed two bars of braſs, ſhorter but broader than the ſteel bar; the length of each is 1.47 in, the breadth 0.078, and the thickneſs 0.032, like that of the ſteel; each of the two braſs bars has one of its ends ſecured to one of the ſtuds deſcribed, and preſſing with its oppoſite end againſt the other, but in ſuch a way, that their poſitions are reverſed with reſpect to the fixing of the ends; the fixed end of the one being contiguous to the free end of the other reciprocally; a ſecond view is given of theſe bars in *fig.* 4, where they are repreſented in an inverted ſtate. The action of the mechaniſm it is not difficult to underſtand, though the author has rendered his account ſomewhat confuſed by his mention of ſhort levers, which the reader does not ſee in the figure. When the balance is expoſed to heat, the ſteel bar elongates a little both ways from the verge in the centre, but the two braſs bars ſeparately elongate more, and conſequently each detached end, having liberty to move a quantity equal to the difference of the two expanſions, puſhes againſt the ſtud or ſhoulder that is contiguous, and forces it outwards; the ſlender ſpring-parts, above the notches of the ſteel bars, now yield to the forces impreſſed reſpectively on the ſtuds, and the parts of the two ſprings which yield moſt may be conſidered as centres of motion of a pair of levers; the diſtance from the yielding point of each ſpring to the point urged by the detached end of its braſs bar, may be called the length of the ſhort end of each lever, and the diſtance from the ſaid point of each ſpring to the centre of the load carried by the neareſt ſtem, may be taken as the length of the long end of the lever, which two ends ſuppoſe as 1 to 20 reſpectively; then if the difference of

of the expanſions of the ſteel and one of the braſs bars be called 1 outwards, the quantity of inward motion in the ſame denomination will be 20; conſequently, the ſame heat which elongates the ſteel bar, and carries the balls from the centre of motion, will, at the ſame time, by the exceſs of expanſibility of the braſs bars, bring the ſame balls inwards towards the ſame centre, and the two contrary actions may be adjuſted, by moving the loads up or down their proper ſtems, till theſe oppoſite effects exactly balance one another; for as thoſe diſtances that have been denominated the ſhort ends of the levers are variable in length, or very nearly ſo, varying the longer ends only, *viz.* the diſtances of the balls from the yielding points of the ſprings, conſidered as centres of motion, will alter the ratios, which may be done in the requiſite proportion, till the compenſation is found in the tentative adjuſtments to be perfect. When once the exact compenſation is effected, it is obvious, that the law by which it is preſerved is uniform and conſtant, as that according to which the grid-iron pendulum is conſtructed, which experience has proved to be permanently uſeful in practice. When the balance has its momentum properly adjuſted for rate, with a given maintaining power, eſcapement, and balance-ſpring, and when the balance is put into an exact ſtate of equilibrium, the ſtems being at all times either exactly parallel to the verge, or, if inclined a little by the extremes of temperature, alike inclined, it is ſelf-evident, that, under theſe reſtrictions, the adjuſtment of the loads up or down for temperature will not deſtroy the adjuſtments of rate, and of equilibrium for the poſitions, previouſly made, provided the two loads be of equal weight, and placed in ſimilar poſitions on their reſpective ſtems; and even if one happen to be left a little higher on the ſtem than the other, no ſenſible bad effect will be produced thereby, which circumſtance is one of the greateſt recommendations of the preſent balance. The effects produced by variations of temperature, are ſaid to be produced not by jerks, but regularly, notwithſtanding the united ſtructure of the parts is ſufficiently firm; and, laſtly, the conſtruction is ſo ſimple, that a common workman may ſucceed in making and putting together the conſtituent parts of this balance without difficulty.

Compenſation on the Balance and alſo at the Spring.

Double Compenſation by Berthoud.—F. Berthoud having experienced much inconvenience, and loſt much time in making the adjuſtments of his balances for rate, temperature, and poſition, at length determined to avail himſelf of the curb, as a ſupplemental aid, in addition to the compenſation carried by the balance itſelf; the union of the two modes of effecting the due compenſation, is repreſented in *fig.* 5 of *Plate* XXX. of *Horology*, in ſuch a way that all the acting parts may be ſeen and underſtood: A is the balance-rim of braſs, and bears four croſſes, beſides two projecting bars, B, B; theſe bars carry each a compound or compenſation bar, C, of the uſual conſtruction, the free ends of which are perforated and attached to the ſcrews or loads of temperature, D and D, or, more properly ſpeaking, to the ſliding ſockets on which thoſe loads ſcrew in and out, in making the adjuſtment; E and E are the ſcrews or loads of adjuſtment for mean time: FF is the cock, and G a ſmall cock, bearing a jewel mounted on it, to take the pivot of the balance. The action of the compenſation bars, C and C, needs no explanation, after what we have ſaid about the effect of ſuch pieces borne by other balances: I, is the compenſation bar of the curb for the ſpiral ſpring, ſhewn in the figure, and acts on the bent ſteel bar, K, which holds the curbing pins, and which has its centre of motion under the cock, at a ſhort diſtance from the balance-verge; the quantity of action of I on K is regulated by the holding piece, *a*, ſliding in a dove-tailed groove, between the parallel bars, *b* and *b*, ſcrewed to the piece N, which piece, N, is moveable round a pin under it, near the part, *a*, in ſuch a way as to admit of a little circular motion, together with the compound bar, I, to regulate for mean time without altering the length of I; and a ſlow motion may be given to the piece, N, by the graduated piece, M, which is moveable on the pivots of its arbor, in the plate and ſmall cock, L, while the tooth, or rounded part, lies in a concave part at the end of N, and impels it almoſt imperceptibly as the end, M, moves; the graduations of the piece, M, are ſeen through a hole made in the interior caſe of the watch; and the adjuſtment for rate may be made there without trouble, and without deranging the previous adjuſtments of the balance itſelf; but then, if there is an iſochronal point in the acting length of the ſpiral ſpring, the adjuſtment made by means of the curb will derange its iſochroniſm, which will become ſenſible as the arc of vibration varies in uſe; otherwiſe the adjuſtment for temperature might be completed by varying the length of the compound-bar, I, after this adjuſtment has been nearly effected on the balance itſelf, and after the balance has been brought into a ſtate of equilibrium for the poſitions; but whether the effect produced by the joint agency of two cauſes, will be uniform in all degrees of temperature, has not been ſaid by the author.

Compenſation for the Spring's want of Iſochroniſm.

That property of a balance's regulating ſpring which makes the balance perform all its vibrations, long, ſhort, and intermediate, preciſely in the ſame time, is called its *iſochronal* or *iſochronous* property, from the two Greek words ισος, *equal*, and χρονος, *time*: it has been aſſerted that there is a certain proportion between the length and thickneſs, or between the length and the breadth and thickneſs taken conjointly, which only aſcertains the iſochronal point in any uniform ſpring, of whatever ſhape; this doctrine has been maintained by Dr. Hooke and Peter le Roy ſeparately, and has been ſubſcribed to by Arnold the ſenior, Berthoud, and others, though Pennington of Camberwell ſays there are different points in the ſame ſpring equally iſochronal; now allowing that there is only one point in the length of every ſpring that determines its iſochroniſm, and that conſequently all other lengths of the uniform ſpring regulate the balance uniformly, only while the arcs of vibration remain unchanged, to determine the iſochronal effective length of ſuch ſpring would be to render all compenſations, for want of iſochroniſm, unneceſſary; and this point may in moſt ſprings be aſcertained by repeated trials with long and ſhort arcs ſucceſſively, and by marking down the reſpective reſults; for it is found from experiments, that if ſhortening the regulating ſpring makes the long arcs of vibration to be performed in leſs time than the ſhort ones, and *vice verſâ*, the ſpring under trial is capable of having its total length reduced gradually till the iſochronal length is determined, but, generally ſpeaking, not otherwiſe. Another method of managing the ſpring, which may be ſaid to be effecting a ſpecies of compenſation for want of iſochroniſm, in the total length of an uniform ſpring, is tapering it from the outer to the inner end, till, with a given length, the long and ſhort arcs are performed in equal times; this method was ſtrongly recommended by Cumming in his Eſſay towards the improvement of watch-work, and after him, Earnſhaw has laid much ſtreſs on this particular, ſo much indeed, that he conſiders his ſkill in the adjuſtment of

of the ifochronifm, by a tapering fpring, as conftituting one of his chief claims to public encouragement; nay, he profeffes to manage the bufinefs fo nicely, that he can make fuch a flight deviation from perfect ifochronifm as will compenfate the *laffitude* alfo, in the intenfity of his fprings in ufe!

The firft notice that we have of a regular compenfation, for want of perfect ifochronifm in a regulating fpring, is Harrifon's, when he propofed to introduce the cycloid-pin which we have already confeffed we do not underftand, from the want of fhading in the drawing of it, as attached to his compenfation curb, in the publication by the Board of Longitude; we may, however, ftate, that Harrifon, not knowing, probably, that there is naturally an ifochronal length in moft uniform fprings, concluded, that the long arcs are naturally performed in lefs time than the fhort ones, reafoning from the circumftance of one of his pieces having been obferved to go fafter in a horizontal pofition, than in a vertical one, though the arc of vibration was fhorter in the latter than in the former pofition; he therefore applied his cycloid-pin, as Mudge did after him, as may be feen in the drawing of his efcapement, in fuch a way that the fhort vibrations were accelerated by its pufh more than the long ones, that were not fo long acted on by auxiliary means; but the fact is, the ufe of fuch a contrivance would neceffarily have an effect juft oppofite to the intended one, if the balance-fpring happened to be pinned to the ftud at the contrary fide of the ifochronal point; that is, if the long vibrations were flower than the fhort ones, the cycloidal contrivance would make the difference ftill more fenfible.

Berthoud's Compenfation for want of Ifochronifm.

Berthoud has given an ingenious method of compenfating the want of ifochronifm in a balance-fpring in his "Supplement au Traité des Horloges Marines," which contrivance he calls an *ifochronal compenfator.* (Compenfateur Isochrone.) The contrivance is reprefented in *fig.* 6. of *Plate* XXX, where A reprefents the balance with three radii; B an eccentric collet of polifhed fteel, placed on the balance-verge, and preffing againft the large roller C, which is carried by and pivoted into a fmall frame at the end of the flender fpring D, attached to the cock, E, on the plate of the watch frame, whenever the long vibrations are found by trial to be performed in a longer time than the fhort ones, the pofition of B and C are refpectively as in the drawing, at the time when the balance-fpring is quiefcent; for then the preffure of the eccentric piece, B, againft the roller urged by the fpring, is greater in the fmaller arcs than in the long ones; but when the long arcs are performed in the leaft time, the pofition of B muft be at *b*, and then C will be found by the force of its fpring at *c*, where it is evident, that the preffure will be lefs in the fhort arcs than in the long ones comparatively; and the quantity of eccentricity of B muft depend on the greateft difference of the two extreme vibrations. The principal reafon why Berthoud adopted this ifochronal compenfator in five clocks, and in his portable watch for the longitude, was, that whenever the cock was difmounted the ifochronifm of his fpring, however well adjufted, was generally found to be deranged when re-mounted. The eccentric collet was of courfe capable of being put to any given eccentricity as well as into any given pofition for accelerating long or fhort arcs at pleafure. The Englifh watch-makers have not, that we know of, ever ufed this contrivance, but depend on their own patience and fkill, in afcertaining the beft length and moft defirable fhape of their regulating fprings for effecting their own purpofe.

Mr. W. Hardy's Compenfation for want of Ifochronifm.

Mr. W. Hardy publifhed a fhort account of a new method of making the balance of a chronometer perform its long and fhort vibration, in the fame time, in Mr. Nicholfon's Journal for September, of the year 1806, (Supplement of vol. xiv. 8vo. Series) which account, we propofe, to copy with fome flight verbal deviations, that are more adapted to our figures, as drawn in perfpective. The fpring *a b*, *fig.* 8 of *Plate* XXX, is fcrewed to the inferior fide of the cock A, *fig.* 7. and lies over the upper part of the regulating-fpring, proceeding in a right line to the axis of the balance B, and having a bend to clear the verge, from which it paffes on to the end of the fpring which it holds. This ftraight fpring is made of fuch a fmall ftrength, that it comes into action before the regulating fpring. The other piece *c*, *fig.* 8, is attached to the cock, in a line with the flender one, but on the oppofite face of the cock; the part of the piece, *c*, which is bent down, is divided into a fork and admits the part, *b*, of the flender fpring, to pafs and play between its prongs; at each fide of the prongs is a lateral fcrew, prefenting its point to the fpring, in fuch a way, that the play between the prongs, or rather between the points of the two equidiftant fcrews, may be limited according to circumftances, provided they are not farther afunder than the quantity of the efcapement angle. The other end of the cylindrical regulating fpring, as ufual, is attached to a piece of metal carried by the verge of the balance. The effect produced by the compenfating fpring, *a b*, is thus; when the balance is firft moved from its place of reft, the flender fpring, *a b*, moves firft, till it meets with the point of one of the two fcrews of the fork, then the cylindrical-fpring begins to be acted on, as in the chronometers in general; this motion of the ftud, at the end of the flender fpring, retards the motion of the balance, which begins to be accelerated only, when the ftud is at reft; confequently the contrivance before us fuppofes that the fhort arcs are in general performed in lefs time than the long ones; and require on that account, to be checked in their velocity at ftarting; and the quantity of play in the fork limits the quantum of retardation; but as we have feen the long arcs may be, and often are, performed in lefs time than the fhort ones, with fprings not adjufted for ifochronifm; we conceive, therefore, that, like Harrifon's cycloid pin, which owed its origin to a contrary fuppofition, the application of the invention we are defcribing may happen to be productive of an effect, juft oppofite to that which it is meant to produce; for it can be ufed as a compenfation for want of ifochronifm, only in the particular cafe, when the fhort arcs of vibration are performed in lefs time than the long ones, which we have feen is juft the oppofite application of that adopted by Harrifon, and founded, as we have faid, on an oppofite fuppofition; whereas the fact is, that fometimes one of the two contrivances may prove to be neceffary, and fometimes the other, with a limited length of fpring, accordingly as the long, or the fhort arcs of vibration, may turn out on trial to be performed in the lefs time; and the trial neceffary for afcertaining, whether the fpring is too long or too fhort, will afford the means of afcertaining very nearly, if not quite, the exact ifochronal length, fuch as fhall require no compenfation at all; to attain which object, though with fome additional trouble, we are difpofed to think the preferable practice.

Compensation-*Pendulum*, is a superior kind of pendulum in which the natural effects of two actions are so opposed to each other, as to counteract or compensate each other's influence on the motion of the going pendulum. We have already described the grid-iron pendulum invented by J. Harrison, and also, Troughton's new arrangement of the metallic bars, under our article Clock, to which we must here refer; and for the other various constructions of a compensation-pendulum the reader is desired to consult the word Pendulum, where he will find the subject treated at considerable length.

COMPERTORIUM, in the *Civil Law*, denotes a judicial inquest made by delegates, or commissioners, to find out, and relate the truth of a cause.

COMPETENCE, or Competency, in *Law*, the authority, or right of a judge, for taking cognizance of any matter. See Jurisdiction.

Competence *Militaire*, Fr. military jurisdiction. In France, the officer of the troops took cognizance of and possessed the right of directing the process or proceedings in regard to every thing that concerned military affairs and offences, those excepted, that were punishable by the provost marshal, and to judge of all crimes and offences committed by an officer against an officer, or by a soldier against a soldier, provided a civil individual had no concern or interest in it. And if the civil judges were obliged to cause military persons to be arrested, the commandants could demand them, and in case of refusal complain to the sovereign through the minister.

Competent *Witnesses*. See Witness.

COMPETENTES, in *Church History*, an appellation given to the catechumens, when being sufficiently instructed in the Christian religion they required baptism.

COMPEYRE, in *Geography*, a town of France, in the department of Aveyron, and district of Milhaud; one league N. of Milhaud.

COMPHEDA, a town of Arabia Felix on the Red Sea, S.E. of Mecca, garrisoned by the Turks.

COMPIANO, a town of Italy, in the duchy of Parma; 12 miles from Pontremoli.

COMPIATA, *Ital.* Complics, *Fr.* The last prayer or hymn sung in full chorus, at the end of the service of the Romish church.

COMPIEGNE (in Latin, *Compendium*,) a handsome town of France, the chief place of a district in the department of Oise, situated on that river at the distance of two kiliometres from the confluence of the Oise with the Aisne and 76 kiliometres from Paris. N. lat. 49° 25'. E. long. 3° 12'. A very extensive forest stretches from this town to the department of the North and that of the Lys. Before the revolution of 1789 the kings of France resided occasionally at the palace of Compiegne to take the diversion of hunting. This palace was built by Charles the Bald, repaired by several of his successors, and reconstructed on a grand scale in 1755 by Louis XV. There is also a beautiful bridge over the Oise which formerly was adorned with the arms of France elegantly carved in stone by Coustou: but this fine monument was mutilated in 1793 by a revolutionary stone-cutter, who put a cap in its place. Compiegne has a sub-prefect, two courts of justice, and 6359 inhabitants. The district contains a population of 88,048 individuals, distributed in 165 communes. Its principal trade is in wood, corn, and wool. Its wine is much esteemed. There are but a few manufactures of worsted caps and stockings.

COMPITALIA, or Compitalitia, feasts held among the ancients in honour of the *lares*.

The word comes from *compitum*, a *cross-way*; because the feast was held in the meeting of several roads.

The compitalia are more ancient than the building of Rome. Dionysius Halicarnassus, and Pliny, indeed, say that they were instituted by Servius Tullius; but this only signifies, that they were then introduced into Rome.

Notwithstanding what Dion relates, that the compitalia were celebrated a little after the Saturnalia, and that the Roman calendar fixes them on the twelfth of January, it appears that they had not fixed any day, at least not till the time of Varro, as is observed by Casaubon.

The feast being then moveable, the day whereon it was to be observed, was proclaimed every year. It was ordinarily held on the fourth of the nones of February, *i. e.* on the second of that month. Macrobius observes that they were held not only in honour of the *lares*, but also of *mania*, madness. The priests who officiated at them were slaves and liberti; and the sacrifice was a sow. They were re-established, after a long neglect, by Tarquin the Proud, on occasion of an answer of the oracle, "That they should sacrifice heads for heads," *i. e.* that for the health and prosperity of each family, children were to be sacrificed: but, Brutus, after expelling the kings, in lieu of those barbarous victims, substituted the heads of garlick and poppy; thus satisfying the oracle, which had enjoined *capita, heads*, at an easier rate.

During the celebration of this feast, each family placed at the door of their house, the statue of the goddess *Mania*: they also hung up at their doors figures of wool, representing men and women; accompanying them with supplications that the *Lares* and *Mania* would be contented with those figures, and spare the people of the house.

As for slaves, in lieu of the figures of men, they offered balls or fleeces of wool. Servius Tullus ordered, that the slaves who assisted at the compitalia, should be free during the whole time of the feast. Augustus ordered the statues of the *Lares*, placed in the cross-ways, to be adorned with flowers twice a year.

COMPLACENCY, in *Pathology* and *Ethics*, denotes full and continued satisfaction, connected with a considerable degree of approbation. It has intrinsic value, or some species of worth for its object. Some mental excellencies, or advantages accruing from them; some sentiment, disposition, acquirement, conduct, performance, either of ourselves or of others with whom we are immediately connected, which, upon close examination, we deem deserving of esteem or applause. Complacency may be enjoyed as the reward of our own conduct, or of the purity and benevolence of our motives; and it may also relate to the approved conduct, sentiments, attainments, and dispositions of others, for whom we are deeply concerned. The satisfaction produced by complacency indicates, that we have, in some respect or other, a personal interest in the object of it; and the approbation implied in it conveys the idea of some kind of excellency. In strict propriety of language, complacency is alone applicable to that species of good which originates from some mental or moral excellence; where there is an indication of propriety, ingenuity, wisdom, address, or dignity, in sentiment, design, execution, or of rectitude and benevolence in the motive, this affection will possess different degrees of strength, according to the various kinds and degrees of excellence discernible in the existing cause; and high complacency is the most grateful of all the affections. It possesses an elevation and a suavity peculiar to itself. It is permanent satisfaction, enjoying the full approbation of reason; and consequently it suffers no allay from the struggle of contending passions, or opposite desires. When it is in-

spired

fpired by our own conduct, it is accompanied by felf-approbation, or the teftimony of an applauding confcience, enlivened perhaps by the voice of gratitude, and enriched by the efteem of the worthy. If it proceed from the conduct of others, it augments the pleafures of affection, friendfhip, and gratitude. This affection, however, has its counterfeit; and an erroneous opinion of ourfelves may change the nature of this fublime affection, and render it the parent of vice and folly. Thus falfe conceptions of our own talents, acquirements, and conduct, may infpire pride, vanity, haughtinefs, and arrogance. Cogan on the Paffions, p. 71.

COMPLAINANT, in *Law*, a plaintiff, or one who prefers a complaint againft another, to be relieved by juftice or equity.

COMPLEMENT, in a general fenfe, denotes what is wanting, or neceffary to complete fome certain quantity or thing.

Complement, *Arithmetical*. See Arithmetical.

Complement, in *Aftronomy*, is ufed for the diftance of a ftar from the zenith; or the arch comprehended between the place of a ftar above the horizon, and the zenith. It is the fame as the complement of the altitude, or co-altitude; or zenith diftance.

Complement *of the courfe*, in *Navigation*, is the number of points the courfe wants of 90 degrees, or eight points; *viz.* of a quarter of the compafs.

Complements *of the curtain*, in *Fortification*, are thofe parts of the fide of the interior polygon, which form the demi-gorges of the two baftions adjoining the curtain.

Complement *of the line of defence*. See Line *of defence*.

Complement, in *Geometry*, is what remains of a quadrant of a circle, or of ninety degrees, after any certain arch has been retrenched from it. Thus, if an arch or angle be 30 degrees, we fay its complement is 60 degrees, fince $60 + 30 = 90$.

The fine of the complement of an arch is called the *cofine*; of a tangent, the *co-tangent*; &c.

We fometimes alfo fay the *complement of an angle*; meaning fo much as it wants of a right angle, or of 90 degrees.

Complement, in *Heraldry*, a term ufed to fignify the full moon, for example, azure, the moon in her *complement*, argent.

Complements *of a parallelogram*, are the two leffer parallelograms, made by drawing two right lines parallel to each fide of a parallelogram, through a given point in the diagonal.

Such are the parallelograms C and M (*Plate* III. *Geometry*, *fig.* 50.) It is demonftrated, that in every parallelogram, the complements C and M are equal: for $Z + C + o = R + M + x$; as making up on each fide the great triangles, made equal by the diagonal; of which, $Z = R$, and $o = x$ (becaufe the diagonal makes them fo); wherefore the remaining parallelogram $C = M$.

Complement *of life*, in the *Doctrine of Life annuities*, denotes the difference, according to M. De Moivre's hypothefis, between the age of any given life, and 86 years; thus, at the age of 30 the complement is 56—at the age of 37 it is 49—at the age of 50 it is 36, and fo on. In this hypothefis the probabilities of life through every period of exiftence, are fuppofed to decreafe in an arithmetical progreffion, fo that out of 86 perfons juft born, one is fuppofed to die every year, till at the end of 86 years, which is confidered as the utmoft limit of human life, the laft furvivor becomes extinct. M. De Moivre, who formed this hypothefis with the view of facilitating the computations of life-annuities, derived it from Dr. Halley's "Table of Obfervations," at Breflaw, which, being the only table of the kind at that time, and making the decrements in the middle ftages of life nearly equal, fo far fupported the truth of the hypothefis, and juftified M. De Moivre in adopting it. But in the earlier and later periods of life the decrements are fo irregular as by no means to accord with this hypothefis; and fince fubfequent tables, more accurately formed, and deduced from more extenfive obfervations, have been publifhed by Dr. Price, Meffrs. Wargentin, Sufmilch, and other writers on the fubject; and the values alfo of fingle and joint lives for all ages have been computed from them; this hypothefis is rendered unneceffary, even in cafes where it is moft correct: in other cafes, which involve two or three lives in the queftion, efpecially if thofe lives be very young or very old, it gives folutions fo inaccurate as to be altogether unfit for ufe.

By fuppofing an uniform decrement in the probabilities of life from infancy to extreme old age, the number of years which a perfon has an equal chance of furviving is made to be the fame with the *expectation* which M. De Moivre by his hypothefis finds to be equal to half the complement of life; fo that if the age be four, the expectation will be $\frac{82}{2} = 41$; if the age be 82, the expectation will be $\frac{4}{2} = 2$, while the chance that a child aged 4 furvives 41 years is $\frac{41}{82}$, and the chance that a perfon aged 82 furvives 2 years is $\frac{2}{4}$. Now fince each of thefe fractions is $= \frac{1}{2}$, it follows, agreeable to what has been obferved above, that the one has an equal chance of living 41, and the other of living 2 years, or fuch a number as fhall be expreffed by their refpective expectations. But by the Breflaw table the expectations of thofe lives are feverally $40.\frac{2}{3}$ and $3.\frac{1}{2}$ years, while the chance of the younger living $40.\frac{2}{3}$ years is .464, and the chance of the elder living $3.\frac{1}{2}$ years is .53: that is, in the firft inftance, the chance is lefs, and in the fecond greater, than an even one, that the perfon lives fuch a number of years as fhall be equal to his expectation. This is true in all other tables deduced from real obfervations, and proves that even in the fimpleft cafe the hypothefis is incorrect.

Mr. Thomas Simpfon, inftead of fuppofing the complement to be the difference between 86 and the age of the given life, affumed this complement to be equal to twice the expectation when computed from a table of the real probabilities of life, and by this means leffened the incorrectnefs of thofe rules which depended entirely on Mr. De Moivre's hypothefis. But had this excellent mathematician been poffeffed of the prefent tables of obfervation, there is no doubt but that he would have adopted a more genuine method of folution. As far as relates to the computation of the probabilities of furvivorfhip between any given number of lives, M. De Moivre's hypothefis in many cafes appears to give approximations which are fufficiently near the truth; but as the mere determination of fuch probabilities is of no ufe in computing the values of contingent reverfions, inafmuch as the difcount of money muft be blended in each feparate year with the chance of furvivorfhip in that year, the inveftigation of them is a matter of no confequence, and therefore the hypothefis of an equal decrement, which often leads to great errors in the doctrine of life annuities, may be wholly laid afide without injury or inconvenience in any cafe. (See Phil. Tranfactions, vol. 78.)

Complement *of a Chord*, in *Mufic*, the note or notes wanting in any chord, to complete its harmony.

Complement *of an Interval*, is the minute quantity it wants in particular temperaments.

Complement, is the difference or remainder between an octave or eighth, and any given interval, called alfo the inverfion of that interval, (fee Inversion); thus, a fifth

fifth is the complement or inverfion of a fourth, and a fourth of a fifth ; a minor third is the complement or inverfion of a major fixth, and *vice verfâ*. See THIRD, FOURTH, FIFTH, &c.

COMPLETE, in French *complet*, in *Military Language*, a regiment, troop, or company is faid to be complete when it has its full complement of officers, non-commiffioned officers, and privates, agreeably to the regulations for the time being.

COMPLETUS, *flos*, in *Botany*, a complete flower, furnifhed with both calyx and corolla ; *incompletus* being ufed when the latter is deficient, and *nudus* when the former.

COMPLEX, a term ordinarily ufed as fynonymous with *compound* ; though, ftrictly fpeaking, there is fome difference between them.

COMPLEX *object*. See OBJECT.

COMPLEX *oppofition*. See OPPOSITION.

COMPLEX *term*, or *idea*, is a term or idea compounded of feveral fimple or incomplex ones.

Thus, in the propofition, *A juft God cannot leave crimes unpunifhed* ; the fubject of this propofition, viz. *a juft God*, is a *complex term*, or ftands for a *complex idea*, compofed of two fimple, or *incomplex* ones, viz. *God* and *Juft*. Mr. Locke obferves, that though the mind be perfectly paffive in the formation of fimple ideas, yet it exerts feveral actions of its own about them, when once formed : and that by this means it is, that they become the materials and foundations out of which all our knowledge is framed.

Thefe acts are chiefly three, *viz.* 1. The combining of feveral fimple ideas into one compound one : and thus it is that all complex ideas are made.

2. The bringing two ideas, whether fimple or complex, together ; fetting them by each other, and fo viewing them, without uniting them into one ; by which it gets its ideas of relation.

3. The feparating feveral ideas from all other ideas that accompany them in their real exiftence : and thus all its general ideas are formed.

As fimple ideas are obferved to exift in feveral combinations united together : fo the mind may confider them as united, not only as they are really united in external objects, but as itfelf has joined them : ideas thus made up of feveral fimple ones put together, we call *complex* ; as man, beauty, army, gratitude, &c.

Complex ideas, however compounded and decompounded, though their number be infinite, and their variety endlefs, may be all reduced under thefe three heads, viz. *modes*, *fubftances*, and *relations* ; which fee under their proper heads, MODE, SUBSTANCE, and RELATION. Complex ideas are often confidered as fingle and diftinct beings, though made up of feveral fimple ideas ; as body, fpirit, &c. See COMPOSITION of *ideas*.

COMPLEX *propofition*, in *Logic*, is that in which the fubject, or predicate, or both, are made up of *complex* terms : and if the term added to the fubject be effential or neceffary to it, then it is called *explicative* ; otherwife it is *determinative*, the adjoined term limiting the fubject to a particular part of its extenfion. Some logical writers afcribe the complexion of a propofition, in fome cafes, to the copula, as in modal propofitions ; but this rather pertains to the predicate. See *Compound* and *Modal* PROPOSITION.

COMPLEX *fyllogifm*, is that in which the middle term is not connected with the whole fubject, or the whole predicate in two diftinct propofitions, but is intermingled and compared with them by parts : *e. g.* The fun is a fenfelefs being, the Perfians worfhipped the fun, therefore the Perfians worfhipped a fenfelefs being.

COMPLEXI *Pars*, in *Anatomy*, a name given by Riolanus, and others, to a mufcle called by Albinus *biventer cervicis*, and by fome the *complexus*.

COMPLEXIO, COMPLEXION, in *Metaphyfics*, the union, or coalition of feveral things different from each other ; either really, or only in our conception. See COMPLEX.

COMPLEXIO, in *Logic*, is fometimes applied to the fecond operation of the mind, *viz.* the judgment ; confidered as it affirms or denies any thing ; fuch affirmation, &c. neceffarily importing a combination of feveral things.

Complexio is fometimes alfo ufed by logicians in the fenfe of dilemma.

COMPLEXIO, in *Rhetoric*, &c. is a figure including a repetition, and a converfation at the fame time ; the fentence both beginning, and ending, with the fame word.

Thus Tully : " Quis legem tulit ? " Rullus. " Quis majorem partem populi fuffragiis privavit ? " Rullus. " Quis comitiis præfuit ?" Rullus.

COMPLEXION, in *Phyfics*, is ufed for the temperature, habitude, or natural difpofition of the body.

Some philofophers diftinguifh four general and principal *complexions* in man, *viz.* the *fanguine complexion*, which, according to them, anfwers to the air ; having the qualities thereof, as being hot and moift. It takes its name from *fanguis* ; becaufe the blood is there fuppofed to be predominant.

The *phlegmatic complexion* takes its name from the pituita, or phlegm, in which it abounds ; and correfponds to water ; being cold and moift.

The *bilious*, or *choleric complexion*, takes its name from the bile, or choler : it is fuppofed of the nature of fire, hot and dry.

Laftly, the *melancholic complexion* partakes of the nature of earth, being cold and dry ; but this fort of reafoning is now not much regarded.

Under this article we may introduce a fubject that has occafioned much difcuffion, and confiderable difference of opinion among phyfiologifts. It relates to the variety of complexion or of colour that has fubfifted amongft the inhabitants of different nations. Some perfons, diffatisfied with the feveral hypothefes that have been fuggefted for explaining this phenomenon, have been led to conceive that there is a fpecific difference in the human race, and that the variations of colour are owing to their not having fprung from one common original. But this hypothefis contradicts the moft ancient and authentic hiftory extant, which reprefents Adam and Eve as the progenitors of all mankind ; and it is alfo liable to various other objections which we fhall take occafion diftinctly to fpecify in the courfe of this work. Dr. Hunter, who has publifhed a thefis on this fubject, has inveftigated it with peculiar attention ; and he gives it as his decided opinion, that there is no fpecific difference among mankind. In order to guard againft the confufion which has arifen from the ufe of the term " fpecies," he begins with defining it, and he comprehends under the fame fpecies all thofe animals which produce iffue capable of propagating others refembling the original ftock, from which they fprung. According to this fenfe of the term, he confiders the whole human race as belonging to the fame fpecies. But, as in the vegetable creation, one fpecies of plants includes feveral varieties depending upon climate, foil, culture, and fimilar circumftances that are incidental, the cafe is the fame with refpect to the human race ; the varieties that occur pertain to the fame fpecies, and are produced by the operation of natural caufes. Of the different colours that fubfift among mankind, he enumerates the following, *viz.*

Black,

Black, comprehending — Africans under the Line. Inhabitants of New Guinea. Inhabitants of New Holland.

Copper-coloured, as the Eaſt Indians.

Brown-coloured, to which claſs belong — Tartars. Perſians. Arabs.

Browniſh, including — The inhabitants of the ſouthern parts of Europe; as, Sicilians, Abyſſinians, Spaniards, Turks, and alſo the Samoiedes and Laplanders.

White, to which belong — Moſt of the European nations; as, Swedes, Danes, Engliſh, Germans, Poles, &c. Kabardinſki, Georgians, and Inhabitants of the iſlands in the Pacific Ocean.

Swarthy, including — The Moors in the northern parts of Africa. The Hottentots in its ſouthern parts.

Red-coloured, as the Americans.

Brown coloured, comprehending — Africans on the coaſt of the Mediterranean. Chineſe.

In tracing the cauſes of theſe differences of colour, he ſets out with obſerving that its ſeat is unqueſtionably in the ſkin; that it is confined to the cuticle, conſiſting of the epidermis and reticulum; and that it chiefly occupies the latter of theſe. The cuticle, he obſerves, is much thicker and harder in black than in white people; the reticulum in the latter being a thin mucus, in the former a thick membrane. The ſeat of colour in whites he conceives to be tranſparent, and either totally deprived of veſſels, or furniſhed with a very ſmall number; as the yellow colour appearing in the jaundice vaniſhes when the cauſe of the diſeaſe is removed, which is not the caſe with ſtains in the cuticle from gun-powder, or ſimilar cauſes. He then mentions three cauſes which contribute to deſtroy the pellucidity of the cuticle, to give it a brown colour, and to thicken it; *viz.* acceſs of air, naſtineſs, and the heat of the ſun: the effect of theſe he illuſtrates by examples; but he apprehends the laſt to be the moſt powerful. Admitting ſuch influence of theſe cauſes, he ſuppoſes that it is ſufficient to account for all the diverſities of colour, that are obſervable among mankind. He proceeds to obſerve, that all the inhabitants of the torrid zone incline more or leſs to a black colour; and the difference that is perceivable among them may be owing, not to mere heat, but to the other cauſes alſo; and if we conſider that even in the torrid zone there is a conſiderable difference of temperature, the exiſtence of a white nation in this climate would not deſtroy the argument. He is farther of opinion, that the exiſtence of a brown colour, and of conſiderable varieties from white, in the northern and coldeſt parts of Europe, may be very eaſily explained, by adverting to the manner of life of the inhabitants, who of courſe are either expoſed to the inclemency of the air, or to the conſtant naſtineſs of ſmoky houſes. If, to this reaſoning, it ſhould be objected, that infants are ſubject to theſe differences even when they are born, and previouſly to the influence of the cauſes above-mentioned, Dr. Hunter replies, that many peculiarities acquired by parents are tranſmitted to their poſterity; in proof of which, he refers to hereditary diſeaſes, which will continue to affect families for many generations. Thus, a parent expoſed to cauſes that deſtroy the natural whiteneſs of his complexion, will beget ſwarthy children; and the ſame cauſes continuing to operate upon the ſon, the blackneſs will be increaſed. In this manner, all the different ſhades may have been at firſt induced, and afterwards continued. To this objection, however, it might be anſwered, that the fact is not admiſſible; as it is now generally allowed, that the children of the blackeſt negroes are born white.

Mr. Clarkſon, in a diſſertation introduced in his "Eſſay on the Commerce and Slavery of the Human Species," has conſidered and well illuſtrated the ſubject of complexion. In the inveſtigation of this ſubject, the firſt queſtion that occurs relates to the preciſe ſeat of the colour. As the old anatomiſts commonly divided the ſkin into two parts or laminæ, *viz.* the cuticle and cutis or true ſkin, they muſt have ſuppoſed, that as the latter is the ſame in all the varieties of mankind, however different their external hue, the ſeat of colour muſt have exiſted in the cuticle or upper ſurface. Malpighi, however, diſcovered that the ſkin is divided into three laminæ; *viz.* the cuticle, the true ſkin, and a kind of coagulated ſubſtance ſituated between both, which he denominated the "rete mucoſum." Accordingly, this diſcovery ſerved to aſcertain the point in queſtion; for it afterwards appeared, that the cuticle, ſeparated from the other laminæ, was ſemi-tranſparent; and that the cuticle of the blackeſt negro was of the ſame tranſparency and colour with that of the pureſt white; and as the true ſkins of both were invariably the ſame, the rete mucoſum muſt be the ſeat of colour. That this is the fact has been alſo determined by a variety of anatomical experiments and phyſiological obſervations. The cauſes, therefore, that operate in producing difference of colour, muſt effect it by acting on the rete mucoſum, which, from the numberleſs perforations of the cuticle, is no leſs acceſſible than the cuticle itſelf. Theſe cauſes are probably thoſe various qualities of things, which, combined with the influence of the ſun, contribute to form what is called "climate." Moreover, it is a farther confirmation of this hypotheſis, that the mucous ſubſtance before-mentioned is ſubject to variation, according to the difference of climates from the equator to the poles. Thus, the inhabitants of many kingdoms and iſlands of Aſia are found to have their rete mucoſum black; thoſe of Africa, ſituated near the line, are of the ſame colour; thoſe of the maritime parts of the ſame continent, are of a duſky brown, nearly approaching to it; and the colour becomes lighter or darker, in proportion as the diſtance from the equator is either greater or leſs. The Europeans are the faireſt inhabitants of the world: thoſe ſituated in the moſt ſouthern regions of Europe, have in their rete mucoſum a tinge of the dark hue of their African neighbours. Admitting theſe facts, we are led to conclude, that climate has a very conſiderable influence in occaſioning a difference of colour. It has, however, been objected to this reaſoning, that people of the ſame climate, geographically conſidered, or under the ſame parallels, are not exactly of the ſame colour. But to this objection it has been replied, that climate, phyſically conſidered, depends upon a variety of accidental circumſtances. See Climate. It ſhould alſo be conſidered, that, although the inhabitants

of

of the fame parallel are not exactly of the fame hue, yet they differ only by certain fhades of the fame colour; and, therefore, if climate has really an influence on the mucous fubftance of the body, we muft expect to find not only a gradation of colour in the inhabitants from the equator to the poles, but alfo different fhades of the fame colour in the inhabitants of the fame parallel. We might alfo add another argument of great weight, *viz.* that when the black inhabitants of Africa are tranfplanted to colder, or the white inhabitants of Europe to hotter climates, their children, born there refpectively, are of a different colour from themfelves, that is, lighter in the firft, and darker in the fecond cafe. To this purpofe the abbé Raynal obferves, that the children, which the Africans procreate in America, are not fo black as their parents were; and that after each generation, the difference becomes more palpable. It is poffible, he adds, that after a numerous fucceffion of generations, the men come from Africa would not be diftinguifhed from thofe of the country into which they have been tranfplanted. If we admit the fact above ftated, that climate has an influence on the mucous fubftance, we may reafonably imagine that this variation of the colour of children from that of their parents muft take place; for being born white, and not being fubject to the influence of caufes equally powerful in colder climates, with thofe to which their parents were fubject in the hotter climates from which they were removed, it muft follow that the fame effect cannot poffibly be produced.

On the other hand, we may here allege an important fact, ftated by Dr. Mitchell (Phil. Tranf. N° 476. § 4.). "The Spaniards," he fays, "who have inhabited America, under the torrid zone for any time, are become as dark-coloured as our native Indians of Virginia, of which I myfelf have been a witnefs; and were they not to intermarry with Europeans, but lead the fame rude and barbarous lives with the Indians, it is very probable that, in a proceffion of many generations, they would become as dark in complexion." Another writer, defcribing the European fettlements on the African coaft, obferves, that "there are feveral other fmall Portuguefe fettlements, and one of fome note at Mitomba, a river in Sierra Leone; the people here called "Portuguefe" are principally perfons bred from a mixture of the firft Portuguefe difcoverers with the natives, and now become, in their complexion and woolly quality of their hair, perfect negroes, retaining, however, a fmattering of the Portuguefe language."

Another circumftance might alfo be mentioned by way of corroborating the argument before us; and this is, that the members of the fame family, feparated from each other, and migrating into different countries, have not only changed their family complexion, but have affumed as many different colours as the different regions of the globe in which they have fettled. The Jews furnifh a remarkable inftance to this purpofe. Thefe people, though fcattered over the face of the earth, preferve themfelves a diftinct people, and never intermarry with any out of their own body, fo as to have any mixture of blood in their veins, by which they fhould differ from each other; and yet it is an undoubted fact, that the Englifh Jew is white, the Portuguefe fwarthy, the Armenian olive, and the Arabian copper-coloured; and there appear to be as many different fpecies of Jews as countries in which they refide. It appears further from the teftimony of the moft ancient hiftorians, that the darkeft black complexion has actually changed in a fucceffion of years into the pureft white. Herodotus informs us, that the Colchi were black and that they had crifped hair. Thefe people were a detachment of the Ethiopian army under Sefoftris, who followed him in his expedition, and fettled in that part of the world where Colchis is faid to have been fituated. Their defcendants probably remained in the fame country. If this be the cafe, they muft have totally changed their complexion; or the black inhabitants of Colchis muft have acquired the hue of the fair Circaffian. If indeed they migrated in any one direction from Colchis and to any diftance within 1000 miles of Colchis, ftill they muft have changed their colour; for if they had gone in an eaftern or weftern direction, their colour muft have been the fame as that of the Circaffians; if to the north, whiter; if to the fouth, of a copper colour. Within the above affigned diftance of Colchis, there are no black people.

Profeffor Zimmermann of Brunfwick, in his work entitled "The Geographical Hiftory of Man, &c," has fatisfactorily proved, that the complexion of the human fpecies uniformly correfponds to the degree of heat or cold to which they are habitually expofed. In eftablifhing this pofition, he diftinguifhes between climate, confidered geographically and phyfically, and thus furnifhes an anfwer to the erroneous reafoning of Lord Kames on this fubject. At Senegal, and in places adjacent, the thermometer is often at 112 or 117 degrees in the fhade; and here we find the inhabitants jet-black with woolly hair. The heat is equally great in Congo and Loango, and thefe countries are inhabited by negroes only; whereas in Morocco to the north of thefe regions, and at the Cape of Good Hope, to the fouth, the heat is not fo intenfe, nor are the inhabitants of fo deep a hue. Lord Kames afks, why are not the Abyffinians and the inhabitants of Zaara of as dark a complexion as the Moors on the coaft of Guinea; Zimmermann replies that thefe countries are much cooler. The defert is not only further from the equator, but the winds blowing over the Atlas mountains, which, like the Alps, are covered with fnow, and the wefterly wind coming from the fea, very much mitigate the heat. Nor is Abyffinia fo warm, as either Monomotapa or Guinea. The N. E. winds from the fide of Perfia and Arabia are cooled by their paffage over the Red fea; the northern winds of Egypt lofe much of their heat on the chain of mountains that is extended between the countries; the winds from the fouth and the weft are fea winds. Thus the only quarter from which they can derive exceffive heat is from the weft, as the air on this fide muft pafs over tracts of heated lands. For a fimilar reafon negroes are not found either in Afia or South America, under the equator. Thefe countries, as M. Zimmermann obferves, being expofed, from their fituation, to fea-breezes and cooling winds from the continent. He alfo obferves, in confirmation of this hypothefis, that the mountaineers in warm climates, as in Barbary and Ceylon, are much fairer than the inhabitants of the vallies; that the Saracens and Moors, who conquered the N.E. part of Africa in 1700, from being brown, are become like the negroes near the equator; that the Portuguefe, who fettled at Senegal in 1400, became blacks; and it is afferted by Tudela the Jew, that his countrymen in Abyffinia acquired the dark complexion of the conquered nations.

Upon the whole it may be obferved, that colour is a kind of habit of the body, which is gradually acquired, and after a fucceffion of ages, fixed and rendered permanent. Thus, the fanguine countenance will be perpetual in the higheft latitudes of the temperate zone, and, as we defcend to the fouth, we fhall find the fwarthy, the olive, the tawny, and the black. The uniformity of the effect in the fame climate, and on men in a fimilar ftate of fociety, proves the efficacy and the certainty of the caufe. As mankind are for ever changing their habitations by conqueft or commerce,

merce, we find that, in all climates, they cannot endure the change; but are fo affimilated by time, that we cannot fay with certainty, whofe anceftor was the native of the clime, and whofe progenitor was the intruding foreigner. For a further illuftration and confirmation of the general arguments comprehended in this article, we refer to an "Effay on the Caufes of the Variety of Complexion and Figure in the Human Species" by Dr. Smith, profeffor of moral philofophy in the college of New Jerfey. See NEGROE.

COMPLEXUS MUSCULUS, in *Anatomy*, derives its name from the intermixture of tendon with its mufcular fibres, which gives to its furface a confufed appearance. It arifes from the tranfverfe proceffes of five, fix, or feven of the upper dorfal vertebræ, by fo many diftinct flips; from the tranfverfe procefs of the laft cervical vertebra; and from the oblique or articulating proceffes of the fixth, fifth, and fourth vertebræ of the neck. The fafciculi of fibres from thefe numerous points of origin meet together to form a broad, flat, and ftrong mufcle, which is implanted into the occipital bone, occupying the hollow in front of the external tranfverfe ridge of the bone. It fometimes receives a fmall flefhy portion from the fpinous proceffes of one or two of the upper dorfal vertebræ; and is generally connected in fome degree with the longiffimus dorfi facrolumbalis and tranfverfalis colli. That portion of the mufcle, which is towards the fpines of the vertebræ, is divided into two flefhy portions by an intermediate tendon, and is feparate from the reft at its origin; this is defcribed by Albinus, Soemmerring, and others, as a diftinct mufcle, by the name of biventer cervicis: we follow Cowper, Douglas, and Winflow, in confidering this as a part of the complexus, fince it is always connected to the reft of the mufcle, for two or three inches before its infertion.

The action of the complexus confifts in carrying the head backwards upon the atlas; and in reftoring it to the erect pofition, when it has been bent forwards. Its longeft fibres will alfo have the fame effect on the neck, *viz.* that of ftraightening and carrying it backwards.

COMPLEXUS, *Minor*, is a name given by Winflow, to the trachelo-maftoideus mufcle, which fee.

COMPLICATION *of difeafes*, a mixture, or combination of feveral difeafes; efpecially where they have any affinity to one another; as the dropfy, afthma, and jaundice, happening together.

What much perplexes the phyficians is, when with a fever there is a complication of fome other diforder.

COMPLINE, in *Ecclefiaftical Antiquity*, denotes that even-fong, which completed the whole fervice of the day in religious houfes, and began at nine of the clock at night.

COMPLUTENSIAN BIBLE. See *Greek* BIBLES, and POLYGLOTT. The Complutenfian edition of the Bible, which the reader will find defcribed and particularly noticed, under the articles to which we have referred, has been highly extolled by Mill and Goeze, and as much depreciated by Wetftein and Semler. Michaelis, in the fecond edition of his "Introduction," &c. endeavoured to fteer a middle courfe between the oppofite opinions of Mill and Wetftein; though he believed, on the authority of the latter, that the editors, actuated by religious zeal, had materially altered the Greek text from the Vulgate. But Goeze, he fays, in his "Defence of the Complutenfian Bible," printed at Hamburgh, in 1765, has enabled him to form a proper judgment of that work; and he acknowledges, that he had too clofely adhered to the opinion of Wetftein, after the perufal of the following publications by the fame author, *viz.* "Complete Defence of the Complutenfian Greek Teftament, with a Collection of the principal Differences between the Greek Text, and the Latin Text of that Edition," printed in 1766, and the "Continuation of the Defence of the Complutenfian Greek Teftament, &c." publifhed in 1769. Michaelis, having fince had accefs to the Complutenfian bible in the univerfity library of Gottingen, has been enabled to fpeak of it with greater certainty. He has particularly ufed it in the Greek verfion of Genefis, the Proverbs of Solomon, and the firft book of the Maccabees; and in thefe books he has found its reading as pure, and as little altered from the Latin, as Goeze had defcribed them. It has been queftioned what were the MSS. from which this edition was prepared, and whether the editors had any befides thofe which were fent to them from Rome; the filence of the editors is no proof of the contrary, for they make no mention of the Codex Rhodienfis, which had been prefented to Cardinal Ximenes, though Stunica, in his controverfy with Erafmus, frequently applies to it, as a MS. ufed in the Complutenfian edition; and the Codex Beffarionis, which was ufed in the Septuagint, had been prefented to him, by the fenate of Venice. Moreover, as the New Teftament was begun in 1502, it is wholly incredible that they fhould have had no other MSS. than thefe fent from Rome, becaufe Leo X. who communicated thefe MSS. was not pope before the year 1513, and the fubfcription at the end of the Revelation bears date January 10, 1514. If, therefore, the MSS. were fent by Leo X., they muft have arrived when at leaft three parts of the Greek Teftament were already printed, and yet the editors, at leaft in the preface, mention no other MSS. One mode, fays Marfh, in his notes on Michaelis's tranflation, of folving this difficulty is, to fuppofe that MSS. were fent from Rome by Julius II. the predeceffor of Leo X., and that the writer of the preface to the Complutenfian Greek Teftament, who knew that the latter was at that time pope, but, perhaps, was ignorant how long he had reigned, committed an anachronifm in afcribing to Leo X. what had been done by Julius II. Or, perhaps, he knew that they were fent by Julius II.; but meant to flatter the vanity of the reigning pope, by attributing to him the act of his predeceffor. Or, Leo X. might, before he was pope, have been inftrumental in procuring them from the Vatican, and be therefore entitled to the compliment. However this be, it feems probable, that the editors, befides the Codex Rhodienfis, had other MSS. of the Greek Teftament, which had been procured by the cardinal. But whether they were ancient or modern, of great or little value, it is difficult to determine, as the editors have given no account of them. Wetftein thinks they were modern, becaufe the readings of the Complutenfian bible have a remarkable agreement with thofe of the MSS. written in the 14th, 15th, and 16th centuries; and this opinion is confirmed by the fhape of the types, for they are fuch as we find in the moft modern MSS; and it is probable that the editors had their types caft in imitation of the MSS., which they employed on the occafion. Michaelis, however, in this account of the types, is not quite accurate; for of all the fpecimens of Greek hand-writing, which Montfaucon has given in his "Palæographia Græca," from the firft introduction of the fmall letters down to the 15th century, none refemble the types of the Complutenfian edition more than that which is found in MSS. of the 9th century. On the other hand, letters not very unlike the Complutenfian are found in MSS. of the 11th, 12th, and even 13th centuries. Moreover, as no MS. written in fuch letters, as are ufed for the Complutenfian edition, is without accents, and the editors appeal not to the MSS. which they actually ufed but

but to the poems of Callimachus, and the Sibylline prophecies, there is reafon to fufpect, that their MSS. had accents, and confequently were modern. Accents, however, if it be allowed that the Complutenfian edition had them, though it has been generally faid (not juftly) that it is printed without them, afford no proof that a MS. is modern; for they are found in feveral very ancient MSS. written even with uncial letters, as the Vaticanus, Claromontanus, &c. &c. and perhaps, fays Mr. Marfh, there are as many ancient MSS. with uncial letters, which have accents as thofe which have not.

With regard to the main queftion, whether the MSS. ufed by the Complutenfian editors were ancient and valuable, Mr. Marfh candidly acknowledges that he is too little acquainted with the Complutenfian bible to be able to form any judgment; and he therefore contents himfelf with obferving, that Griefbach accedes to the opinion of Wetftein and Semler, and fays, in the preface to the fecond volume of his Greek Teftament (p. 16); "Complutenfes non habuerunt codices Græcos, nifi paucos, recentes, exigui fere, fi ad lectionum bonitatem fpectes, pretii."

It has been fuggefted, that the Complutenfian editors, in confequence of a too high opinion of the Vulgate, and a miftaken zeal for the Chriftian religion, have fometimes introduced into the Greek text readings of the Vulgate, which they did not find in the Greek MSS.

The Greek text of the difputed paffage, 1 John, v. 7., in the Complutenfian edition, feems to have been a mere tranflation of one of the editors; becaufe the paffage is found in not a fingle ancient. and in only two modern MSS. the Montfortianus and the Ravianus, the latter of which is only a copy of this edition; and in the former, the text is very different from that in the Complutenfian edition. It cannot, therefore, as in the third edition of Erafmus, have been taken from this MS.: though, on the other hand, it is not impoffible that they found it in fome modern MS., in which the paffage, as in the codex Montfortianus, had been already tranflated. The queftion can never be decided, becaufe the MSS. which they ufed are either deftroyed, or are at leaft unknown. For an account of the fate of thefe MSS., fee the article Alcala. Michaelis candidly explains the conduct of the Complutenfian editors fo as to remove the charge of difhonefty. They might believe, he fays, that this paffage was really genuine, and, on account of its fuppofed importance, take no notice of its alteration from the Greek MSS.; in the fame manner as the verfe has been inferted by later editors in Luther's verfion. Or, they might have made fome remarks on it, which were afterwards erafed by the cenfors of this edition; for, contrary to their ufual cuftom, they have a marginal note on 1 John, v. 7., which is in itfelf unimportant, and almoft implies that fomething originally preceded. If they have taken the paffage from a modern MS., they have only acted like Erafmus, who has inferted it on the authority of a very modern MS. which he had never feen. In fhort, many of the beft editors have been guided in this paffage by a miftaken zeal for the Chriftian religion, and have acted on principles which they have never admitted in other places. It was the principal object of Goeze to fupport the authenticity of this paffage, and as it occurs in the Complutenfian bible, he defended the antiquity and value of the Greek MS. from which he fuppofed that paffage had been taken. On the other hand, Semler's object was to fhew the fpurioufnefs of this paffage, and at the fame time to fupport the opinion of Wetftein, that the text of the Complutenfian Greek Teftament, in general, is of little value. The genuinenefs of this paffage is now generally exploded by the moft approved biblical critics.

The Complutenfian edition is extremely fcarce, becaufe only 600 impreffions were taken off, and is become too expenfive for a private library. That which is now at Gottingen coft 480 florins, and the late Münchaufen gave an order to his commiffioner as far as 900; and the price of it, fays Michaelis, will ftill increafe, in proportion as its great excellence, efpecially in the Septuagint, fhall be better known. Mill, Bengelius, and Wetftein, have collated this edition as a MS. with great diligence; but their extracts are by no means complete. Goeze has alfo given extracts from it, in his "Complete Defence of the Complutenfian edition," (p. 277), which, in the proper fenfe of the word, may be called critical, and which no future editor of the Greek Teftament ought to leave unnoticed. Michaelis thinks, that a real fervice would be rendered to thofe who are engaged in facred criticifm, if a new edition both of the Greek and Latin Teftament was publifhed, that was an exact copy of the Complutenfian. From the Greek text of the Complutenfian edition were printed the following, *viz.* feven at Antwerp in 1564, 1573, 1574, 1590, 1591, 1601, 1602; five Geneva editions in 1609, 1619, 1620, 1628, 1632; and, laftly, that of Mayntz, in 1753. Thefe are all defcribed in Le Long Bibl. Sacra, ed. Mafch. P. i. p. 191—195. See Polyglott.

COMPLUTICA, in *Ancient Geography*, a town of Spain in the Tarragonenfis, placed by Ptolemy in the country of the Callaici, and thought to be the prefent village of Compludo, in Galicia. It is marked in the chart of M. d'Anville on the right of the Durius, to the fouthweft of Pallantia.

COMPLUTUM, a town of Spain, in the Tarragonenfis, placed by Ptolemy in the country of the Carpetani, and marked in the chart of M. d'Anville in Hifpania citerior, N.E. of Mantua; now *Alcala de Henares*, which fee.

COMPOLI, in *Geography*, a town of Italy, in the kingdom of Naples, and province of Lavora; 4 miles E. of Sora.

COMPONE', or *Gobony*, in *Heraldry*, is compofed of two colours in equal divifions in a border, or any other ordinary; if it confifts of two ranges it is called counter-compony, and if of three, it is then termed chequé, and is generally ufed in a border to denote illegitimacy.

COMPOS *Mentis*. See Non-Compos.

COMPOSED *Baftion*. See Bastion.

COMPOSER *of Mufic*, a perfon who invents a melody, and cloaths it with harmony, according to the eftablifhed rules of the art. Under the word *compofition* we fhall detail the qualifications requifite to fupport this character. Yet thefe are infufficient to form a complete compofer, whofe productions will be felt and admired whenever they are heard. All the fcience poffible, without the infpirations of genius, is unable to command attention, and intereft an audience, at all times, and in all places. They are only gifted men that poffefs fuch powers. What is meant here by genius, is not a whimfical and capricious imagination, that quits a flowery road to ramble in thickets, through briars and brambles; that to render harmony piquant, loads it with difcords; and inftead of grace and elegance, is labouring to furprife by extraneous modulation, and to divide the whole fcale into half notes; true genius is that latent fire which inflames the compofer, irrefiftibly forces him to write, and inceffantly fupplies him with new melodies, always agreeable, expreffive, and natural, accompanied by a harmony pure, touching, and majeftic, which embellifhes melody, without overpowering it. "This was the guide" fays the Citizen of Geneva, "that led Corelli, Vinci, Perez, Jomelli,

melli, and Durante, to the fanctuary of harmony; and Leo, Pergolefi, Haffe and Buranello, to that of good tafte." We have to add to thefe. Handel, whofe fublime works were never heard by Rouffeau; the elder Stamitz, Piccini, Sacchini, Cimarofa, and Paefiello, with Haydn and Mozart, who have gone fomewhat further in vocal mufic, and many leagues in inftrumental,

The knowledge of harmony is doubtlefs the foundation of compofition. To fill the chords, prepare and refolve difcords, find the fundamental bafe, and know all the other little elementary rules, is neceffary; but with the rules of harmony alone, we are not nearer being compofers, than being orators by knowing the rules of grammar. Padre Martini fays, that no one can be a good compofer without finging in good tafte, and playing well upon the organ. His rules are for a real *maeftro di capella*, an ecclefiaftical compofer; but for fecular mufic he would have faid it was neceffary to fing and play well on the harpfichord or piano forte. In fetting words for the ftage, he ought to know what paffages are difficult, and what eafy to execute; what ftyle fuits the finger, and what the character he has to reprefent; he is to know the compafs of voices and inftruments, and their peculiar genius and powers; how to produce effects, and when to apply them; to feel the character of different meafures; to know all the difficulties and pedantry of the art: imitations, fugues, canons, double counterpoint, and how to write for double, triple, and quadruple choirs. To thefe add the myfterious laws of modulation; and all this is no more than preparatory to compofition. But he muft inherently poffefs a fund of beautiful melodies, fublime harmony, and grand defigns.

Befides correct harmony, correct expreffion, in lyric compofitions, is required. The fpirit of three feveral kinds of compofition muft be called up in writing for the church, the ftage, and the chamber. In the firft, folemnity and harmony muft be invoked; in the fecond, a diftinct ftyle for each character, ftrongly marked by the poet; ingenious and fpirited fymphonies, picturefque accompaniments, a judicious mixture of inftruments, and their peculiar powers, occafionally called forth; and for the third fpecies of compofition, pieces that require but few hands and few voices; free from all tremendous difficulties, in want of no wind inftruments; and, unlefs catches and glees are in queftion, no provifion need be made for more than one or two voices, and a quartet band. *La mufica di camera*, chamber mufic, requires eafe, grace, and elegance, more than force, energy, and feats of execution.

Among the various ftyles of compofition for which an accomplifhed mafter fhould be prepared, is the military, in which wind-inftruments and drums are chiefly employed. To know the compafs, fcale, genius, and defects, of the trumpet, horn, clarinet, hautbois and baffoon, both in the orcheftra and the field, will require fome ftudy, counfel and experience.

Rouffeau feems fometimes to regard muficians as mere inftruments, incapable of reflexion; and that it is the bufinefs of philofophers to think for them; fo imagine M. Suard, and all fpeculative muficians; but in the following advice to a compofer, Jean Jaques feems to require more meditation and reflexion than the dæmon of compofition, by which a man of genius is poffeffed, will allow; who, abforbed in his own ideas, or impelled by the ideas of others, flies to his pen or his inftrument, without metaphyfical reafoning, or analytical inquiry into the foundation of his art. But Rouffeau fums up the article *Compofer (Compofiteur)*, in his Dictionary, with the following inftruction. "In compofing, the author has to confider the phyfical production of found, and that its fole ufe is to delight the ear; or if he mounts up to imitative mufic, he has to move the paffions by moral effects. In the firft inftance, he has to felect the moft pleafing feries of found, and agreeable harmony; but in the fecond, he ought to confider mufic with refpect to its fimilarity with the inflexions of the human voice in fpeech, and the poffible conformity between the harmonical combinations of found and imitable objects." This is all very fine and profound: but we apprehend, that the moft happy effufions of genius have been generated without fpeculative affiftance.

For the mechanical rules by which a compofer is to fteer, we fhall refer our readers to the article COUNTERPOINT; where, though its principal rules are difperfed through the work, we fhall collect and form them into a fynopfis, and illuftrate precepts by examples.

In this mufical grammar, we fhall perplex the ftudent with no mathematical calculations, no ratios, harmonics, or fpeculations on the philofophy of found; but adhere clofely to practical knowledge of immediate ufe in the firft ftages of ftudy. We fhall not even attempt to give new melodies, or harmonical combinations; but endeavour to indicate the foundation on which the beft models of compofition have hitherto been built. See COUNTERPOINT, CONCORDS, DISCORDS, HARMONY, and MODULATION.

COMPOSITÆ, or COMPOSITI, in *Botany*, the twenty-firft natural order in the Philofophia Botanica of Linnæus; and the forty-ninth in the Prælections, publifhed after his death by Gifeke. The plants with compound flowers are kept diftinct by moft authors, with only a little difference as to the proper limits and moft convenient divifions of the order. But Linnæus obferves, that, though it is perfectly natural, its effential character is not eafily determined. A compound flower, from the obvious meaning of the term, implies the union of feveral flowers, or florets, as in this cafe they are ufually called, by fome common bond. But this character is not peculiar to the compofite plants, nor does it extend to all their genera. For cephalanthus, dipfacus, fcabiofa, &c. have feveral florets included in a common calyx, but belong to a different family; and feriphium, corymbium, and ftrumpfia, have only one flower in each calyx, and yet cannot be feparated from thofe which are truly compound. Nor will the united anthers, which Linnæus has taken for the diftinguifhing character of his artificial clafs fyngenefia, exactly apply to this natural order; jafione, viola, impatiens, &c. have fuch anthers, but cannot properly be arranged with the compofitæ.

In the Philofophia Botanica the order ftands thus:

I. *Semiflofculofi*, prenanthes, lactuca, chondrilla, hieracium, crepis, andryala, hypochæris, picris, hyoferis, leontodon, fcorzonera, tragopogon, fcolymus, fonchus, lapfana, cichorium, catananche, elephantopus. II. *Capitati*, echinops, fphæranthus, gundelia, arctium, ferratula, onopordum, carduus, cynara, carthamus, carlina, cnicus, atractylis, centaurea, corymbium. III. *Corymbiferæ*, ftoebe, fantolina, chryfocoma, tanacetum, kleinia, ftoehelina, xeranthemum, gnaphalium, carpefium, conyza, tarchonanthus, baccharis, erigeron, tuffilago, doronicum, folidago, fenecio, inula, after, gerbera, othonna, chryfanthemum, matricaria, buphthalmum, anacyclus, cotula, anthemis, achillea, eriocephalus, helenium, arctotis, bellis, tagetes. IV. Helianthus, rudbeckia, coreopfis, bidens, verbefina, figefbeckia, milleria, filphium, eupatorium, ageratum, oftcofpermum, calendula? chryfogonum? melampodium? tridax? tetragonotheca?

All thefe are retained in the Prælections, except gerbera, which has been abolifhed, and its fpecies referred to arnica. Several of them are alfo placed in different divifions.

 The

The following is the arrangement in the ſynoptic table annexed to the Prælections. Thoſe printed in Italics were added by Linnæus himſelf; and thoſe marked with aſteriſks are additions by Giſeke.

I. *Capitatæ*, gundelia, echinops, ſphæranthus, arctium, ſerratula, carduus, cnicus, onopordum, cynara, carlina, *gorteria*, atractylis, carthamus, centaurea, *zoegea*, elephantopus, removed from ſemifloſculi, *barnadeſia*, *vernonia, *Schreb.* *liatris, *Gært.* II. *Semifloſculoſæ*, ſcolymus, cichorium, catananche, lapſana, hypochæris, *feriola*, *krigia, *Schreb.*, hyoſeris, *rothia, *Schreb.*, andryala, crepis, hieracium, leontodon, prenanthes, chondrilla, lactuca, ſonchus, *apargia, *Scop.*, picris, ſcorzonera, tragopogon, *geropogon*. III. *Diſcoideæ*, gnaphalium, xeranthemum, ſtœhelina, tanacetum, matricaria, carpeſium, chryſanthemum, *pteronia*, baccharis, *oſmites*, conyza, inula, erigeron, *cineraria*, tuſſilago, doronicum, *arnica*, ſenecio, ſolidago, chryſocoma, aſter, *leyſera*, ſantolina, anthemis, anacyclus, cotula, *athanaſia*, achillea, *cacalia*, *perdicium*, bellis, ageratum, removed from oppoſitifolii, eupatorium, removed from oppoſitifolii, *ethulia*, *kuhnia*, *bellium*, *unxia*, *mutiſia*, *lavenia, *Soland. Sw.* *kleinia *Jacq.* Giſeke obſerves, that it is not eaſy to determine why Linnæus has given the name of diſcoideæ to this order, which nearly correſponds with his former corymbiferi; ſince the greater part of them are not diſcoid, in the uſual ſenſe of the word, but furniſhed with a ray. IV. *Not named by Linnæus.* Corymbium, removed from ſemifloſculi, helenium, othonna, and arctotis, removed from corymbiferæ, calendula, and oſteoſpermum, removed from oppoſitifolii, *ſclerocarpus, *Jacq.* V. *Oppoſitifoliæ*, *ſpilanthus*, bidens, verbeſina, ſigeſbeckia, coreopſis, ſilphium, tetragonotheca. *polymnia*, *trixis, *Swartz.*, helianthus, rudbeckia, milleria, buphthalmum, removed from corymbiferi, chryſogonum, melampodium, tridax, *pectis*, tagetes, removed from corymbiferi, *zinnia*, *calea*, *amellus*, *eclipta*, *baltimora*, hippia, *oedera*, *cilbadium*, *jungia*, *relhania, *L'Herit.*, *boltonia, *L'Herit.*, *meyera, *Schreb.*, *phaëtuſa, *Gært.*, *galardia, *Lam.*, *berckheya, *Ehrh.*, *craſpedia, *Forſt.*, *didelta, *L'Herit.*, *tetranthus, *Swartz.*, *rolanda, *Rottb.*, *ſhawia, *Forſt.* VI. *Nucumentaceæ*, ſtoebe, and tarchonanthus, removed from corymbiferæ, *artemiſia*, *ſeriphium*, eriocephalus, removed from corymbiferæ, *filago*, *micropus*, *iva*, *parthenium*, *ambroſia*, *xanthium*, *ſtrumpfia*.

None of the plants of this order are poiſonous, except tagetes, doronicum, and arnica. Moſt of them are bitter and unpleaſant to the taſte, but poſſeſſed of ſtrengthening qualities as a medicine. Some, however, are leſs bitter and eſculent; and ſeveral others are rendered ſo by cultivation and blanching.

Vaillant, Juſſieu, and Ventenat have divided this order into three: *chicoraceæ*, *cinarocephalæ*, and *corymbiferæ*.

COMPOSITE Numbers, in *Arithmetic*, are ſuch as can be exactly divided by ſome ſmaller number or numbers, without leaving any remainder; ſuch as do not admit of this even diviſion, are called Prime *numbers*, which ſee. The following table of compoſite and prime numbers under 100, ſhewing all their prime diviſors, will be found uſeful in a great variety of calculations.

	Units	1	2	3	4	5	6	7	8	9
Tens	0	1	2	3	2^2	5	2.3	7	2^3	3^2
1	2.5	11	$2^2.3$	13	2.7	3.5	2^4	17	2.3^2	19
2	$2^2.5$	3.7	2.11	23	$2^3.3$	5^2	2.13	3^3	$2^2.7$	29
3	2.3.5	31	2^5	3.11	2.17	5.7	$2^2.3^2$	37	2.19	3.13
4	$2^3.5$	41	2.3.7	43	$2^2.11$	$3^2.5$	2.23	47	$2^4.3$	7^2
5	2.5^2	3.17	$2^2.13$	53	2.3^3	5.11	$2^3.7$	3.19	2.29	59
6	$2^2.3.5$	61	2.31	$3^2.7$	2^6	5.13	2.3.11	67	$2^2.17$	3.23
7	2.5.7	71	$2^3 3^2$	73	2.37	3.5^2	$2^2.19$	7.11	2.3.13	79
8	$2^4.5$	3^4	2.41	83	$2^2.3.7$	5.17	2.43	3.29	$2^3.11$	89
9	$2.3^2 5$	7.13	$2^2.23$	3.31	2.47	5.19	$2^5.3$	97	2.7^2	$3^2.11$

In the above table, any number is to be ſought for in the angle of meeting of its *tens*, in the front column, and its *units* in the top line; thus, 23 will be found in the line with 2 at its beginning, and under three at the top. The prime numbers are diſtinguiſhed by larger figures, and the compoſite numbers have their component primes ſhewn, ſeparated by dots to expreſs, in this caſe, the ſign of multiplication, as is frequently done by the writers on ſeries; thus 84 is compoſed of the ſquare of 2 or 2^2, multiplied by 3 and by 7; 72 is compoſed of the cube of 2 into the ſquare of 3. Matter of curious reflection will be furniſhed by this table to ſuch as ſtudy the properties of numbers, by tracing the parallel lines in which each prime occurs; thus, in one diagonal of the above table, the whole of the multiples of 11 will be found, while 3^2 (or 9) will be found in the compoſition of every number in the other diagonal line; parallel to which, in every alternate line, the other multiples of 3 will be found. The fives and the twos will all be found to occur throughout every vertical column in which they occur at top; and under 0, they both occur in every line. This uſeful and curious table we found in M. Overend's manuſcripts, in the library of the Royal Inſtitution, where the moſt copious tables of compoſite and prime numbers may be ſeen, by thoſe who are curious in theſe matters.

Composite *Numbers*, in *Muſical Calculations*, are ſuch as are

are compofed by the multiplication of the prime integers, 2, 3, and 5; all primes larger than thefe, or compofite numbers into which fuch enter, are not mufical numbers, but are irrational or furd in a mufical fenfe. See MUSICAL NUMBERS.

COMPOSITE, or *Roman Order*, in *Architecture*. This name is ufed to denote a kind of column whofe capital is compounded of the Ionic and Corinthian forms; the vafe or tambour of the capital being like that of the Corinthian order, and ornamented in the fame manner, with two tiers of leaves, and with a fimilar abacus; but to thefe are added Ionic volutes which fupply the place of the caulicoli and feroles, proper to the Corinthian capital. See the plates of capitals. In other refpects, in the fhaft bafe and entablature, there is no uniform and affignable difference between the Compofite and Corinthian, and we fhall, in a fubfequent portion of this article, examine what claims this compofite has to be confidered as a diftinct order.

The principal remains of antiquity in which the compofite capital is found, are the following; the arch of Titus, the arch of Septimius Severus, and the arch of the goldfmiths, the building commonly called the Temple of Bacchus, without the gate of Sta. Agnefa at Rome, the baths of Diocletian, the Baptifterium of Conftantine, which is ornamented with porphyry columns of the moft exquifite workmanfhip, removed from fome more ancient edifice; the arch at Verona, and the chapel or bafilica at Nifmes.

This capital was therefore very popular among the Roman architects, but it does not by any means appear that they admitted a diftinct compofite order. A paffage of Vitruvius will throw fome light upon this point; this author, after defcribing the capitals of the Doric, Ionic, and Corinthian orders, proceeds to obferve, that "there are alfo other kinds of capitals called by various names, which are difpofed on the fame columns, and which have no proper fymmetry or relation to any feparate order of columns, but they are all derived and transferred from the Corinthian, Pulvinated (Ionic) or Doric orders, from whofe fymmetries they only differ in the little novelties of the fculpture." In fact, the remains of Roman antiquity furnifh a vaft variety of capitals, many of which are more remarkable and remote from the ufual orders, as well as more beautiful than the compofite capital, and yet no architect has ever thought of erecting any of thefe into diftinct orders. The capitals of the Temple of Concord at Rome, a very entire and confiderable remain, are compofite, being a melange of the Ionic and Doric; but no one has claimed the honours of an order for this ftrange production.

The difference between the pretended Compofite order and the Corinthian, exifts merely in the capital; for neither in the remains of antiquity, nor in the works of modern artifts, is there any decided, uniform, and characteriftic difference in any other particular. But the capital, though an important member, is not of itfelf fufficient to form an order, otherwife we fhould reckon not five but hundreds; and a compofition which has no appropriate proportions, no exclufive character, can only be regarded as a variety of that order with which it is perpetually liable to be confounded. The equivocal nature of this production has caufed great embarraffment to the fyftem-mongers of architecture; for while its later origin would lead them to place it laft in their fyftems, and higheft in their buildings, its heavinefs of appearance, in comparifon with the Corinthian order, feems to indicate a contrary arrangement. It is unneceffary; for the three Grecian orders fupply all the expreffions which architecture is capable of giving with diftinctnefs. The Doric is ftrong, the Ionic elegant, and the Corinthian rich; while they admit all the modifications of thefe qualities that can be required; but as to the Compofite, what is it but an exaggeration of the Corinthian, in which the attempt at fuperior richnefs has only produced a degree of heavinefs.

It has been before obferved, that the Romans affected no particular entablature to the compofite capital. In the temple of Bacchus the cornice is entirely plain, with a fwelled frieze. The arch of Septimius Severus has a cornice enriched with dentils extremely fimilar to the Ionic of the temple of Fortuna Virilis, and the theatre of Marcellus; while the cornices of the arch of Titus, and the arch at Verona have both dentils and modillions, and the whole profile of the entablatures is precifely in the ftyle of the generality of Corinthian examples. Among the moderns, Palladio has imitated the frontifpiece of Nero in his cornice and architrave; but he has omitted its beautiful frieze, and fubftituted a fwelled one. Scamozzi's entablature being only one-fifth of the column, and much divided, has rather a trifling appearance, though the details are upon the whole well defigned. Vignola's compofite has nothing in it remarkable; the architrave differs but little from that of the frontifpiece of Nero, and the cornice is nearly the fame with that of his Ionic order. Serlio's entablature is extravagantly abfurd, being taken from the fourth order of the colifeum, a compofition well enough adapted for the termination of that gigantic edifice, but wholly difproportionate to a fingle order.

COMPOSITE *Stalk*. See STALK.

COMPOSITIO MENSURARUM, the title of an ancient ordinance for meafures, not printed; it is mentioned in the ftatute of 23 Hen. VIII. cap. 4.

COMPOSITION, in a general fenfe, is the uniting or joining of feveral different things, fo as to form one whole, called a *compound*.

The fchoolmen diftinguifh two kinds of compofition; the one *entitative*, which is between things of the fame nature, *e. gr.* two or more drops of water: the other *effential*, when things of different kinds are joined, and thus conftitute new things, or effences, different from any of the parts: and thus, fay they, from the matter and the form of wood, arifes wood; whofe effence is very different from either of thofe ingredients taken feparately.

COMPOSITION *of bodies*, in *Chemiftry*. See COMBINATION and AFFINITY.

COMPOSITION, in *Commerce*, a contract between an infolvent debtor and his creditors; whereby the latter agree to accept a part of the debt, in compenfation for the whole, and give a general acquittance accordingly.

COMPOSITION *for Trees*, in *Gardening*, a fubftance difcovered, prepared, and applied by Mr. Forfyth, for the purpofe of removing difeafes, defects, and injuries in fruit and foreft-trees. It is directed to be compofed in the following manner, in his "Treatife on the Management of Trees."

"Take one bufhel of frefh cow-dung, half a bufhel of lime-rubbifh of old buildings (that from the ceilings of rooms is preferable), half a bufhel of wood-afhes, and a fixteenth part of a bufhel of pit or river-fand; the three laft articles are to be fifted fine before they are mixed; then work them well together with a fpade, and afterwards with a wooden beater, until the ftuff is very fmooth, like fine plafter ufed for the cielings of rooms."

It is advifed that the trees fhould be prepared for its application "by cutting away all the dead, decayed, and injured parts, down to the frefh found wood; leaving the furface of the wood very fmooth, and rounding off the edges of the bark with a draw-knife, or other inftrument, per-

fectly fmooth, which muft be particularly attended to: then lay on the plafter about one eighth of an inch thick all over the part where the wood or bark has been fo cut away, finifhing off the edges as thin as poffible: then take a quantity of dry powder of wood afhes mixed with a fixth part of the fame quantity of the afhes of burnt bones, put it into a tin box with holes in the top, and fhake the powder on the furface of the plafter, till the whole is covered over with it, letting it remain for half an hour to abforb the moifture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder till the whole plafter becomes a dry fmooth furface."

And he adds the following directions.

"All trees cut down near the ground fhould have the furface made quite fmooth, rounding it off in a fmall degree as before-mentioned; and the dry powder directed to be ufed afterwards, fhould have an equal quantity of powder of alabafter mixed with it, in order the better to refift the dripping of trees and heavy rains."

Such parts or portions of the compofition as may be left for a future ufe "fhould be kept in a tub or other veffel, and urine of any kind poured on them, fo as to cover the furface; otherwife the atmofphere will greatly hurt the efficacy of the application."

And "where lime-rubbifh of old buildings cannot be eafily got, take pounded chalk, or common lime, after having been flaked a month at leaft."

It is further remarked by the author, that "as the growth of the tree will gradually affect the plafter, by raifing up its edges next the bark, care fhould be taken, when that happens, to rub it over with the finger when occafion may require (which is beft done when moiftened by rain), that the plafter may be kept whole, to prevent the air and wet from penetrating into the wood."

But "as the beft way of ufing the compofition is found, by experience, to be in a liquid ftate," Mr. Forfyth advifes that it fhould "be reduced to the confiftence of pretty thick paint, by mixing it up with a fufficient quantity of urine and foapfuds, and be laid on with a painter's brufh. The powder of wood-afhes and burnt bones is to be applied as before directed, patting it down with the hand."

It is alfo further advifed, that "when trees are become hollow, to fcoop out all the rotten, loofe, and dead parts of the trunk to the folid wood, leaving the furface fmooth; then to cover the hollow, and every part where the canker has been cut out, or branches lopped off, with the compofition; and as the edges grow, to take care not to let the new wood come in contact with the dead, part of which it may be fometimes neceffary to leave; but to cut out the old dead wood as the new advances, keeping a hollow between them, to allow the new wood room to extend itfelf, and thereby fill up the cavity, which it will do in time, fo as to make it as it were a new tree."

And if the cavity be large, to cut away as much at one operation as will be fufficient for three years. But in this to "be guided by the fize of the wound, and other circumftances. When the new wood, advancing from both fides of the wound, has almoft met, to cut off the bark from both the edges, that the folid wood may join, which, if properly managed, it will do, leaving only a flight feam in the bark. If the tree be very much decayed, not to cut away all the dead wood at once, which would weaken the tree too much, if a ftandard, and endanger its being blown down by the wind. It will confequently be neceffary to leave part of the dead wood at firft, to ftrengthen the tree, and to cut it out by degrees as the new wood is formed. If there be any canker, or gum oozing out, the infected parts muft be pared off, or cut out with a proper inftrument. When the ftem is very much decayed and hollow, it will be neceffary to open the ground and examine the roots." See Dressing *of Trees*.

Various interefting facts and obfervations on the advantage and utility of this compofition in the removal of the difeafes of different forts of trees, may be feen below, as taken from Mr. Forfyth's valuable "Treatife on the Culture and Management of Fruit and Foreft Trees."

It is ftated by Mr. Forfyth as being "the received opinion and common practice of moft profeffional men, to prune or lop their trees, from the month of October, when the juices have been exhaufted by the fummer foliage, autumnal fruit, and general nourifhment of the body of the tree, until the month of March, when the fap or juices, re-invigorated by nature during the winter's repofe, begin to re-afcend and perform the annual function of clothing it with frefh foliage, bloffoms, and fruit. The reafon of this practice is, he fays, that the fap being fallen at that feafon of the year, it has been confidered as the moft proper period to lop off all fuperfluous growths, and the efforts of nature to heal the wounds thus neceffarily given (before the rifing of the fap in the following fpring), have been judged beft for the fafety and health of the tree. The danger of performing this fervice when the juices are in a more vigorous flow, as in the months of May, June, and July, has been dreaded, from a fear of its occafioning a wafte of the nutritive juices, difcharging themfelves through the wound, to the impoverifhment and injury, if not the ruin of the tree." And it is added, that "the pruning of fruit-trees, and the lopping off large branches from foreft-trees during the winter feafon, has alfo been frequently attended with great hurt and impediment to their health and vegetation; the wounds being expofed to all the rigours of an inclement feafon, and thereby contracting thofe difeafes which contain the principles of decay. Hence it is, that fuch numbers of foreft-trees are continually injured in their value for public ufes, either by unfkilful management, or purpofed depredation, or by the violence of boifterous winds, when their limbs and branches being torn off, the trees are left in that unprotected ftate to imbibe the feeds of decay and rottennefs, which will in time pervade their very heart, and render them unfit for any of thofe valuable purpofes for which nature, by their frame and texture, appears to have defigned them." And "it may alfo be obferved, that where branches have been cut off from the body of the tree, even at the diftance of two or more feet from the trunk, with a view to prevent injury to the timber, even that method has not been found effectual to fave the tree from very material detriment; as the remaining ftem of the branch fo cut away, dying foon after, becomes a ready conduit for conveying pernicious moifture and difeafe to that part of the tree with which it is connected; and fo on, in time, to the whole."

But he fuppofes "the practice of others in lopping their trees clofe to the trunk, and dreffing the part fmooth and even, has lefs objections than the former; neverthelefs, even according to this method, the tree is liable to injury. The effort of nature to heal the wounds thus given, difcovers itfelf by encircling the wound with a kind of callus or lip, which increafing in fize, and fwelling out from the annual flow of the juices, forms a hollow or cavity of the central part, where the rain or fnow is very apt to lodge; and penetrating between the bark and wood, dried and cracked by a hard froft, or a warm fun, promotes that fermentation with the natural juices, which is the certain fource of difeafe and decay." It is fuggefted that "young, healthful, and vigorous

gorous trees, when they have been injured by being wantonly cut through the bark, or from other caufes, will fometimes recover themfelves, and, to all outward appearance, be reftored to their original foundnefs; but when cut into planks and boards, internal blemifhes and faults are difcovered in them, which appear to have been occafioned by the early injuries which the tree had received; the texture of the wood not uniting where the wound was originally given; though, from the youthful vigour of nature, the bark has clofed, and an external cure been evidently performed on fuch trees.

The compofition is a moft efficacious remedy to prevent thefe evils with all their deftructive confequences, and to reftore found timber where the fymptoms of decay are already apparent, which being applied in the manner directed, "to the wound or injured part, will infallibly prevent the bleeding of trees, or the oozing of juices through the wounds of limbs or branches that have been cut off in the middle of fummer, when they are in their higheft vigour, and moft rapid flow of vegetation; by which means, any wafteful difcharge of the juices is prevented, and they are duly confined to their natural operations of giving nourifhment, growth, and fertility, to their refpective bodies. By employing this remedy, trees of all kinds, whether in gardens or orchards, in parks or forefts, may, he fays, with greater fafety and advantage be pruned or lopped in the fpring, or early in the fummer, than in the winter feafon; as the compofition, when properly applied, repels the flow of the juices through the wound, caufes a more active vegetation, and affifts nature more powerfully in healing the wound at the time the fap is in full vigour, than when it is on the decline, as in autumn and winter feafons."

The writer confiders it alfo neceffary to remark, further, "that both fruit and foreft-trees (particularly thofe which grow in the fhade) are very liable to be affected with diforders proceeding from the growth of liverwort, and various kinds of mofs, that adhere to the outer bark of the tree, and frequently gain a confiderable thicknefs, that not only prevents the natural flow of the juices, but caufes a ftagnation in the circulation and brings on decay; which, after deftroying the outer bark, penetrates by degrees deeper into the wood. Where this circumftance is obferved, care fhould be taken to clear the whole bark of the tree from thefe growths; and where it is infected, to fcrape or pare it away. When the body of the tree is thus cleanfed from infection, the compofition may be applied to the parts fo cleanfed, to clofe the pores of the wood; when the tree will foon acquire a frefh bark, and improved health and vegetation."

The author is "confirmed in thefe opinions by the many experiments and various trials that he has made, to afcertain, by the moft pofitive proofs, the properties of this compofition, before he ventured to offer it to the public attention." "Indeed, every year's experience has increafed his conviction of its general utility, when properly applied to the purpofes for which it is recommended." In order to give a more complete illuftration of its virtues, and to place the advantages arifing from it in a ftronger light, he ftates a few of the very numerous experiments that he has made on the foreft trees in his majefty's gardens at Kenfington, where the falutary effects of it are extremely evident.

It is remarked that "the firft trials of its efficacy were made on fome very large and ancient elms, many of which were in a moft decayed ftate, having all their upper parts broken, by high winds, from their trunks, which were withal fo hollow and decayed, that a fmall portion alone of the bark remained alive and found. Of thefe trees he cut away at firft a part only of the rotten ftuff from the hollow of the tree, and then applied the plafter to the place where the operation had been performed, by way of an internal coat. In a fhort time, however, the efforts of nature, with a renovated flow of the juices, were clearly difcernible in their formation of new wood, uniting with and fwelling as it were from the old, till it became a ftrong fupport to that part of the tree where the compofition had been applied. He then cut away more of the rotten wood from the infide, applying the plafter in the fame manner, with the fame good effects, and continued to ufe the knife in proportion to the acquifition of new wood; fo that from the tops of the decayed and naked trunks, ftems have, he fays, actually grown of about thirty feet in height, in the courfe of fix or feven years from the firft application of the compofition; an incontrovertible proof of its good effects in reftoring decayed vegetation in fuch cafes."

And he adds, that "many other elm trees, which had received hurts from bruifes and other caufes, and where difeafe and decay were already evident, after cutting away all the infected part, and duly applying the plafter, were fo completely healed, that the outline of the wound is fcarcely difcernible on the bark, and the new wood is as perfectly united to the old, as if it had been originally formed with the tree."

It is ftated that "of oak trees alfo, which had received very confiderable damage from various accidents, as blows, bruifes, and cutting of deep letters, the rubbing off of the bark by the ends of rollers, or wheels of carts, and mutilated branches, a perfect cure has been made, and found timber produced. The acidity, or corrofive quality of the juice of oak-trees, when obftructed in their circulation from any of the caufes already mentioned, and fermenting with the wet and moifture imbibed by the wounds from the atmofphere, will bring on difeafe, and promote decay; for, notwithftanding the hard texture of the oak, when once the principles of decay begin to operate, the acrimonious juices feed the difeafe, and accelerate its progrefs, as much, perhaps, as in trees of a fofter quality and texture, but when the difeafed or injured part is entirely cut away to the frefh found wood, and the compofition properly laid on, as perfect a cure has been made as he has already related in the recovery of elm trees."

The writer likewife further ftates, that "various experiments have alfo been made on other foreft trees, as afh, limes, chefnuts, and fycamores, that had received the feveral injuries to which they are expofed; as well as many of the refinous kinds, fuch as the cedar of Lebanon, and others of the pine tribe: in all of which he has experienced a degree of fuccefs that exceeded his moft fanguine expectations. And as he feels a ftrong folicitude to render his experiments of the moft extenfive advantage to the community, and in particular to the proprietors of landed eftates throughout the kingdom, he begs leave to recommend to their particular attention, that all foreft trees, whether felled with a faw or an axe, may be cut near to the ground; at the fame time carefully preferving the ftump and roots from any further injury. The furface may then be made quite fmooth, and the compofition be fpread over the whole, according to directions already given. But in thefe cafes the compofition fhould have an equal quantity of the powder of alabafter mixed with the dry powder generally directed to be ufed after it is laid on, in order to render the furface harder, and of courfe better able to refift the bad effects of the dripping of trees, of rain, froft, and fnow; an addition which is by no means neceffary in the ufual application to the fides of trees." He concludes that, "in confequence of this procefs,

cefs, the vigour of the roots will operate fo powerfully in the courfe of the fucceeding fpring, that a confiderable number of buds or branches will fhoot forth round the ftump, which, with proper care and attention, may be trained to many valuable purpofes, either ftraight or crooked, for knee timber, or other ufes; and, by retaining only fo many of thefe fhoots as are defigned to grow for any particular intention, more than one half will be faved, in point of time, according to the proportions of common growth; for, if a young tree be planted in a foil equal in quality to the ftate of the old ftump, the roots growing from the latter will, in eight or ten years, attain to a fize which the fingle plant will hardly acquire in twice that period. There are alfo many ufeful purpofes of hufbandry, as hop-poles and other poles ufed on various occafions, for which a number of fhoots may be trained from one ftump, whofe fertile juices will fhortly rear a healthy and numerous offspring around it. Very particular attention, however, fhould, he fays, be paid to regulate the number, according to the fize and vigour of the ftump. It would certainly be proper to leave more of them at firft than are intended to be referved for final ufe, in order to draw up the fap; if too few are left, they will be liable to burft, from the fuperabundant flow of the juices from the old ftock; to prevent which inconvenience they fhould be cut away by degrees, always applying the compofition as they are cut, and leaving the fineft ftem to produce the new tree, and will, in time, cover the old ftump, and leave nothing but a faint kind of cicatrix at the junction of the old and new part of the tree."

He thinks it "needlefs for him to infift on the great advantages which land proprietors and farmers will derive from this method of managing their woods and coppice-grounds, wherever they may be. In many counties of England, coppice, or underwood, is an article in very great demand for charcoal, common fuel, or the purpofes of particular manufactories, as well as to furnifh a variety of articles for hufbandry and domeftic conveniences." And its advantages in a national as well as ornamental point of view, are ftill more obvious. See Canker.

Composition, in *Grammar*, denotes the joining of two words together; or prefixing a particle to another word, to augment, diminifh, or change its fignification. See Word, &c.

Composition, in *Law*, an agreement or contract made between the owner of lands and the parfon or vicar, with the confent of the ordinary and the patron, that fuch lands fhall for the future be difcharged from payment of tithes, by reafon of fome land or other real recompence, given to the parfon, in lieu and fatisfaction thereof. Land may be exempted from the payment of tithes, where compofitions have been made; and real compofitions for tithes are to be made by the concurrent confent of the parfon, patron, and ordinary. Real compofitions are diftinguifhed from perfonal contracts; for a compofition called a perfonal contract is only an agreement between the parfon and the parifhioners, to pay fo much inftead of tithes: and though fuch agreement is confirmed by the ordinary, yet (if the parfon be not a party) that doth not make it a real compofition, becaufe he ought to be a party to the deed of compofition. (Marfh's Rep. 87.) This kind of compofition was permitted by law, becaufe it was fuppofed that the clergy would be no lofers by fuch compofition; fince the confent of the ordinary, whofe duty it is to take care of the church in general, and of the patron, whofe intereft it is to protect that particular church, were both made neceffary to render the compofition effectual; and hence have arifen all fuch compofitions as exift at this day by force of common law. But, experience fhewing that even this caution was ineffectual, and the poffeffions of the church being, by this and other means, every day diminifhed, the difabling ftatute 13 Eliz. c. 10, was made, which prevents, among other fpiritual perfons, all parfons and vicars from making any conveyances of the eftates of their churches, other than for three lives or twenty-one years. So that now, by virtue of this ftatute, no real compofition made fince the 13th Eliz. is good for any longer term than three lives, or twenty-one years, though made by confent of the patron and ordinary; which has, indeed, effectually demolifhed this kind of traffic; fuch compofitions being now rarely heard of, unlefs by authority of parliament. See Modus.

Compofition is fometimes ufed for "decifio litis." Accordingly compofitions were anciently allowed for crimes and offences, even for murder. By this expedient it was propofed to reftrain the violence of private revenge. The cuftom may be traced back to the ancient Germans (fee Tacit. de Mor. German. c. 21.) and prevailed in other uncivilized nations. The nature of crimes and offences was eftimated by the magiftrate, and the fum due to the perfon offended was afcertained with a minute, and often a whimfical, accuracy. Rotharis, the legiflator of the Lombards, who reigned about the middle of the 7th century, difcovers his intention both in afcertaining the compofition to be paid by the offender, and in increafing its value: it is, fays he, that the enmity may be extinguifhed, the perfecution may ceafe, and peace may be reftored. About the beginning of the 9th century, Charlemagne ftruck at the root of the evil, and enacted, "that when any perfon had been guilty of a crime, or had committed an outrage, he fhould immediately fubmit to the penance which the church impofed, and offer to pay the compofition which the law prefcribed, and if the injured perfon or his kindred fhould refufe to accept of this, and prefume to avenge themfelves by force of arms, their lands and properties fhould be forfeited. Tavernier relates, that in Perfia, a murderer is ftill delivered to the relations of the perfon whom he has flain, who put him to death with their own hands; and if they refufe a fum of money as a compenfation, the fovereign cannot pardon the murderer. Montefq. Sp. of Laws, vol. ii. p. 382. Robertfon's Hift. of Ch. V. vol. i. p. 334, &c.

Composition, in *Logic*, is a method of reafoning, wherein we proceed from fome general felf-evident truth, to other particular and fingular ones.

The method of compofition, called alfo *fynthefis*, is juft the reverfe of that of refolution, or *analyfis*.

Refolution is the method whereby we ordinarily fearch after truth; compofition, that whereby a truth found, is difcovered and demonftrated to others; refolution is the method of inveftigation; compofition, of demonftration.

The method of compofition is that ufed by Euclid, and other geometricians; refolution, that ufed by algebraifts and philofophers. The two methods differ, juft as the methods of fearching a genealogy; which are either by defcending from the anceftors to the pofterity, or by afcending from the pofterity to their anceftors: each have this in common, that their progreffion is from a thing known, to another unknown.

The method of compofition is beft obferved by the mathematicians: the rules which are, 1. To offer nothing but what is couched in clear and exprefs terms; and to that end, to begin with definition. 2. To build only on evident and clear principles; to that end, to proceed from axioms or maxims. 3. To prove demonftratively all the conclufions that are drawn hence; and to this purpofe, to make ufe of no arguments or proofs, but definitions already laid down, axioms

axioms already granted, and propofitions already proved; which ferve as principles to things that follow.

Composition *of ideas*, is an operation of the mind, whereby it combines feveral of its fimple ideas into complex ones.

Under the fame operation may likewife be reckoned that of enlarging; whereby we put feveral ideas together of the fame kind, as feveral units to make a dozen.

In this, as in others, brutes come far fhort of men; for though they take in and retain feveral combinations of fimple ideas; as poffibly, a dog does the fhape, fmell, and voice of his mafter; yet thefe are rather fo many diftinct marks whereby he knows him, than one complex idea, made out of thofe fimple ones.

An ingenious writer has fuggefted the impropriety of the phrafe "compofition of ideas," adopted by Mr. Locke, alleging it is merely a contrivance of language, and that the only compofition is in the terms; and that it is as improper to fpeak of a complex idea, as it would be to call a conftellation a complex ftar. He further adds, that they are not ideas, but merely terms, which are general and abftract. Whatever, he fays, the immortal author of the "Effay on Underftanding," has juftly concluded in his reafoning on this fubject will hold equally true and clear, if we fubftitute the compofition, &c. of terms, wherever he has fuppofed a compofition, &c. of ideas. If upon ftrict examination this fhould appear to be the cafe, we fhall need no other argument againft the compofition of ideas: it being exactly fimilar to that unanfwerable one which Mr. Locke himfelf declares to be fufficient againft their being innate. For the fuppofition is unneceffary: every purpofe for which the compofition of ideas was imagined being more eafily and naturally anfwered by the compofition of terms; whilft at the fame time it likewife clears up many difficulties, in which the fuppofed compofition of ideas neceffarily involves us. This writer further adds, that it is an eafy matter, upon Mr. Locke's own principles, and a phyfical confideration of the fenfes and the mind, to prove the impoffibility of the compofition of ideas. Tooke's Diverfions of Purley, pt. i. p. 37, &c.

Composition, in *Mathematics*, is the taking of a given number of quantities, out of as many equal rows of different quantities, one out of every row; and combining them together. Here no regard is had to their places; and it differs from combination, in which there is but one row of things.

I. "The number of compofitions of n things taken out of n rows, each row confifting of m things, is m^n, or the n^{th} power of m."

Let there be any number of rows, fuch as thofe annexed. It is plain the number of fingle things as a, b, c, d, is m or m^1.

$$\left\{\begin{array}{llll} a, & b, & c, & d, \\ e, & f, & g, & h, \\ i, & k, & l, & m. \end{array}\right.$$

Then the number of combinations of every 2 is had by joining each quantity in the fecond row to all the quantities in the firft, which will make as many times m as there are things in the fecond row, or m times m, that is m^2, for all the two's. Again, taking in the third row; there will be as many times m^2, as there are things in the third row, that is, m times mm, or m^3, for the compofition of three things.

After the fame manner, if a fourth row was taken in; all the combinations of every four would be m^4, and fo on: and, therefore, univerfally, when n rows are taken in, the number of combinations will be m^n, which is the number of compofitions. Hence it follows, 1. That the number of compofitions of all the one's, two's, three's, &c. to n, is $\frac{m^n - 1}{m - 1} m$. For $\frac{m^4 - 1}{m - 1} = m^3 + m^2 + m + 1$. And $\frac{m^4 - 1}{m - 1} m = m^4 + m^3 + m^2 + m$, as will appear by divifion, or, in general, $\frac{m^n - 1}{m - 1} m = m^n + m^{n-1}$, &c. to m = compofitions of all the one's, two's, three's, &c. to n.

2. Hence may be found the compofition of n things out of m, as follows: Involve m to the n^{th} power for the anfwer.

E. G. 1. How many compofitions may be had, of 3 letters out of 20?

Anf. $20^3 = 8000$. In this cafe there fhould be three different alphabets.

E. G. 2. How many changes are there on throwing four dice?

Anf. $6^4 = 1296$.

II. "If there be m rows of quantities given, having the fame quantities, and the fame number of them, as a, b, c, d, &c. to find the number of compofitions of m things taken out of the m rows; for any given form of thefe quantities, as $a^t\, b^v\, c^w\, d^x$, &c.

Rule. Put V = variations of the things $a^t\, b^v\, c^w\, d^x$; and A = variations or alternations of the indexes, t, v, w, x, (See Changes and Permutation.) Then will AV = the number of compofitions required.

For let the different rows in the laft propofition be made all alike, or the firft row m times repeated, as here. And let the number of things propofed be $a^3\, b^2\, c$, and firft let the index 3 be fixed to a and 2 to b, &c. Now, fince a^3 may be taken out of any three rows, and b^2 out of any two remaining rows;

$$\left.\begin{array}{llll} a, & b, & c, & d, \\ a, & b, & c, & d, \\ a, & b, & c, & d, \\ a, & b, & c, & d, \\ a, & b, & c, & d, \\ a, & b, & c, & d, \\ a, & b, & c, & d. \end{array}\right\}$$

and c out of the laft remaining row; therefore, there will be fo many ways of taking thefe letters, as each of them can be placed in different rows, that is, in different places or fituations; for the varying of the rows is the fame thing as the varying of the places of the letters; and, confequently, the different ways of taking them out of the feveral rows is equal to the number of variations or permutations of thefe letters; which number is = V. And this will hold as long as the indexes are fixed to thefe particular letters, and to none elfe. But fince, in any one form, as $a^3\, b^2\, c$, that form will comprehend as many cafes as there can be variations in fhifting the indexes from one letter to another; therefore, there will be fo many times V, as is the number of thefe variations. Therefore, if A be = the number of variations, or alternations, of the indexes, 3, 2, 1; or, in general, of t, v, w, x; then A V will be the whole number of compofitions, which that particular form will admit of.

Hence, 1. In any $a^t\, b^v\, c^w\, d^x$, where the indexes are fixed invariably to their particular letters; the number of compofitions V will be $= \frac{1 \times 2 \times 3 \times 4 \ldots\ \text{to}\ m}{1 \cdot 2 \cdot 3 \ldots t \times 1 \cdot 2 \cdot 3 \ldots\ \text{to}\ v \times \&c.}$

2. If n = the number of different letters in any form, $a^t\, b^v\, c^w\, d^x$, &c.; then the whole number of compofitions for that form will be $= \frac{1 \cdot 2 \cdot 3 \ldots\ \text{to}\ n}{RS, \&c.} \times \frac{1 \cdot 2 \cdot 3 \ldots\ \text{to}\ m}{1 \cdot 2 \ldots t \times 1 \cdot 2 \ldots v \times \&c.}$ where R = 1 . 2, or 1 . 2 . 3, &c. according as any index is twice or thrice, &c. repeated; and the like for S, and fo on.

E. G. 1. How many compofitions are in the form $a^3\, b^2\, c$? Here $n = 3$, $m = 6$, $t = 3$, $v = 2$, $w = 1$: and in this cafe there is no repetition of indexes.

Anf. $1 . 2 . 3 \times \frac{1 . 2 . 3 . 4 . 5 . 6}{1 . 2 . 3 \times 1 . 2} = 6 \times 60 = 360.$

E. G. 2. How many compofitions are in the form $a^3\,b^2$ c? Here $n = 3$, $m = 5$, $t = 2$, $v = 2$, $w = 1$. The index 2 is twice repeated.

Anf. $\frac{1 . 2 . 3}{1 . 2} \times \frac{1 . 2 . 3 . 4 . 5}{1 . 2 \times 1 . 2} = 3 \times 30 = 90.$

E. G. 3. To find the compofitions in the form $a^3\,b^3$. Here $n = 2$, $m = 6$, t, $v = 3$, $w = 0$. The index 3 is twice repeated; and the letters a, b thrice.

Anf. $\frac{1 . 2}{1 . 2} \times \frac{1 . 2 . 3 . 4 . 5 . 6}{1 . 2 . 3 \times 1 . 2 . 3} = 1 \times 20 = 20.$

E. G. 4. To find the number of compofitions of the form $a^3\,b^3\,c^2\,d^2$. Here $n = 4$, $m = 10$, t, $v = 3$, w, $x = 2$. The index 3 is twice repeated, and alfo the index 2. The letters a, b are thrice repeated; and c, d twice.

Anf. $\frac{1 . 2 . 3 . 4}{1 . 2 \times 1 . 2} \times \frac{1 . 2 . 3 . 4 . 5 . 6 . 7 . 8 . 9 . 10}{1 . 2 . 3 \times 1 . 2 . 3 \times 1 . 2 \times 1 . 2}$ $= 6 \times 25200 = 151200.$

E. G. 5. How many compofitions in the form $a^5\,b^3\,c^3\,d\,e\,f$? Here $n = 6$, $m = 14$, $t = 5$, v, $w = 3$, $x = 1$. The index 3 is twice repeated, and the index 1 thrice: the letter a five times repeated; and b and c thrice.

Anf. $\frac{1 . 2 . 3 . 4 . 5 . 6}{1 . 2 . 3 \times 1 . 2} \times \frac{1 . 2 . 3 . 4 . 5 . 6 . 7 . 8 . 9 . 10 . 11 . 12 . 13 . 14}{1 . 2 . 3 . 4 . 5 \times 1 . 2 . 3 \times 1 . 2 . 3}$ $= 60 \times 20180160 = 1210809600.$ So prodigioufly do the numbers increafe in thefe operations. See Combination and Composite *numbers*.

Composition *of motion*, in *Mechanics*, is an affemblage of feveral directions of motion, refulting from powers acting in different, though not oppofite lines.

If a point move or flow according to one and the fame direction, whether that motion be equable or not, yet it will ftill keep the fame right line; the celerity alone being changed, *i. e.* increafed, or diminifhed, according to the forces with which it is impelled. If the directions be oppofite, as one, *e. gr.* directly downward, the other upward, &c. yet ftill the line of motion will be the fame.

But if the compounding motions be not according to the fame line of direction, the compound motion will not be according to the line of direction of any of them, but in a different one from them all; and this either ftraight or crooked, according as the direction or celerities fhall require.

If two compounding motions be each of them equable, the line of the compound motion will ftill be a ftraight line; and this, though the motions be neither at right angles one to another, nor equally fwift, nor (each to itfelf) equable; provided that they be but fimilar; that is, both accelerated and retarded alike.

Thus, if the point a (*Pl.* XV. *Mechanics*, *fig.* 1.) be impelled equally with two forces; *viz.* upwards, towards b, and forwards, towards d; it is plain, that when it is gone forwards as far as $a\,c$, it muft of neceffity be gone upwards as far as $c\,e$; fo that were the motions both equable, it would always go on in the diagonal $a\,e\,c$.

Nay, fuppofe the motions unequal as to celerity, fo, *v. gr.* as that the body move twice as faft upwards as forwards, &c. yet ftill it muft go on in the diagonal $a\,c$; becaufe the triangles $a\,e\,c$, $a\,e\,c$, &c. and $a\,c\,d$ will ftill be fimilar, being as the motions are: and it will have defcribed the diagonal in the fame time which it would have required to defcribe either of the fides fingly.

But, if the motions be diffimilar, then the *compound* motion muft be a curve.

And, if a body, as b (*fig.* 2.) be impelled or drawn by three different forces, in the three different directions $b\,a$, $b\,c$, and $b\,d$, fo that it yields to none of them, but continues in *æquilibrio*; then will thofe three powers or forces be to one another, as three right lines drawn parallel to thofe lines, expreffing the three different directions, and terminated by their mutual concourfes.

Let $b\,e$ reprefent the force by which the body b is impelled from b to a; then will the fame right line $b\,e$ reprefent alfo the contrary equal force, by which it is impelled from b to e: but by what hath been faid before, the force $b\,e$ is refolvable into the two forces acting according to the two directions $b\,d$ and $b\,c$, to which the other impelling from b to e, is as $b\,e$ to $b\,d$, and $b\,c$ or de, refpectively.

So likewife two forces, acting without the directions $b\,d$, $b\,c$, and being equipollent to the force acting without the direction $b\,e$, from b to e; will be to the force acting according to the direction $b\,e$, from b to e, as $b\,d$, $b\,c$, to $b\,e$: and therefore, the forces acting in the directions $b\,d$, $b\,c$, and equipollent to the force acting in the direction $b\,e$, are to the force acting in the direction $b\,e$, as $b\,d$, $b\,c$, or de, to $b\,e$: that is, if a body be urged by three different equipollent powers in the directions $b\,a$, $b\,d$, and $b\,c$; thefe three forces fhall be to one another as $b\,e$, $b\,d$, and de, refpectively.

This theorem, with its corollaries, Dr. Keill obferves, is the foundation of all the new mechanics of M. Varignon: by help of which may the force of the mufcles be computed, and moft of the mechanic theorems in Borelli, De Motu Animalium, be immediately deduced. See Motion.

Composition *of proportion*.—If there be two ratios, wherein the antecedent of the firft is to its confequent, as the antecedent of the other is to its confequent; then, by compofition of proportion, as the fum of the antecedent and confequent of the firft ratio, is to the antecedent, or the confequent, of the firft; fo is the fum of the antecedent and confequent of the fecond ratio, to the antecedent, or the confequent, of the fecond.

E. gr. If A : B : : C : D; then by compofition, A+B : A or (B) : : C+D : C or (D). See Proportion.

Composition *of ratios*, in *Arithmetic* and *Algebra*, is performed by multiplying the quantities or exponents of two or more ratios together; the product is then faid to be compounded of the ratios whofe components were multiplied. Thus, if the quantities or exponents of the ratios a to b, c to d, e to f, be multiplied, we fhall have $\frac{a}{b} \times \frac{c}{d} \times \frac{e}{f} = \frac{a\,c\,e}{b\,d\,f}$. And the ratio $a\,c\,e$ to $b\,d\,f$, is then faid to be compounded of the feveral ratios a to b, c to d, e to f, &c. Thus alfo the ratio of 10 to 12, is compounded of the ratio 2 to 3, and of 5 to 4; for $\frac{2}{3} \times \frac{5}{4} = \frac{10}{12}$.

This operation is by fome called *addition* of ratios. See Ratio.

Composition, in *Mufic*, implies harmony, mufic in different parts, according with each other; and by the mixture of concords and difcords embellifhing melody, and communicating at once, to a well organized ear, the double delight arifing from the union of the two great conftituent ingredients in mufic, Melody and Harmony. To be able to write down or dictate a melody or fingle part, does not exalt its author to the rank of compofer; though many have affumed that title, who have not been poffeffed of fcience fufficient to make a bafe to a ballad or minuet.

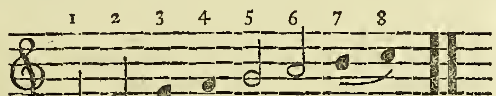
As the term *compofition* implies the union of various ingredients we fhall endeavour in the important article Counterpoint,

TERPOINT, from our own knowledge, and from the precepts and practice of the greateſt maſters of the art, to deſcribe theſe ingredients, and point out their legitimate uſe. See COUNTERPOINT, which is ſo nearly ſynonymous with *Compoſition*, that we know not how to ſeparate them.

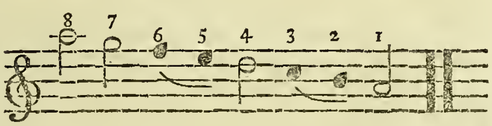
We take it for granted, before a muſical ſtudent is inflamed with the ambition of becoming a *compoſer*, that he is perfectly acquainted with the elements of the art; that he has read, or at leaſt heard, the principal productions of great maſters; that he knows intervals, and their relation to the key note and diſtance from every other ſound of the ſcale. See SCALE and INTERVAL. That he knows the different meaſures or kinds of time in muſic, nor is unacquainted with rhythm, nor where the accents of each bar ſhould be placed. See TIME, ACCENT, and MEASURE. That he knows and feels the difference between concords and diſcords; is offended with falſe intonation, and inſtruments out of tune; feels ſomething wrong in the regular ſucceſſion of two ſharp 3ds or 6ths; two 5ths or two common chords riſing or falling one degree; that he knows the compaſs and genius of the voice or inſtrument for which he writes. But we muſt not take too much for granted, or, in order to ſave ourſelves trouble, teaze our readers with too many references to articles connected with *compoſition*; we ſhall therefore refer our readers to the article *Counterpoint*. (which we have laboured with great zeal) for the mechanical rules of compoſition; firſt reminding the young ſtudent, that the ſcale of eight notes aſcending and deſcending, which repreſents the whole ſyſtem in a major key, conſiſts of 5 tones and 2 ſemitones, the 8th note being a recurrence of the ſame letter, and nearly the ſame ſound, is included in the ſame harmony as the key note or principal baſe.

Keys are denominated major or minor, ſharp or flat, from the ſituation of the ſemitones. Let C ♮ repreſent all major keys, and A ♮ the minor. In the major keys, the two ſemitones lie from the 3d to the 4th, and 7th to the 8th; and in minor keys, from the 2d to the 3d, and 5th to the 6th, aſcending in the major, and to avoid accidental ſharps, deſcending in the minor, thus:

Major key.
Aſcending.



Minor key.
Deſcending.



A ſharp or flat at the clef, or an accidental ſharp or flat in the middle of a melody, changes the place of the firſt ſemitone; and two ſharps or two flats change the place of both.

Of theſe eight notes, ſome are termed *concords*, and ſome *diſcords*. Of the concords, ſome are *perfect*, and cannot be changed by an accidental ſharp or flat, without becoming diſcords. Theſe are the 4th, 5th, and 8th, which furniſh, when uſed in the lower part of the ſcale, a baſe to the regular aſcent in the treble. See SCALE, FUNDAMENTAL BASE, and COMPOSER.

COMPOSITION, in *Oratory*, the order and coherence of the parts of a diſcourſe.

As a part of general *elocution*, (which ſee) it regards the turn and harmony of the periods: and therefore to *compoſition* belong, both the artful joining of the words, whereof the ſtyle is formed, and whereby it is rendered ſoft and ſmooth, gentle and flowing, full and ſonorous; or the contrary: and the order, which requires things firſt in nature and dignity, to be put before thoſe of inferior conſideration.

Compoſition conſiſts of four parts; which rhetoricians call PERIOD, ORDER, JUNCTURE, and NUMBER, which ſee reſpectively. Ward's Oratory, vol. i. p. 340.

COMPOSITION, in *Painting*, is that great and important requiſite, the knowledge of which enables the artiſt to diſpoſe all the various objects in his picture, as required by the ſubject, and furniſhed by the imagination or invention, in ſuch a manner as to render them, individually and collectively, moſt conducive to the beauty, the effect, and the expreſſion of the whole work. The objects furniſhed by the imagination or invention, may be conſidered as ſo many unmanufactured materials, which the ſcience of compoſition teaches us to work up and diſplay, as the peculiar circumſtances of each caſe may require. Compoſition, in its general ſenſe, may, therefore, be ſtyled the ground-work of painting, upon which the ſuperſtructure, expreſſion, deſign, chiaro-ſcuro, and colouring, in a greater or leſs degree depend; and the ſcience of it opens a wide field for our conſideration, as it ſuppoſes not only the knowledge of all the various combinations or contracts of lines and forms, which are calculated to produce agreeable or ſtriking effects in general, but likewiſe, that judicious choice in their ſelection which may be moſt applicable to the diſtinguiſhing character and expreſſion of each ſubject or work in particular. Compoſition, thus contemplated, is no longer confined to the artificial pyramid or the forced contraſt, but embraces every poſſible diverſity of arrangement and diſtribution, from the artleſs ſimplicity of Giotto and Maſaccio, to the moſt ſtudied and complex grouping of Buonarotti and Rubens.

In treating this ſubject we ſhall follow the ſame method which we purſued in our inquiries reſpecting clair-obſcure and colouring. We ſhall commence by taking a curſory view of the ſtyle of the firſt reſtorers of painting, then trace the principles and ſyſtems of compoſition at different periods introduced by their ſucceſſors, and conclude by recommending ſuch examples, and ſuch precepts, as we conceive may be moſt calculated to inſure the ſtudent's improvement.

The efforts of the early artiſts, Cimabue, Giotto, and their ſchool, were entirely directed to one great point, the appropriate expreſſion of the ſtory to be repreſented; every kind of artifice was to them unknown, and their pictures may be compared to the ſimple unembelliſhed diction of the rude but faithful hiſtorian, or to the wild but uncouth ſtrains of the untutored muſe. Theſe old painters, in their ſcriptural or eccleſiaſtic repreſentations in the churches of Italy, ſeem to have conſidered the art in no other light than as a means by which to conduce to the devotion of the people, and as they really believed the truth of thoſe ſtories which they endeavoured to repreſent, (upon which perhaps a great deal depends), ſo they deſcribed every incident exactly as they ſuppoſed, or had been taught by tradition to believe, it had taken place. In their pictures of the Madonna, ſtyled in the Roman church, the Mother of God, and in their attempts to give the image of that eternal being which man never ſaw, the effect was rendered more awful and impreſſive by the introduction of choirs of angels and ſaints, in regular order, diſpoſed on each ſide and behind the throne; a more pictureſque diſtribution of figures may be found, it is true, in the large altar pictures of the more modern painters, Carlo Maratti, Luca Giordano, and others; but then all

ſolemnity and dignity are ſacrificed, where the Virgin Mary, with the ſaints and angels, her attendants, ſeem huddled together with as little decorum, as if a group of beggar children, at play in the ſtreet, had been the ſubject to be repreſented.

In all thoſe pictures of the old painters, which may be more particularly ſtyled devotional, we perceive an attempt to elevate the mind of the ſpectator to the contemplation of celeſtial enjoyments; in the pictures of the moderns, beginning from the death of the divine Raffaele, artifice is too apparent, and the ſubject ſeems too frequently to have been made ſubſervient to the deſire of the painter to diſplay his own academic acquirements. Nature alone ſeems to have been the preceptreſs of the old painters in compoſition, and hence that variety, and at the ſame time that ſimplicity in their works which we ſo much admire; but as they were extremely deficient in many neceſſary parts of the art, and particularly in theſe three, drawing, perſpective, and clairobſcure, it is not ſurprizing if, in the eyes of curſory obſervers, their pictures have alone to boaſt the merit of antiquity, and that intereſt which is neceſſarily attached to the early efforts of man in every branch of ſtudy.

Inſtances, however, may be found, even in the works of the oldeſt painters, of compoſitions uniting at once propriety of expreſſion, with beauty of diſpoſition: amongſt the numerous freſcoes of Cimabue ſtill remaining in the church of St Francis, at Aſſiſi, there is in particular one, repreſenting a dead Chriſt with the Marys and other figures, where, the ſubject naturally allowing of it, the artiſt has given ſuch an agreeable form to the groups, by introducing around the recumbent figure of our Lord, the varied attitudes of figures kneeling and ſtanding, as to leave little to be deſired, ſave a greater perfection in the executive and mechanical parts of the art.

The works of Giotto, the ſcholar of Cimabue, may be ſtudied with abundant advantage as to invention and compoſition. The church of Aſſiſi, above-mentioned, poſſeſſes an extenſive ſeries of the freſcoes of this extraordinary child of nature, repreſenting ſtories of the life and miracles of St. Francis; here the compoſitions, though ever ſubſervient to the expreſſion of their ſubjects, are in ſome inſtances ſo beautifully grouped, as to leave it almoſt doubtful whether, in this reſpect, they ever were ſurpaſſed even by the beſt artiſts of later periods. One of theſe repreſents the ſtory of a nobleman of diſſolute character, who having heard of the fame of St. Francis, invited him and his companion, another friar, one day to his table. The holy converſation of the ſaint had ſuch influence on the nobleman, that he made to him a full and contrite confeſſion of his ſins, when, after receiving abſolution, he inſtantly fell down and expired. Giotto has ſeized this moment. The women, relatives of the deceaſed, the attendants, all flock, with varied expreſſions of grief, aſtoniſhment, and terror, to the corner of the picture where he lies; an elderly man, (thereby forming the connection between this group and the other) is repreſented imploring the interpoſition of St. Francis, who, riſing from his ſeat, ſeems to pity their ſorrow, at the ſame time that he endeavours to aſſuage it by the conſolatory aſſurance that the ſins of their maſter are forgiven, and that his ſpirit is in peace. The friar alone, accuſtomed to behold miracles, ſits unmoved.

In another of theſe freſcoes, Giotto has repreſented the moment, when, after the death of St. Francis, his body was carried, in the way to the place of burial, to the convent of Sta. Clara. The bearers of the body, ſurrounded by a concourſe of people, have reſted the bier on the ground: Sta. Clara is taking a laſt look at the face of him, who, in her youth, ſhe ſo much loved, one of the nuns is kiſſing the feet of the departed ſaint, a ſecond bathes his hand with her tears, whilſt others, with a gracefulneſs and tenderneſs of expreſſion not to be ſurpaſſed, are advancing from the three doors of the church to pay theſe laſt duties to the object of their affection and veneration. The church itſelf, beautifully enriched with alto-relievos, gives the moſt agreeable termination to the group.

We ſhall mention one more of this ſeries of pictures, which, though not in point of beauty equal to the two firſt deſcribed, is applicable to our preſent purpoſe as it ſtrongly exemplifies how much a proper diſpoſition of the groups in a picture contributes to the expreſſion of the ſubject. The ſtory repreſented is a miracle which took place ſome time after the death of St. Francis.

A woman from ſome cauſe or other died without making a full confeſſion; ſhe had, however, upon the whole been a good catholic, and eſpecially devoted to St. Francis; the ſaint therefore made interceſſion for her, and when the prieſt with his attendants were upon the point of carrying the body to the grave; ſhe, to the great aſtoniſhment of all preſent, ſat up, called a confeſſor who was preſent by name, revealed to him her hidden ſins, and then once more died and was buried. In the middle of the picture is repreſented the woman ſitting up on her bed, in the act of confeſſing to a friar, who at once unites in his countenance the ſtrongeſt expreſſion of terror with the moſt earneſt attention; ſome women, the friends of the deceaſed, and a child, form a group on the right; the prieſt and his attendants are on the left; both theſe groups are kept at a diſtance from the two principal figures, in the centre, by which the idea of ſecret confeſſion, a leading point in the ſtory, is more decidedly given, than could have been accompliſhed by any other manner of placing the figures. The interceſſion of St. Francis to our Saviour is repreſented in the ſky; and a little below, the effect of that interceſſion is unequivocally deſcribed, by the introduction of a celeſtial agent, who is driving before him the infernal ſpirit, by which the woman is ſuppoſed to have been poſſeſſed.

Amongſt the principal ſcholars of Giotto we may enumerate, Taddeo Gaddi, and Puccio Capanna: of the former many admirable freſcoes are ſtill exiſting in the church and ſacriſty of Sta. Croce, and in the cortile of Sta. Maria Novella at Florence, and of the latter, great part of the roof or vault, beſides two excellent compoſitions of the taking down from the croſs and the burial of Chriſt, on the ſide wall of the lower church of St. Francis at Aſſiſi.

However, the ſchool of painting founded by Cimabue and Giotto, continued with but little variation or advancement, till about 1430, when Maſaccio diſtinguiſhed himſelf by a correctneſs and perfection of imitation, hitherto unknown. He began to ſhew a juſt notion of perſpective, and firſt ſucceeded in fore-ſhortening the feet of his figures, ſo as to give them the true appearance of ſtanding on an horizontal plane; a difficulty never ſurmounted by his predeceſſors, whoſe figures, except when in profile, ſeemed generally, as if ſtanding on tip-toe. He gave a great breadth of light and ſhadow to his groups, and was an excellent colouriſt, and the heads of his figures are ſo finely drawn, ſo full of nature, and finiſhed with ſuch a delicacy and at the ſame time ſuch a mellowneſs of pencil, as to be ſcarcely ſurpaſſed by the fineſt portraits of Raffaele, Titian, or Del Sarto. In all the executive parts of the art, Maſaccio eminently excelled; but we cannot join in the opinion of thoſe who conſider him as having equally contributed to the advancement of compoſition: his aim was to make the moſt correct poſſible tranſcript of the model before him; hence

hence his frescoes, in the celebrated chapel at the Carmine, abound with admirable representations of his friends and cotemporaries, portraits that seem almost alive, but they are not always alive to the subject, nor do they express by their actions or gestures, those feelings which the act of which they are represented as spectators, should naturally awaken in them; in the miracle of the boy restored to life by St. Peter, and in the martyrdom of the same saint, the surrounding figures seem no more affected than so many indifferent persons met together in the market place, to talk over the ordinary news of the day. However this work of Masaccio greatly contributed to hasten the great æra of painting which followed, by exhibiting to contemporary and succeeding artists, a model much more perfect, at least as to the executive parts of the art, than they had hitherto been accustomed to contemplate. Much has been said as to the plagiarisms of Raffaele from this work. The Adam and Eve driven out of paradise in the Loggia of the Vatican, is certainly an improved transcript of that of Masaccio, and the Saint Paul preaching at Athens in the cartoon, bears some resemblance, it must be allowed, to the figure of the same saint visiting St. Peter in prison in Masaccio's chapel: but if Masaccio furnished the body of the saint, it was necessary that the great Raffaele should animate it with the energy of his own soul, ere it could convey the idea of that irresistible torrent of eloquence, by which the apostle combatted and overthrew the sophisms and superstitions of his audience at the Areopagus.

The immediate followers of Masaccio were blind to his greatest excellence, and instead of that mellowness and breadth which we find in his works, adopted a style of execution more crude and unharmonious, than even that of the more early painters; design, however, made a rapid advancement, which, added to a competent knowledge of perspective, now become general, gave to Luca Signiorelli, and others of genius, the means of embodying those bold conceptions, which as yet no one had hoped to transmit to the canvass.

The chapel which Signiorelli painted in the cathedral church of Orvieto with stories of the End of the World, the Last Judgment, Paradise, Hell, &c. is fraught with the most novel and daring fore-shortenings, energetic expressions and finely contrasted groups, insomuch that the great Michelangelo, is said to have derived benefit from the study of this work, previous to his painting the celebrated Last Judgment in the papal chapel at Rome.

In this work, however, the composition, though fine in its separate parts or groups, is not always judicious in the whole; that essential part of theory, which teaches the artist the policy or necessity of making many small parts of his picture subordinate to the principal figure or chief group, yet remained to be known, nor was it for a long time sufficiently understood, that the great distinguishing prerogative of painting, and that from which arises its decided advantage over every other artificial mode of representation, is its power to give upon a limited plane the appearance of boundless space. Thus, in those two compartments in particular, in which the artist has represented Paradise and Hell; much effect is lost by the figures and groups being ranged as it were in one line parallel to the plane of the picture; and this seems the more surprizing, as in one or two of the other compartments, and especially in that describing the End of the World, and the Destruction of the Wicked by Fire from Heaven, a most happy and striking distribution of the figures into different groups, and on different planes and distances, is to be observed.

Of Domenico Ghirlandajo, the master of Michelangelo in his youth, it may be well to note, that although he merited, in the opinion of many, the reputation of being the best painter of his time, yet the style of composition adopted by him in his great work in the tribuna of the church of Sta. Maria Novella at Florence, is by no means such as to rank him amongst those artists whose performances may be studied with profit, as to the branch of art we are now treating of; unless, indeed, that the contemplation of their manifest faults in this particular, may tend to deter the student from pursuing a similar line of conduct. The subject is here made subservient to the rage of the painter for displaying his talents in portrait; these frescoes containing striking resemblances of almost every lord, lady, or literary character of distinction of his time; and as the figures are throughout dressed in the dresses of the time, so this work is valuable, as giving perhaps the best idea of the costume of Florence towards the end of the fifteenth century, of any in existence; add to this, that the whole is admirably executed; but the spectator may long dwell on the various beauties of this work ere he discovers that it is intended to represent the principal stories of the New Testament!

The happy æra was, however, fast approaching, when the profound Lionardo, the great Michelangelo, and the divine Raffaele, were destined, not only to unite all the various excellencies of the old painters, but likewise, by an unparalleled and happy exertion of comprehensive and elevated genius, at once to carry all those parts of the art, which most ennoble it, to a height of perfection beyond which the efforts of succeeding artists have never enabled them to reach; if indeed they have ever approached it in the four great points of invention, composition, expression, and design.

It was about the year 1503 that the Florentines formed the idea of decorating their great hall of council with productions of the pencil. Upon this occasion Lionardo da Vinci executed in a cartoon the astonishing Group of Horsemen fighting for the Standard, so well known by the fine print of Edelink; a composition replete, but not crowded, and which exhibits the utmost energy of action, without extravagance, and the most striking and beautiful variety of contrast, without affectation: this was Raffaele's model for the intricate groups in his "Battle of Constantine," and is the great prototype of all those battles and huntings so daringly executed by the bold pencil of Rubens. That Da Vinci at the age of fifty should have so far surpassed the efforts of preceding painters is, however, less a matter of surprize, than, that the youthful Buonaroti, who entered the lists with him, should, as agreed by contemporary writers, have borne away the palm.

The subject chosen by Michelangelo for his cartoon, related to the war between the Florentines and Pisans: the moment taken was an imaginary one, when some of the Florentine soldiers, who had been bathing in the Arno, are hastening out of the river upon the signal of attack, buckling on their armour, and rushing to the assistance of their countrymen, who had already commenced the combat in the distance. This subject naturally embraced a very great variety of character, action, and expression, and was certainly most happily calculated for displaying academic acquirements, and especially that knowledge of the human figure which Michelangelo is universally allowed to have possessed in a greater degree than any other artist of modern times, and which, amongst the Florentine painters, was considered as at least paramount to all the other parts of the art put together. It is perhaps to this last circumstance that we must attribute the very decided pre-eminence given

given to the "Cartoon of Pifa" (as it was called) over that of Lionardo, and which foon after occafioned his quitting his native city in difguft.

Confidering thefe two celebrated works in every other refpect, it would be a difficult tafk to determine to which belonged the preference. The figures in Da Vinci's group, it is true, were fomewhat difguifed by the introduction of capricious ornaments on their armour; but, on the other hand, the Cartoon of Buonaroti wanted that breadth of chiaro-fcuro which that of his rival poffeffed. Each, however, in its way, is a mafterpiece for invention, compofition, defign, and expreffion; and each, in its kind, perhaps ftill remains unrivalled. We refer the reader to a very animated defcription of the "Cartoon of Pifa" in the third Lecture delivered by Mr. Fufeli to the ftudents of the Royal Academy.

The fubjects which Lionardo and Michelangelo had felected for the difplay of their talents, afforded in their nature the moft ample fcope for the intricacies of grouping, and the novel charms of contraft: but it was not fufficiently underftood by many of the young artifts, who flocked to ftudy thefe works, that that which they fo much admired, and which in reality powerfully contributed to expreffion in the Cartoons before them, might be inadmiffible, or at beft fhould be fparingly ufed, in fubjects of a different character. This cenfure applies not to Fra. Bartolommeo, Andrea del Sarto, and two or three others, rather cotemporaries than followers of Michelangelo; but it is certain, that the indifcriminate introduction of contrafts, fore-fhortenings, and naked figures, without regard to propriety or expreffion, foon became a predominant characteriftic of the Florentine fchool.

In the fubfequent productions of Michelangelo's pencil, we almoft ever find the happieft concordance of ftyle with fubject, nor can he be accufed of having at any time facrificed the invention or expreffion of his picture, to an oftentatious difplay of his powers in the executive parts of the art.

The general defign of his fublime works, the "Vault of the Seftine Chapel," and the "Laft Judgment," will be the fubject of our confideration, when we come to treat of invention and expreffion in painting; we fhall, for the prefent, content ourfelves with obferving, that there is no part of them which affords not a valuable leffon in compofition. The beautiful angels, attendant on the Creator of the fun and moon, give dignity to the fubject at the fame time that they enrich the compofition. The angelic troop, fupporting the figure of the Almighty, in the Creation of Man, by furnifhing a number of fmall parts oppofed to one large one, produces a delightful effect; whilft the broad dark mantle which furrounds the whole, at once fimplifies, whilft it throws out the group; this rich group is again finely contrafted by the fimple unembellifhed figure of Adam. In the compartment where Adam and Eve are reprefented eating the forbidden fruit, Michelangelo has laid himfelf open to the accufation of having been guilty of an anachronifm, as he has introduced in the fame picture their fubfequent expulfion from Paradife; but, ere we condemn his conduct, it will be well to confider whether the fault, if it is one, in the cafe before us, is not amply made amends for by the additional intereft and the awful leffon it furnifhes—here is at once the caufe, and the effect; the tranfgreffion and the punifhment. This group of the "Tranfgreffion of Man" is particularly deferving our notice, as it furnifhes an example in compofition different from any other in the chapel; the Eve is fitting in a beautiful pofture on the ground, and nearly in front; fhe extends her left arm to receive the apple prefented to her by the tempter, who is reprefented, like the Scylla of the ancients, under the form of a female terminating in a ferpent: Adam is ftanding immediately behind the figure of Eve; he extends both his arms to pluck the fruit off the tree, and thus difcovers a back view of his figure from the loins upwards, thereby making a moft beautiful contraft to the Eve, at the fame time that it affifts, by its union or connection with the ferpent and the tree, in forming a fort of arch over the figure of Eve, which produces a moft agreeable and novel effect. In that tremendous group of the "Offending Ifraelites tormented by Serpents," the low point of fight increafes the terror of the fcene, at the fame time that, by caufing the figures to be fore-fhortened, it permits the introduction of a greater number of them, and of a larger fize than could have been the cafe, had the horizontal line been fuppofed higher. The "Prophets" and "Sybils" might each in their turn furnifh a lecture; but it would far exceed our limits to attempt to point out the various mafter pieces of compofition with which the Seftine Chapel abounds. Each compartment or group contains fome principle or effence more or lefs diftinguifhing it from every other, and peculiarly adapted to the expreffion of the fubject it reprefents.

The "Laft Judgment" was executed many years after the Vault of the Seftine Chapel. With refpect to the compofition of this celebrated work, as a whole, there have been various opinions; fome highly approving the uniform arrangement of the groups into diftinct fubdivifions, as contributing to that awful majefty required by the fubject; whilft others have regretted the abfence of that perfpective, that depth, that *sfondo*, employed with fo ftriking and picturefque an effect in the great works of Tintoretto, Paolo Veronefe, and Rubens. The matchlefs perfection of the diftinct groups has however remained undifputed, and we can therefore with fafety recommend the prints from them by Georgio Mantuanus, or thofe recently publifhed by Mr. Metz, as fources from which the ftudent will beft acquire the principles of grand compofition, at the fame time that he imbibes the antidote to poverty of ftyle, and to every thing trivial or common-place.

We have before obferved that the older painters confidered a certain degree of uniformity of difpofition as indifpenfable in thofe reprefentations, which were more efpecially intended as objects of devotion or religious awe. Michelangelo, though in moft other refpects he departed from the fyftem of his predeceffors, feems to have confidered this principle as facred; accordingly, in his defigns of Madonnas, Holy Families, and Pietas, we ever find this uniformity; fometimes effected by the manner of placing the figures, and balancing equally, as it were, one fide of the compofition with the other; fometimes by the regularity of the architectural decoration. His "Chrift with the Samaritan Woman at the Well" is an inftance of this kind, fo is the "Flagellation at S. Pietro Montorio," and, more particularly fo, his "Reprefentation of the Crucifixion," where the two angels in the clouds and the two figures of the Madonna and St. John, are introduced abfolutely at meafured diftances on each fide of the crofs.

Fra. Bartolommeo di San Marco has practifed a fimilar uniformity of compofition in his great altar pictures, and fo has not unfrequently Raffaele, although in many of his numerous fmall pictures of the Holy Family he feems to have aimed at the expreffion of domeftic felicity or maternal endearment, rather than to elevate the mind to the contemplation of the myfteries of redemption by a fublime image of the Virgin Mother with the Infant God.

If

If the works of Michelangelo excel in fublime imagery, or in the perfonification of fupernatural agency, thofe of Raffaele, on the other hand, have ever been confidered the moft perfect models of that fpecies of painting which is properly termed hiftorical or dramatic. "We ftand with awe" fays Mr. Fufeli, "before M. Angelo, and tremble at the height to which he elevates us. We embrace Raffaele, and follow him wherever he leads us." The works of Raffaele never fail to exhibit the happy union of a compofition every way adapted to the expreffion of the fubject, joined to an inexhauftible variety of well-arranged and beautifully contrafted groups; and yet every part feems fo naturally to grow out of the ftory, and comes fo home to our feelings, that the fpectator is often almoft tempted to exclaim, with the countryman when he faw Garrick, "Why I fhould have done it fo myfelf!"

The productions of Raffaele furnifh nothing like a recipe for compofition. He well knew there was none, and hence thofe forcible and diftinct impreffions which each of his pictures makes on the mind, and leaves indelible on the memory.

If Raffaele can be faid to have regulated his compofitions by any particular rule or maxim, it was that of making each as unlike the other as poffible, confiftent with propriety of expreffion. Thus, in the Cartoon of "Chrift giving the keys to Peter," the apoftles, all crowding together to be witneffes of the action, occupy the principal part of the picture, and form a group as it were in profile, the Saviour, although in the corner of the picture, being neverthelefs rendered evidently the principal figure, by the infulated fituation given to him, as well as by the actions of the apoftles, who all prefs forwards towards him, as to the centre of attraction. This Cartoon is finely contrafted by that reprefenting the death of Ananias, where the figures of the apoftles form a group in the centre, and are all feen in front. The admirable defcription of this compofition by Mr. Fufeli cannot but prove acceptable to the reader. "In the Cartoon of "Ananias," at the firft glance, and even before we are made acquainted with the particulars of the fubject, we become partakers of the fcene. The difpofition is amphitheatric, the fcenery is a fpacious hall, the heart of the action is the centre, the wings affift, elucidate, connect it with the ends. The apoplectic figure before us is evidently the victim of a fupernatural power infpiring the apoftolic figure, who, on the raifed platform, with threatening arm pronounced, and with the word enforced his doom. The terror occafioned by the fudden ftroke, is beft expreffed by the features of youth and middle age on each fide of the fufferer; it is inftantaneous, becaufe its fhock has not yet fpread beyond them, and this is done not to interrupt the dignity due to the facred fcene, and to ftamp the character of devout attention of the affembly; what preceded and what followed is equally implied in their occupation, and the figure of a matron, entering, and abforbed in counting money, whilft fhe approaches the fatal centre, and whom we may fuppofe to be Sapphira, the accomplice and the wife of Ananias, and the devoted partner of his fate. In this compofition of near thirty figures, none can be pointed out as a figure of common place or mere convenience; they are linked to each other, and to the centre, by one chain; all act, and all have room to act, repofe alternates with energy." The Cartoon of "Peter and John healing the Cripple at the Beautiful Gate of the Temple," is again ftrikingly different from either of the others, Raffaele having there, with a boldnefs of which any but a fublime genius would have been incapable, interfected his compofition by the columns of the portico. But though divided, it is true, into feparate, and almoft equal parts, neither the unity of action, nor the expreffion of the picture, is impaired, whilft the effect produced is at once novel and beautiful. In the Cartoon of "Paul preaching at Athens," the elevated fituation, and energetic action of the apoftle, inftantly denote him the hero of the piece, whilft the attentive but aftonifhed circle gathered round him, receive, as it were, light from him, their centre, and unequivocally declare him the refiftlefs organ of divine truth.

The Series of "Scripture Hiftories," painted by Raffaele in the Loggia of the Vatican, and his other works, do not lefs evince the defire of obtaining, as far as confiftent with propriety of expreffion, this diverfity in his compofitions; but an attentive examination of the prints from them, will better elucidate this point, and indeed every thing relative to compofition, than a volume of prolix and laboured defcription. In fhort, the works of Raffaele difplay the moft becoming union of natural with acquired talent; ftrength of conception, and inexhauftible invention, with propriety of difpofition in the whole, and endlefs variety in the component parts.

After the death of this great mafter in 1520, the art rapidly declined, nor has any one fince him trod with equal fuccefs the dignified and inftructive path of hiftory-painting.

The great reputation of Raffaele, however, even for fome time after his death, checked the afcendency of miftaken principles, at leaft in Rome, where the great works in the Hall of Conftantine, and other rooms of the Vatican, were ftill continued by Giulio Romano and Raffaele's other fcholars, after their mafter's defigns.

Of Polidoro da Caravaggio, one of the moft eminent, it might be faid that the foul of a Greek animated his pencil, fo replete with Attic purity and grandeur of ftyle are his numerous friezes on the facades of the palaces of Rome, now however beft known by their prints by Goltzius, Cherubino, Alberti, and Bartoli.

It was not till after the noted fackage of Rome in 1527, when the arts and artifts were forced to feek an afylum in diftant parts of Italy, that painting was doomed to fuffer degradation; Polidoro flew to Meffina, Pierino del Vaga to Genoa, and Giulio Romano to Mantua, where, in the palace of the T, he explored the regions of poefy, gave new force to the inftructive leffons of fable, or decked the playful charms of allegoric fiction; ftill however firm to the principles of his great inftructor, nor ever facrificing the true end of his art, the expreffion of the fubject, to a too oftentatious difplay of his prowefs in the means.

We have before obferved that Michelangelo's celebrated Cartoon of "Pifa," contributed not a little by its influence to determine the future character of the Florentine fchool. Blind to its more fublime excellencies, the vigour of its conception, the energy and variety of its parts, and its unity of action as a whole, the young ftudents of Florence ignorantly imagined that a fimilar introduction of naked and forefhortened figures into their compofitions, without any reference to the fubject of their picture, would at all times infure them the applaufe of the artifts of their own country, and the envy of thofe of neighbouring ftates: nor had Michelangelo the good nature or the good fenfe to point out their error.

An army of expert mannerifts, for the moft part joining to a miferable fterility of conception the moft audacious rapidity of execution, but proud of poffeffing what they thought the true fecret of the *Grand Gufto*, now fallied forth; nor can it be a matter of furprize that the palaces, the churches, and the halls of Rome, Florence, and moft of

of the other cities of lower Italy, were fo foon deluged with the common-place productions of mediocrity, fince the unrelenting pencils of Giorgio Vafari and Federigo Zuccaro alone, covered more fquare yards of wall or canvafs than had been effected by the honeft diligence of perhaps any ten of their predeceffors.

The due expreffion of the fubject of a picture was now the laft confideration. Provided two or three well drawn academy-figures, however unmeaning, occupied the foreground on the one fide, and fome women fporting with their children, on the other, whilft the centre difplayed a pyramidical group, all was well; the employer was delighted, and the painter applauded. Thus a ftranger may pafs and repafs through the Sala Regia in the Vatican without being ftruck by, or difcovering the meaning of one of thofe frefcoes which occupy its fpacious walls, or without being afterwards enabled to call to mind the fmalleft feature diftinguifhing one from the other. This fubverfion of art, this filly fondnefs for what was erroneoufly confidered picturefque compofition, for near a century afterwards degraded the fchools of Rome and Florence; we fhall therefore leave them, and turn the reader's attention to thofe of Lombardy and Venice.

If the anatomic ftudies of the old Florentine artifts had rendered them almoft exclufively the mafters of correct defign, the painters of Lombardy could boaft a more complete infight into the doctrine of perfpective, and were certainly the firft who applied it with real effect in large works.

Melozzo da Forli, in the middle of the fifteenth century, in his frefco in the vault in the tribuna of the church of St. Apoftoli at Rome, firft difcovered what the Italians call the knowledge of the *Sotto in Sù*, that is, the method of forefhortening figures, fo as to give them the due appearance of rotundity and projection when feen from below; and upon the fame principle, Andrea Mantegna, in feveral of his great works, and particularly in a chapel at Padua, where the ftoried compartments are entirely above the eye, adopted, with equal boldnefs and effect, an ideal point of fight upon a line with the eye of the fpectator, that is beneath the very bottom of the picture.

From fources like thefe, Antonio Allegri da Coreggio, the fplendid meteor of the Lombard fchool, imbibed the firft principles of his art. With a fpirit every way conformable to his name, he pictured the "Joyful Affumption of the Madonna amidft Myriads of the Angelic Hoft," in the cupola of the duomo of Parma, and the "Afcenfion of Chrift," in the church of S. Giovanni in the fame city; works which may be juftly ftyled the never-equalled models for that fpecies of compofition. In the execution of thefe, and probably of his other chief works, he was however greatly affifted by his friend Antonio Begarelli, a celebrated Modenefe fculptor, who modelled for him in clay all the figures, fo that Coreggio, by placing and grouping them together as they were to be reprefented, was enabled to delineate, with the greateft correctnefs, every forefhortening, and at the fame time to acquire a truth and boldnefs of light and fhade unattainable by any other means. And here it may be well to obferve, that the trouble of preparing fuch models in the firft inftance, is amply repaid by the great facility, or rather certainty, which it gives the artift in the execution of his work. Moreover, the painter having his modelled figures before him, and being enabled, by varying the fituation of his eye, to view them in every direction, will frequently difcover beautiful combinations which he never dreamed of, at the fame time that he is rendered lefs liable to the error of too often repeating the fame view of a figure, or the fame action, and is taught to avoid a common-place mode of compofition.

Primaticcio, a native of Bologna, in his commerce with Giulio Romano, whom he affifted in his works at Mantua, acquired an admirable talent for treating poetical fubjects. Mafter of perfpective, and the *Sotto in Sù*, his beautiful fictions on the ceilings, and other compartments, in the palace of Fontainbleau, alike charmed by the fire with which they were conceived, the elegance of their compofition, the prodigious boldnefs and truth of their effect, and the eafy grace with which they were executed.

The grandeur and ftriking appearance of projection and depth, for which the works of Primaticcio were fo remarkable, judging as well by their prints as by the writings of thofe who witneffed them prior to their deftruction, was in a great meafure occafioned by his having univerfally chofen, what is called in perfpective a *fhort point of diftance;* by which mode of conduct the figures in his near-ground appeared proportionally large, as thofe behind diminifhed in a more rapid gradation. This mode of conduct in Primaticcio is the more worthy of remark, as it is the reverfe of what we generally find adopted in the works of the great Roman and Florentine painters, his predeceffors. It became, however, a favourite doctrine of the Venetian fchool, particularly of Tintoretto and Paulo Veronefe, and was one of the leading principles of the Caracci in the formation of their ftyle.

The compofition of Giorgione, Titian, and the older Venetian painters, is fimple and dignified, fuggefted by the fubject alone, and of courfe liable to none of thofe objections which apply to the works of their followers, Tintoretto, Paulo Veronefe, Palma, and a multitude of others, who, like the Florentines, valuing themfelves chiefly upon the poffeffion of only a part of the art, facrificed to their favourite darling all the remainder. No longer expreffion, but colouring and glitter of effect became their object, and hence, with all their prodigious talents, they foon turned the art into a fplendid toy.

The works of thefe great mafters (for great they were in fpite of all their faults) may neverthelefs be ftudied with benefit, even as to compofition, as they at all times poffefs a boldnefs and variety of difpofition, which rank them far above the infipid and mannered performances of their cotemporaries of Florence and Rome.

About the end of the 16th century, the Caracci of Bologna attempted, by an union of the fcattered excellencies of the various fchools beforementioned, to eftablifh a perfect fyftem of art; but though they indeed fo far fucceeded as to form a ftyle in which no particular fault feemed to predominate, ftill in no one point did they fully reach the purpofed objects of their emulation. Their works prefent neither the dignified compofition, the juft and ftriking expreffion, the beautiful variety of character, which diftinguifhes thofe of Raffaele; the fublime conception, or the learned and grand defign of Buonaroti; the grace and enchanting effect of Coreggio, nor the truth and richnefs of Venetian colour; but feem rather the refult of a fyftem founded on the bafis of a compromife between the eye and the underftanding, the mechanic and the ideal of the art; in forming which compact, however, the former have been evidently allowed the preponderance. This remark is, perhaps, lefs applicable to the productions of Ludovico Caracci; but with refpect to the chief works of Annibale, and particularly his Farnefe gallery, we cannot withold our affent to the critiques of Mr. Fufeli, and the fevere but juft remarks of Mr. Webbe.

Having faid thus much, it cannot be expected that we

should hold forth the Caracci as models for imitation; there is nevertheless a breadth, a concordance of the various mechanical parts of the art, and an ease in their style which render it highly deserving our regard, and would have justly entitled the Caracci to a reputation even greater than that which they have so long enjoyed, had their prodigious powers been made the vehicle of more elevated conception.

With respect to the scholars of the Caracci, and other artists of reputation, who immediately succeeded this epoch, it is only to our present purpose to observe, that grace and beauty rather than grandeur or sublimity, seem to have been their objects, and that whatever eminence they sometimes attained in their Holy Families and devotional subjects, still the dignity of historical painting was evidently on the decline.

Niccolo Poussin alone seems to have considered the art as a language addressed to the mind through the organs of vision. Possessed of a refined and scrutinizing mind, he at all times collected, and, with the greatest ingenuity, inserted in his pictures all those collateral circumstances, probable or possible, which his subject could furnish; and hence his works, more addressed to the imagination than the eye, at once invite and are sure to reward investigation. The greatest defect, however, of his compositions, seems to be that these explanatory or accessorial groups generally appear too principal, and thereby not unfrequently counteract their object, by distracting the attention from the principal figure or group, destroying the unity of action, and weakening that expression which they were intended to augment. Were we to draw a comparison between Poussin and Raffaele, we should liken the former to the cool but subtle reasoner, who by slow degrees brings us to grant his position; Raffaele to the heaven-taught genius who at once darts the ray of truth upon our minds.

The works of Poussin, though esteemed even in his life-time, had little influence in correcting the corrupt and meretricious taste which was every day gaining ground in Italy. The proper end of the art had been long forgotten or habitually sacrificed, and that bane of painting, picturesque, or artificial composition, which, however varying in its mode, was ever the same in its effect, became every day more deeply rooted.

Poverty of conception, or rather no conception at all, common-place or unmeaning attitude, contrast so often repeated as entirely to lose its effect, and, above all, empty bustle, were now become the elements of what was still called historical composition: if to this we add a brilliant rapidity of execution, joined to gay colouring and tolerable light and shade, with occasionally a madonna's or an angel's head, rather pretty and seductive than devout, we have the sum total of the merits of the most eminent artists who succeeded this period, and the genuine characteristics of the admired Pietro da Cortona, the facile Luca Giordano, and the insipid Carlo Maratti.

It would swell this article beyond our prescribed limits, without throwing much additional light on our subject, were we to attempt to trace the different changes of style which at various periods took place in the schools of painting of Germany, Flanders, Holland, or France. The succession of young students, who at all times considered a visit to Italy as an indispensable part of their education; naturally imbibed in a greater or less degree the principles of those to whom they had been taught to look up as models for their imitation: hence the style of the Florentine and Roman mannerists of the 16th century, unjustly denominated the followers of Michelangelo, was caricatured in the preposterous works of Martin Heemskerck, Van Mander, Spranger, and Goltzius; that of Tintoretto feebly imitated in those of his scholars, de Vos and Rotthenhamer. Rubens, however, who, though long in Italy, became no wise infected by that poverty of style which then prevailed, broke the fetters of corrupt system, and rescued his countrymen from the effects of such baneful influence. His comprehensive genius, cultured by reading, enlightened by travel, and blest, above all, with that envied quality, a just appreciation of its own powers, could not but obtain its object, that object being once clearly defined and steadily pursued. What that object was, the decided character of his works sufficiently determines: it was unquestionably the union of magnificent and expressive composition, with the most splendid colouring and the greatest breadth of chiaro-scuro; for, however enchanted by the spells of colour, Rubens never forgot that painting is mute poesy, and its first great prerogative, the converse, which, through the medium of the eyes, it is permitted to hold with the understanding. It cannot, therefore, be said of Rubens, as of the Venetian painters we have censured, that he sacrificed the ideal to the mechanical part of his art. With the exception of his smaller works, or such as he was sometimes necessitated to undertake, in compliance with the will of his employers, we generally find in his productions the most judicious application, the most happy combination of his powers:—Subjects allowing full scope to the exuberance of his invention, compositions furnishing an ample field for the magic blaze of his tints, and the broad expanse of his masses.

It was the good fortune of Rubens that the burines of the most eminent engravers were employed under his own inspection, to make prints from all his chief works; and indeed so admirably is the character of the originals preserved in those of Bolswort, Vosterman, Pontius, and others, that when the pictures shall be no more, they alone will be sufficient to eternize the claims of this great master of the Flemish school. As an inventor and composer, the "Battle of the Amazons," the numerous "Huntings of Wild Beasts," the "Raising of the Cross," the "Michael combating the Devil and his Angels," and the two tremenduous representations of the "Fall of the Wicked," are alone sufficient to place Rubens in the first rank; to say nothing of his celebrated "Garden of Love," and the truly poetic allegories in the "Luxemburgh gallery."

Of Rembrant, the great head of the Dutch school, it has been justly remarked by Mr. Fuseli, that he was "a genius of the first class, in whatever relates not to form." We have in another place spoken of his chiaro-scuro, (see Clair *Obscure*,) and we can, with equal propriety, upon the present occasion, recommend the study of his works to all those who feel with us, that the telling of the story, and the appropriate expression of the subject are the true ends of composition; nor will we omit to add, that the works of many of the other Dutch painters, particularly Ostade and Brawer, however the humble representations of low and vulgar nature be their object, abound in admirable examples of composition, and may be studied with advantage, even by such as make the more noble path of historical or epic painting the course of their pursuit.

In the retrospect we have taken of the styles of composition at different periods, adopted by the schools of Italy, it has been our care to point out to the student such examples as are best calculated by their influence to promote his advancement towards the legitimate end of our art; at the same time, that we have cautioned him against that corrupt but specious system of grouping, which, for distinction's sake, we have called picturesque.

The art of painting is a language addreffed, through the medium of the eyes, to the underftanding; like that addreffed to our minds through the ears, it muft have fome ideas, fome truths to communicate; and the perfection of painting, as well as of writing, confifts in conveying thofe truths to the mind in the moft clear, the moft forcible, and moft beautiful manner. A judicious diftribution of the arguments in a difcourfe is of importance, inafmuch as it gives additional force, and fheds increafed luftre on the evidence contained; but in a picture this propriety of diftribution is itfelf the argument and the evidence, and is therefore indifpenfable.

Thofe who are converfant with the firft fketches and drawings of great mafters, know that a few fimple rude lines are frequently found fufficient to imprefs the mind with a decifive and immediate idea of the ftory meant to be reprefented, and that, in many cafes, even the expreffions as well as the actions of the chief figures feem evident, although no features of the countenances be delineated.

We may, therefore, fafely affirm, that any rule, any mode of compofition, except fuch as is dictated by the fubject of a picture, is wrong, and that, were this doctrine fufficiently underftood, we fhould not fo frequently pafs unmoved by graphic reprefentations, or remain ignorant of the fubjects they were intended to exprefs.

To attempt, therefore, to prefcribe any general method of diftribution would be to infult the underftanding of our readers and to degrade the art. The painter, warmed by his fubject, muft form the ideal picture in his imagination, and from thence transfer it to the canvafs: it is only as to the relative economy of the parts of the work that fome hints may be fuggefted: thefe are the refult of obfervation and experience, and bear the ftricteft analogy to the precepts we have inculcated refpecting clair-obfcure and colouring, and, perhaps, to every other part of the art.

As there fhould be in a picture one principal mafs of light, which, however connected with others, fhould ftill predominate; fo one group or one figure fhould ftrike the eye with the fame fuperiority over the fecondary groups or figures of the compofition; as in clair-obfcure there is no rule by which we are obliged to place the principal light in any one given part of the picture; fo are we at liberty to give to the chief group or figure of the compofition that fituation which we judge moft appropriate. As in clair-obfcure, an inequality of parts, a fubordination of feveral fmall maffes to one large one, never fails to produce richnefs and beauty of effect; fo in compofition a fimilar richnefs and beauty are the refult of an oppofition of feveral fmall bodies or parts, to one large and fimple; as we have before illuftrated by the fublime group of the Almighty, fupported by a multitude of angels, in the "Creation of Adam," by Michelangelo.

As by the addition of fmaller maffes of light, connected with the principal mafs, that mafs acquires at once greater breadth and influence; fo the unity of action in a compofition is in moft cafes powerfully augmented by a repetition of nearly the fame action in two or three of the accefforial figures arranged together, one neverthelefs being principal: this was the frequent cuftom of Raffaele, has its foundation in nature, where fimilar fentiments moft frequently excite fimilar outward demonftrations, and never fails, if judicioufly managed, to produce its effect.

Every thing that has been faid relative to contraft of clair-obfcure, or relieving dark or light maffes immediately by their oppofites, equally applies to compofition, where ftrong contrafts of line, of back to front figures, &c. produce fimilarly ftriking and beautiful effects, and muft to infure thofe effects be ufed with fimilar difcretion and parfimony. The too frequent introduction of contrafts of lights and fhadows or of colours, produces a fpotty and confufed effect; the inordinate ufe of contrafts in compofition produces fimilar confufion, and defeats their end. The moderate introduction of them in both cafes gives a zeft to the picture. It is like the border or other well-difpofed ornament on a piece of drapery; but when indifcriminately ufed, the work refembles the rich gothic medley of an embroidered petticoat, where the beautiful folds of the ftuff are wholly obfcured by tinfel and gewgaw.

Having obferved thus much, we muft refer the reader, who is defirous of obtaining a more complete infight into the fubject of this inquiry, to the works of the great mafters above-mentioned, or to the numerous prints which have been made from them, by the moft eminent engravers of the laft three centuries. One hour fpent in the ftudy of the Cartoons of Raffaele, or the Laft Judgment of Michelangelo, will perhaps teach more than could be inculcated by words in the compafs of this volume.

What we have faid of hiftorical compofition may equally apply to landfcape; each work fhould poffefs a decided character, diftinguifhing it from its neighbour, and calculated to incite a train of kindred reflections. This we fometimes find in the fimple views of the Flemifh and Dutch painters, who painted nature as they found her, and did not think it neceffary that every picture fhould poffefs a given proportion of fore ground, middle ground, diftance and extreme diftance, a winding road, a meandering ftream, a water mill, a church fteeple, a hanging wood, and a mountain.

The works of the two Pouffins, fome of thofe of Salvator Rofa, Dominichino, and the Caracci, and the admirable etchings from the drawings of Titian, abound in the fineft examples of fublime and characteriftic landfcape, and are indeed fo perfect in their way, that they can never be fufficiently contemplated by the artift who would attain eminence in this delightful branch of art.

Plates illuftrative of compofition.

No. 1. "The Battle of the Standard," by Lionardo da Vinci.

2. "The Cartoon of Pifa" (or according to Vafari, its chief group) by Michelangelo Buonaroti.

3. "The Creation of Man," the "Tranfgreffion at the Tree of Knowledge," and "The Expulfion from Paradife;" frefcoes of Michelangelo in the Seftine chapel.

4. "Groups of the Laft Judgment," by the fame author in the fame chapel.

5. "Paul preaching at Athens" from the Cartoon, by Raffaele, at Hampton Court.

6. "The Group of the Affumption of the Madonna," in the cupola of the Duomo at Parma. Coreggio.

Composition, in *Pharmacy*, the art, or act, of mixing divers ingredients together into a medicine; fo that they may affift each other's virtues, fupply each other's defects, or correct any ill qualities thereof.

Composition, in *Printing*, ordinarily called *compofing*, is the arranging of feveral types or letters in the compofing-ftick, in order to form a line; and of feveral lines ranged in order in the galley, to make a page; and of feveral of thofe to make a form.

The compofing-ftick is made of iron generally, fometimes brafs or wood; of greater or lefs length or depth, according to the page to be compofed, or the compofitor's fancy: it hath two fliding pieces, to be faftened by means of a nut and fcrew, which are flipped forwards or backwards, at the pleafure of the compofitor, and according to the

fpace

ſpace which the lines, notes, &c. are to take up. See *Plate Miſcellany, Fig.* 5.

The compoſing-ſtick ordinarily contains ſeven or eight lines of a middle-ſized letter; theſe, when ſet, are taken out, by help of a thin ſlip of braſs, termed a rule, and diſpoſed in the galley; and others compoſed, till a page be formed. The page being compoſed, is tied up, and ſet by; and the reſt of the pages of the ſheet prepared in the ſame manner: when done, they are carried to the impoſing or correcting-ſtone; there ranged in order, and diſpoſed in a chaſe, or iron-frame, fitted with wooden furniture; then, the quoins being ſtruck in, it is carried to the preſs to be printed.

Composition, in *Sculpture*, from *Compozitione*, Italian, the art of placing figures or other objects together, whether by entwining them in groups, or forming them into maſſes more nearly or diſtantly appoſed. The word bears the ſame meaning in the arts of deſign as in literature, from which it was moſt probably received, with many other terms, by the Italian artiſts at the revival of learning. Although in its moſt ſimple ſenſe it is only ſyntheſis, or joining together; yet, in its extended acceptation, it comprehends the production, order, and fitneſs of all the parts contained in the whole. The firſt elements, therefore, are invention and ſentiment; the invention ſhould be new and copious, affording an abundant choice of beautiful parts according to the ſubject, whether there be many figures or one only; the ſentiment muſt be juſt and ſtriking; according to the rule "feel yourſelf if you would make others feel;" this muſt pervade every part of the character of the figures; their action or paſſion expreſſed to the points of their fingers and toes as well as in the very folds of their drapery.

The order of compoſition contains the divine, heroic, and hiſtoric. The divine contains all ſublime and terrific ſubjects of divinities, angels, departed ſouls, and infernal miniſters. The heroic, according to the ancients, conſiſts of thoſe mortals, ſaid to have one mortal and one immortal parent. The hiſtoric claſs contains the whole ſeries of human life, in which however the moſt exalted perſons and circumſtances are always to be preferred.

The arrangement muſt be dramatic, repreſenting an action; becauſe ſentiment only affects the countenance of the figure prior to action, and words cannot be expreſſed by mute figures; therefore the ſentiments and paſſions muſt be demonſtrated by the action, in which the figures partake. The principal perſon muſt have the moſt diſtinguiſhed place, whilſt the inferiors occupy ſubordinate gradations; thus in "Prometheus chained;" Prometheus occupies the firſt intereſt and place, whilſt Force, Strength, and Vulcan are gradually inferior, although linked in the ſame group. If the hero or heroine of the ſubject be not entwined in the ſame group with other figures, he or ſhe will ſtill be diſtinguiſhed by a preferable ſituation to thoſe in which the inferior perſons are placed; this rule is obſerved in all the beſt pictures of the Herculaneum collection. In the antique baſſo-relievos, and painted vaſes, and in the beſt works of antiquity, we ſcarcely ever ſee more figures introduced than ſuch as are ſufficient to tell the ſtory, and for this reaſon that the expreſſion may be the ſtronger, being leſs divided.

Outline. The general outlines of a compoſition, whether it conſiſt of one or more groups, ſhould be agreeable to the eye, which is produced by a ſucceſſion of curves of different ſegments alternately reverſed; or, in other words, a ſucceſſion of S. lines of different curvatures and dimenſions. Theſe will be more gentle in tender and graceful ſubjects, ſuch as the Triumphs of Nymphs, Naiads, and Sea Divinities, the Judgment of Paris, &c. In the antique baſſo-relievos, theſe curves become more violent with a mixture of angles in ſubjects of great exertion, ſuch as the War of the Giants, the Battles of the Lapithæ and Centaurs, the Athenians and Perſians. See Stuart's Athens, vol. iii. Muſeum Pium Clementinum. Baſſo-relievos. In the fine antique groups, as the Laocoon, Niobe and her Daughter, Cupid and Pſyche, and the Fauns and Nymphs, the lines are incatenated (chained) as it were linked into each other in whatever view they are ſeen.

Light and Shadow. Sculpture is not like painting, ſeen and forced on our perception, by the variety and brilliance of its colours. On the contrary, it has properly no colour at all; and its forms are underſtood by the effect of light and its privation, with the degrees of their medium called middle tint; theſe, in fact, produce the all of ſculptural forms to the eye, becauſe no ſuch thing as outline really exiſts, and when we ſpeak of it or uſe it, it is only to demonſtrate form geometrically. Light and ſhadow will be continually varied in the varied forms of the human figure. If ſeen abroad in the open air, or illumined from a ſky-light within doors, the light will ſtrike moſt powerfully on the head and breaſt, and gradually with leſs force on the lower part of the body and inferior limbs as they approach nearer to the earth. If the figure be recumbent, or in an horizontal poſition, thoſe parts will have moſt light which are neareſt to the luminary. If the figure be inverted, the bottoms of the feet will have the ſtrongeſt lights, which will gradually diminiſh as they approach the head; and conſequently all thoſe parts which are ſhadowed, when the figure is upright, will be lightened in this poſition, and *vice verſâ*. It muſt be remembered that, as the human figure partakes of globular forms, ſome one part will be lighter than the reſt, and that light will be brighteſt in one point. It will be found that figures in ſculpture are almoſt covered with middle tint, having a ſmall portion of bright light neareſt the luminary, with a very few dark and ſtrong ſhadows which relieve particular projections. Baſſo-relievos preſent the general effect of darkiſh figures on light back-grounds; in diſtribution of quantity, of both lines and form, that will be moſt agreeable which is inherent in the nature of things, which pervades all creation, and is more particularly evident in muſical proportion of 3ds, 5ths, and 8ths, with their ſubdiviſions and relative quantities.

We muſt however obſerve, that the rules for compoſition, like all other rules laid down for liberal art, will only aſſiſt genius; they will never produce any thing without the vigorous exertion of mental powers and manual induſtry in the ſubtle inveſtigation and diligent imitation of nature; all muſt be done by ſympathy and beautiful repreſentation; rules may be compared to the ſcaffold for raiſing a building. We muſt therefore remember that the beauties of nature are alſo various as they are endleſs, and from them only we can furniſh ourſelves with original materials for compoſition, by continually obſerving the expreſſion of ſentiment and paſſion in men, women, and children; the characters of their faces, the forms and action of their limbs, their draperies, and the manner in which the direction of the folds obſcures or indicates the bodies or limbs, in the grouping of figures; the entwining of the limbs ſhould be carefully obſerved, and the planes in which the different parts of the bodies and limbs are directed.

In the liberal arts, the ſentiment of a compoſition applies to our ſympathetic feelings, as the invention ſurprizes and delights by its novelty, and both together animate the maſs as a body is animated by the ſoul; and as no compoſition would be complete or intereſting without them, ſo when theſe vital principles are obtained, great care ſhould be

be taken to confine their demonftrative forms within that department of art to which they belong, in order that the whole may be as pleafing as interefting, without deformity or abfurdity. Thus, for example, all thofe pofitions which extend the human figure by violent action fhould in baffo-relievo be reprefented in the flatteft view, in which all the lines of the body and limbs may be underftood in the fulleft and cleareft manner, without legs or arms ftanding out horizontally from the back ground, like fcaffold poles driven into a wall. Such extended members belong only to the clafs of entire fculpture, as ftatues and groups. The lines and limbs in the compofition muft be more parallel to the back ground, as the alto-relievo or baffo-relievo recedes from entire fculpture, until, in the flatteft relief, the moft complicated forms and groups are diftinguifhed by little more projection than an outline gives.

COMPOSSIBLES, Compossibilia, in *Logic*, fuch things as are compatible, or capable of fubfifting together.

COMPOST, in *Agriculture*, a term fignifying that fort of manure which is formed by the mixture or combination of one or more different ingredients with dung or other fimilar matter, fo as to conftitute an uniform mafs or fubftance fit for the improvement of the foil.

Thefe compofts are ufually made by mixing various fubftances with ftable or yard dung; and hence, in fome counties, are called *mixens*.

The moft common materials for this purpofe are turf pared from wafte places, virgin earth, peat earth, lime, the fcourings of brooks, ponds, and ditches, weeds, fea-fand, rubbifh of buildings, coal-afhes, &c. That dung alone, properly managed and applied, is a moft valuable manure, is beyond all doubt, but it is certainly not equally ufeful in all foils and fituations. It is much better calculated for active than inactive foils. On lime-ftone, chalk, &c. it meets with abundance of active materials; but upon clays, deep loams, &c. it operates beft in conjunction with lime or fome other ftimulating fubftance. When dung is intended for a compoft, no attempts fhould be made to add a large quantity of lime, earth, &c. till it is properly fermented, every addition of this checking the fermentation. The lime, earth, &c. fhould be added after the fermentation is finifhed, and the whole then carefully mixed, and laid up together. In a few days a fecond fermentation will come on; and if the mixture has been properly turned over and properly incorporated, it will be fit for ufe in a month or fix weeks. Some judgment and attention will be requifite, with regard to the quantity of lime and other active principles employed; for, if the quantity be fmall, their action upon the rich fubftances in the dung will be partial and imperfect; and if too great, a confiderable lofs may be fuftained by their over action. If the quantity of earth alfo be fuch as to prefs the dung too hard, the air will be excluded, and the fecond fermentation be impeded or prevented. It is certainly a right method to lay a good coat of earth as a foundation for the dunghill, into which the moifture of the dung may foak down; and it is no bad way to make a heap of fuch fubftances as can be readily obtained, apart from the dung, and to throw the moifture of the dunghill, and the urine of cattle over it frequently.

The compofts employed by the farmer are formed in various ways. In fome places where there is a head or foot ridge, too high to admit the water being readily difcharged from the field, they plough it, then fill it full of lime, dung, or both, and, after frequent ploughings, fpread it upon the field. After the lime by thefe means is fufficiently mixed, the earth may be gathered into a heap with the fpade, and mixed with dung; or the whole operation may be performed with the fpade, which is ftill better.

It is remarked by Mr. Young, that "the farmer may have great advantage from compofts; which, when they confift of proper materials, and are fkilfully mixed, he may fafely depend upon. Where a variety of materials can be had, they may, he fays, be laid as follows: firft clay or ftrong earth, next foap-afhes, dung, loamy earth, lime, tanners' bark, green vegetables before they run to feed, earth, or as many of thefe as can be got; alfo fat chalk, fea-weeds, fea-fand, and feveral others; which may be fo mixed, as not only to raife a general fermentation throughout the whole compoft; but likewife to fuit the nature of the land on which it is intended to be laid. The common way is to lay the feveral materials in layers, one over the other, till a large heap is raifed; and it is advifed by fome authors, and the practice of many farmers is, to make thefe layers from fix inches to a foot in thicknefs; but this he has found by experience is wrong. For the fermentation raifed in the compoft is not ftrong enough to penetrate thefe thick layers, efpecially thofe of clay, or ftrong earth; for after the reft have fufficiently fermented, and the compoft is turned, thefe layers rife almoft as whole as when firft laid, and muft be broken by hand, to mix them with the reft of the compoft; whence arife two inconveniences, one an extraordinary expence, and the other that twice or thrice turning is fometimes neceffary to diffolve thefe large pieces; and as a new fermentation is excited every time the compoft is turned, the ftrength of the manure is greatly wafted before it is laid upon the land, where it is then incapable of raifing any confiderable fermentation, which is, he thinks, one of the principal ufes of manure."

It has been fuggefted, that the beft way of making compoft is not in thick layers; but after the ground is marked out for the compoft, to lay the feveral materials, after being well broken, in heaps round the fpace marked out for the compoft heap; and to place a man between each two heaps, to throw the manure fpreading upon that fpace. In this manner, the compoft heap will foon be raifed to the intended height, and the feveral forts of manure being thus well mixed, the whole will foon begin to ferment, and will incorporate as fully in two months, as the fame manures, placed in layers in the ufual way, will in four or five. The owner, therefore, in making fuch compofts, fhould not prepare them too long before they are laid upon the land; otherwife they will be much wafted, and their beft parts evaporated and deftroyed. And "compofts prepared in this manner need not be turned, or at moft not above twice. If the fermentation is obferved to abate too foon, holes fhould be made with a pole from the top almoft to the bottom of the heap, upon which throw urine, or the returning of a dunghill, which will fill the holes, force through the whole fubftance of compoft, and foon complete the fermentation." It is added, that "fuch a compoft, by duly proportioning the ingredients, may be made to fuit any fort of land, and is excellent for meadow or pafture grounds. A way to improve thefe, is to cut them five or fix inches deep with the five-coultered cutting plough, or fcarificator, which cuts the furface in flips four or five inchs afunder, but does not raife or turn them. This cutting of the roots of the grafs, and the manure laid on at the fame time, finking into thefe incifions made by the coulter, caufe an improvement in the quality of the herbage, and alfo make fuch grafs grounds produce much more than they did before. But here it is to be noted, that cutting the ground firft, and then laying on the ma-

nure, makes a greater improvement than manuring firft, and then cutting; and both are fuperior to manuring and not cutting; all which have been proved by experiments. The cutting-plough is ufed with fuccefs upon clay grounds, loams, and gravel; but in very ftrong grounds, the coulters are apt to be thrown out of their work by ftones; and therefore, it is not proper to ufe the cutting-plough where ftones abound to any great degree."

It is added, that "in fuch compofts, where it is intended to ufe a large proportion of earth, that lies at a confiderable diftance from the limeftead, to fave the double carriage of it to and from the compoft heap, the dung and other materials may be carried to a head land of the field to be manured, and be there mixed into a compoft."

It is contended that "the beft fituation for a compoft, is upon level ground; or if made upon a defcent, a trench fhould be cut on the lower fide to receive the running of the heap, which is fome of the beft part of it, and fhould from time to time be thrown up again, which will quicken the fermentation."

It is fuppofed that "the richeft compofts may be made in the farm-yard, which fhould be made deepening all round from the fides to the middle in form of a hollow ditch or bafon. When the yard is made in this form, little of the urine or liquid part of the manure can run off or be wafted. When the dung is carried from the ftables, cow-houfes, &c. into the farm-yard, it fhould not be thrown carelefsly in heaps, each fort by itfelf, but carried in carts or wheelbarrows, and laid regularly, and fpread all over the yard. Upon this fhould be fpread a thin layer of earth, mud, the fcowerings of ditches and ponds, green vegetables before they run to feed, and other fuch materials as are moft fuitable to the nature of the land, to be manured with them. The racks and cribs out of which the cattle are foddered, fhould be frequently moved over the yard, that the offal ftraw and hay may be equally difperfed, and trod in by the cattle. This method of fpreading the dung and other materials being continued, the whole will be incorporated with the urine of the cattle, and make an extraordinary rich compoft." It is fuppofed that the only inconveniency of this kind of compoft, is its being filled with the feeds of weeds, from the earth mixed with it, the hay, ftraw, and dung of the cattle. It is, therefore, a manure beft fuited to grafs-grounds, and to fuch arable lands as are to be hoed, as turnips, cabbages, carrots, potatoes, beans, &c. as thefe weeds will in a great meafure be deftroyed by good hoeing," or a proper attention to the after culture of the crops. And the earth or mud gathered from the bottom of ditches is excellent for compofts. It is ufually the lighteft part of the foil, carried thither by water, and frequently contains a large proportion of vegetable matter. To this may be added, the cleanings of roads, efpecially where they are laid with limeftone. But one of the beft materials for compofts is peat-earth: this fills up the pores of a fandy or gravelly foil, without diminifhing its friability. Even where applied by itfelf to fuch foil, peat increafes its fertility. But in a hard clay foil, it fhould be fermented with lime or dung, or both, and frequently turned, to make it mix properly. Without this precaution it dries, hardens, and cannot be afterwards properly mixed and incorporated with the foil. With regard to the making of compofts, if only one fort of manure be ufed, it is only neceffary to put the manure and earth into alternate layers, in a long ridge, and top it fo that the rain may not wafh through it. When both lime and dung are ufed, a layer of earth fhould be interpofed between every two beds of lime and dung; for lime, if mixed with dung in the firft ftage of its putrefaction, corrodes and diffipates its effluvia. After the firft fermentation of the dung is completed, the whole fhould be turned, to mix the ingredients; and this operation fhould be repeated until the mafs be fufficiently pulverized; which is done by cutting the compoft with a fpade in perpendicular flices. All the weeds fhould be collected from the neighbouring fields, before they run to feed, and mixed with the compoft. The weeds alfo that grow upon it fhould be buried down in it. Such kinds of compofts may be ufed for any crop, and when fufficiently pulverized, are excellent for a top dreffing to paftures; the parts being gradually crumbled down, and beaten into the foil by the feet of cattle, or wafhed in by rains. Some are of opinion, that no advantage refults from mixing dung with earth; a bottom of earth, however, muft always be ufeful to detain the moifture that flows from the dung. Quicklime mixed with the dung is ufeful, by keeping the mucilage in a proper ftate, and preventing the putrefaction from proceeding to too great a length. It has been obferved, that making compoft dunghills is a general practice in Norfolk. The principal fource of them is the fhovelings of ditches, which are found there to be fingularly fertile. It is not the fediment of water from the inclofures, but it confifts entirely of dead weeds, leaves of the hedge, and the mouldering of the bank and fides of the ditch. The moft barren fub-ftratum, expofed a few years in the face of a ditch bank, is frequently changed into a rich black mould. Perhaps the fea air, acting upon a loofe porous foil, may affift in producing this change. Other fources of manure are ufelefs turf, the backs of ditch-banks, the borders of fences in general, the fides of lanes, the nooks of yards, and which, in many places, are fuffered to remain the nurfery of weeds. Thefe are turned up into ridges, to rot the roots of the grafs and weeds, and to receive the melioration of the air; which done, they are carted in due feafon to the dunghill, to be well incorporated with that fubftance. It is ftated as a good and effectual mode of raifing a large quantity of compoft manure, to bed the farm-yard about two feet deep with earth, and on this cleanfe the ftables, cow-houfes, hog-ftys, &c. and to move the cribs in which loofe cattle are fed, with ftraw about it. This bed of earth will retain the urine, fo that, when the whole is mixed together, it will all be nearly of equal goodnefs, and admirably adapted to gravelly and loofe foils in general, through which the effence of dung alone would be wafhed in one feafon; and a top dreffing of foot, pigeons' dung, &c. would laft but one crop, and very rotten pure dung would be little better. Having the drains from the ftables, cow-fheds, and other offices, made fo as to difcharge themfelves into places where thefe different forts of earthy materials are depofited, might be a cheap and expeditious method of procuring good compoft-manure. And another good method of raifing compoft dunghills is by making them into clamps. Make a layer of hedge earth from a grubbed border, two feet deep, and about twelve feet fquare, in the beginning of November; the quantity of earth will be about twenty-fix loads of fixteen bufhels each; on this clean all the yards and fheds. The yard not being bedded with earth, fhould be well littered, to foak up the urine, and to be made into dung by the hogs and loofe cattle; this may be cleaned once a fortnight, and the fheds once a week, and piled regularly on the foundation of earth, until the heap is about feven feet high; and when one clamp is thus filled up, another foundation of earth may be laid adjoining to it. In order to enrich the compoft, the flowings of the heap fhould be prevented from running off, and thrown up occafionally on it. By thus piling the compoft in clamps, it will be in very good order for arable land early in the fpring; which will not be the cafe if it be left to be trodden flat over

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the whole yard, and every particle washed by the rain. Fermentation goes on much quicker in this method; and it would be better still if the heap were made under a roof, to keep off all water but what is thrown up. Another advantage of this method is, that any part of the compost may be used, by taking a division of the hill that has been the longest finished, and is consequently in the most suitable state for application. See Dung.

It is found that all sorts of animal substances, mixed with earth, litter, or any vegetable material, make a rich compost. Saw-dust, mixed in layers with the blood and offal of a slaughter-house, and incorporated till the whole becomes a moist fetid mass, is a rich compost. Two loads of it, with three loads of earth, will be sufficient for an acre of wheat or spring corn. Being a kind of top dressing, it should be put on at the time of sowing, and harrowed in with the grain. This kind of manure is best adapted to lands of an open texture. Tough clays require lime, and plenty of dung, to break the cohesion of their parts. As this compost takes up little room, it is very convenient for the use of such farmers as are obliged to bring manures from a distance: it is also extremely rich, and will probably continue longer in the land than yard or stable dung. All animal substances being of the same nature, the refuse of whale-fat, after the oil is boiled out, will make a rich compost with fresh dung, which will reduce the blubber speedily into a putrid state, or with earth and dung. Having marked out the length and breadth of your intended dunghill, make a layer of earth, such as moor earth, or that of ant-hills, about a foot in thickness; over this put a layer of yard or stable dung of the same thickness, then a layer of blubber, and over that another layer of dung. Repeat the operation till the heap be raised about six feet, then give it a thick covering of earth, and coat the heap with sods. In about a month, turn the whole in the usual manner; and when turned, coat with earth as before, to confine the putrid steam. In a month or two, the heap will be considerably fallen, when it should have a second turning. This operation must be repeated at proper intervals, till the whole becomes an uniform putrid mass. In general, this compost should not be used till it is a year old. The heap must be guarded from dogs, swine, &c. This compost may with great advantage be applied to all purposes where good rotten dung is required. It is excellent for cabbages and for meadow ground. One hogshead of whale refuse will make eight loads of dung; and must be of great importance to such farmers as lie at a distance from manure, but within reach of those places where train oil is prepared. The practice of throwing this kind of offal into the sea was highly wrong and inconsiderate. And it is obvious, that the refuse of all sorts of fish, and fish itself, when in shoals too great for consumption in the way of food, may advantageously be made into a compost in the way above described. These are local advantages; and are mentioned principally with a view to put farmers upon searching diligently for such substances as are within their reach, that are capable of assisting the sheepfold and common dunghill, upon which in many places they rely wholly, however inadequate to their wants; abundance of good manure properly managed, being the life and soul of husbandry. Where there is a deficeney of materials for making good composts, proper for the soil in many cases, a mixture of different soils may answer the purpose. Thus, where clay predominates, the addition of sand, where it is happily within reach, is often sufficient to ensure fertility; and where sand prevails, the addition of clay or chalk will answer the same purpose. Gravel enriches peat-moss; and that in return improves gravel. The farmer should, therefore, search every where above ground and below, for such substances as may improve his several soils, by being properly mixed with them.

In considering the nature of manures, and the methods of applying them to lands, under different circumstances, further directions will be given in regard to the making and applying of composts. See Manure.

COMPOSTELLA, or St. Jago de Compostella, in *Geography*, a city of Spain, and capital of the province of Gallicia, with an archbishop's see and an university, situated in a peninsula formed by the rivers Tambra and Ulla. N. lat. 42° 54'. W. long. 7° 17'. It has a great number of nunneries and monasteries, and contains about 2000 houses. The public squares, the churches, and particularly the cathedral, are magnificent. The Spanish military order of St. Jago derives its origin from this place, where the body of St. James is reported to lie buried, which circumstance likewise used to draw a vast concourse of pilgrims from most parts of Christendom in former times.

The number of pilgrims who went thither from England in 1428, amounted to 916 persons; in 1433 the number was 520; in 1434, 2460, and in 1445, 2100. It was the practice for the crown to grant licenses to masters of ships for carrying out a limited number of these votaries of superstition, who took with them considerable sums of money, not only for their necessary expences, but for offerings and other charges incurred by this pilgrimage. See St. Jago.

Compostella *Nueva*, or *New Compostella*, a rich town of North America, in Old Mexico, or New Spain, in the province of Xalisco, built by Nunez de Gusman in 1531, near the South sea; 400 miles N.W. of Mexico. The soil is barren and the air insalubrious; but it has several mines of silver at St. Pecaque, in its neighbourhood. N. lat. 21° 20'. W. long. 110° 12'.

COMPOUND, the result or effect of a composition of different things; or that which arises from them.

Strictly speaking, every new composition does not produce a new compound; but only that from which a new essence arises. Thus, when one drop of water is added to another, there does not arise a new physical compound; the essence being the same now as before the union.

Compound differs from complex, and stands opposed to simple, which see respectively.

Compound, in *Botany*, applied to leaves, expresses their being composed of more than one piece, or leaflet, connected by a common footstalk, which is either simple or branched. *Folium decompositum* is applied to a leaf more than once compounded, and *supra-decompositum* to any greater degree of such conformation. See Leaf.

A compound flower is limited by Linnæus to that particular kind of aggregate flower, (see Aggregate,) whose florets are sessile on a common receptacle, within a common calyx, and furnished with anthers united into a tube. These are the exclusive characters of the great natural class *syngenesia*, the 19th in the Linnæan System, the last order of that class, *monogamia*, consisting of simple flowers, being now, by general consent, disused. Compound flowers consist either of uniform perfect florets, each furnished with stamens and pistils, and all ripening perfect seed; or of such florets in the disk, with female, or even neutral, ones in the radius; or, lastly, of male florets in the disk and female florets in the radius. Their partial corollas are either tubular and five-cleft, or ligulate, strap-shaped. Their manner of becoming double is for the tubular and perfect florets of the radius to become ligulate and female only, or even neuter, which change is often extended to all the florets, even to the centre, in which case no seed is perfected. Sometimes the ligulate florets become not only abortive, but tubular,

tubular, or quilled. The prevailing colour of compound flowers is yellow, efpecially their difk. The ligulate radius is often white, red, or blue, with a yellow difk, but if the radius be yellow, the difk is never of any other colour, except what arifes from the anthers or ftigmas.

COMPOUND *Force, Forms, Foffils, Fractions, Fracture, Gland, Harmony.* See the fubftantives.

COMPOUND *intereft,* called alfo *intereft upon intereft,* is that which is reckoned not only upon the principal, but upon the intereft itfelf forborn; which hereby becomes a fort of fecondary principal. See INTEREST.

COMPOUND *Larceny.* See LARCENY.

COMPOUND *Machine, Mafonry.* See the fubftantives.

COMPOUND *motion,* that motion which is effected by feveral confpiring powers.

Powers are faid to confpire, if the direction of the one be not directly oppofite to that of the other; as when the radius of a circle is conceived to revolve about a centre; and at the fame time a point to move ftraight along it.

All curvilinear motion is compound.

It is a popular theorem, in *Mechanics,* that in an uniform compound motion, the velocity produced by the confpiring powers, is to that of either of the powers feparately, as the diagonal of a parallelogram, according to the direction of whofe fides they act feparately, to either of the fides. See COMPOSITION *of motion.*

COMPOUND *numbers.* See COMPOSITE.

COMPOUND *pendulum,* in *Mechanics,* that which confifts of feveral weights conftantly keeping the fame diftance, both from each other, and from the centre about which they ofcillate. See PENDULUM.

COMPOUND *propofition.* See PROPOSITION.

COMPOUND *quantities,* in *Algebra,* are fuch as are connected together by the figns + and —: thus, $a + b - c$, and $bb - b$ are compound quantities.

COMPOUND *ratio* is that which the product of the antecedents of two or more ratios has to the product of their confequents. Thus 6 to 72 is a ratio compounded of 2 to 6, and 3 to 12. See PROPORTION and COMPOSITION *of ratios.*

COMPOUND *Sounds, Surd, Tafte, Ulcer, Words.* See the fubftantives.

COMPOUND *ftops* on an organ, are fuch wherein each finger-key acts upon two, three, four, or even five pipes of different pitches, and caufes them all to found together, whenever a key in this ftop is put down. The moft common of thefe are the CORNET, the SESQUIALTER, and the MIXTURE, or furniture ftops, (fee thefe articles;) the ufe of thefe compound ftops with others which are not tuned to the actual note which they reprefent, or that on the diapafon ftop, but to the XIIth or XVIIth thereof (fee TWELFTH, TIERCE, and LARIGOT, *Stops*) is to introduce an inconceivable number of actual difcords into the common chord, even during full performances, as any perfon may, at leifure, fatisfy himfelf, by writing down the feveral notes produced by a chord formed of the ftops above-mentioned, combined with the diapafon and other unifonant ftops, or by putting down all the keys on a piano-forte at the fame time, to which a chord on thefe ftops anfwers. No problem in the fcience of harmonics is more difficult of folution, than to account for the ear's receiving pleafure from fuch a confufed and diffonant affemblage of founds: and it can only perhaps be accounted for by fuppofing, that the concordant notes being fo many more in number in thefe kinds of chords, overpower and drown the difcords to fuch a degree, that the ear is able by a fort of mental exertion to pafs over and not attend to the latter, any more than to the rattling of the keys of a badly conftructed harpfichord, or the noife of carriages in the ftreet adjoining a concert-room, &c.

COMPOUNDED IDEA, in *Logic,* unites feveral ideas of a different kind, which are ufually confidered as diftinct fingle beings, whether thofe united ideas be fimple or complex. See COLLECTIVE *idea.*

COMPOUNDING FELONY, in *Law.* See THEFT-BOTE.

COMPOUNDING *of informations* upon penal ftatutes, is an offence of an equivalent nature to CHAMPERTY in criminal caufes; and, befides, it is an additional mifdemenfor againft public juftice, by contributing to make the laws odious to the people. At once therefore to difcourage malicious informers, and to provide that offences, when once difcovered, fhall be duly profecuted, it is enacted by ftatute 18 Eliz. c. 5, that if any perfon, informing under pretence of any penal law, makes any compofition without leave of the court, or takes any money or promife from the defendant to excufe him, (which demonftrates his intent in commencing the profecution to be merely to ferve his own ends, and not for the public good), he fhall forfeit 10*l.*, fhall ftand two hours on the pillory, and fhall be for ever difabled to fue on any popular or penal ftatute.

COMPREHENSION, in *Englifh Church Hiftory,* denotes a fcheme propofed by fir Orlando Bridgman in 1667-8, for relaxing the terms of conformity in behalf of proteftant diffenters, and admitting them into the communion of the church. A bill for this purpofe was drawn up by lord chief baron Hale, but difallowed. A project to the fame purpofe was propofed and argued in parliament foon after the reftoration, in 1661; but the royalifts and zealous churchmen formed a majority, and the endeavours of thofe who wifhed to avail themfelves of the king's declaration to this effect, proved ineffectual. The attempt was renewed by Tillotfon and Stillingfleet in 1674, and the terms were fettled to the fatisfaction of the non-conformifts, but the bifhops refufed their affent. This fcheme was likewife revived again immediately after the Revolution; the king and queen expreffed their defire of an union: however the defign failed after two attempts; and the act of TOLERATION was obtained. Birch's Life of Tillotfon, p. 42, 167, &c.

COMPREHENSION, in *Metaphyfics,* is that act of the mind, whereby it apprehends, or knows, any object prefented to it, on all the fides, whereon it is capable of being apprehended, or known.

To comprehend a thing, is defined by the fchoolmen, *rem aliquam totam & totaliter cognofcere.* See APPREHENSION.

COMPREHENSION, in *Rhetoric,* a trope, or figure, whereby the name of a whole is put for a part; or that of a part for a whole: or a definite number of any thing for an indefinite.

COMPREIGNAC, in *Geography,* a town of France, in the department of the Upper Vienne, and diftrict of Bellac; 10 miles N. of Limoges.

COMPRESS, in *Surgery,* from the Latin word *comprimere,* to prefs together, is a bolfter of linen cloth folded feveral times, and employed on various occafions.

Compreffes are formed fometimes of lint or furgeon's tow, but more commonly of half-worn linen without feam or felvage. The fize, thicknefs, and form of them, muft be regulated by the part to which they are applied, or the object which the furgeon has in view.

When they are intended to cover other dreffings to a wound, &c., they muft be always larger than the fubjacent plafters, and muft lie upon the part in an equal and even manner,

manner, fo as to retain the dreffings fteadily on the affected part.

Compreffes are divided into fimple and graduated. A fimple comprefs confifts of linen or flannel folded from two to eight times; and are made quadrangular, triangular, or with pieces cut off a fquare at the corners, fo as to give the comprefs a crucial form, &c. A graduated comprefs confifts in a number of fimple ones laid one above the other, and fometimes fewed together in the fhape of a pyramid; thefe latter are ufed for compreffing a bleeding artery, or they are applied to the bottom of a fiftulous fore, or to the fides of a deep flefhy wound, or upon ganglions, and fome other tumours, in order to difperfe them.

Compreffes are employed to fill up inequalities, or hollow parts of the body; they are alfo ufed to guard wounds againft the contact of irritating fubftances, and fometimes merely to receive the purulent difcharge. They are frequently moiftened with different medicated fluids, and are applied either warm or cold according to the furgeon's intention.

Compreffes are fometimes of confiderable length, and of little breadth, efpecially when employed to the extremities of the body in a circular form, after the manner of common bandages. (See BANDAGE.) The latter kind of bandage is named by the French *longuétte*. The methodical application of fuch compreffes has effected a cure in fome aneurifms: they are alfo found particularly ufeful in finuofities and deep fores, where matter is apt to collect and require counter openings. From the various ufes of compreffes, writers have named them contentive, uniting, diverfive, &c.

Tourniquets, truffes, and fome other furgical inftruments, are only particular kinds of compreffes. (See ANEURISM, and HERNIA.) Compreffion is now and then made very advantageoufly by means of the finger only, and will often ftop a violent bleeding in parts where no furgical apparatus can be employed. Thus the root of the nofe is compreffed with the fingers, in order to ftop violent fneezing, and the crown of the teeth in order to relieve the tooth-ach; and in order to make polypi fuppurate, fphacelate, or fall-off, their roots are compreffed between the fingers. A great number of the bandages that are ufed, produce their effects merely by the fupport which they give to the parts.

The diverfity of cafes in which a fkilful furgeon will employ compreffion with advantage, cannot here be detailed; but in addition to what has already been faid, we may add that by this means alone dropfical fwellings may frequently be diffipated; and of this, Mr. John Bell records a ftriking example in his "Principles of Surgery," 4to. vol. i. p. 128, where he treats of bandages in general. By the way, we may mention, that Mr. John Bell has here given fome excellent general obfervations; but (as in other parts of his writings) he affects to have read in authors what no one elfe can find; and in the inftance before us, he pretends to have read "the treatifes of Soranus, Glaucus, and Diocles, in which," he fays, "I find nothing but what has fallen into deferved neglect;" whereas thefe authors have not written any treatifes upon bandages that have defcended to the prefent generation! Well might this author afk the queftion, "Why fhould we go back to the ancients in this pitiful manner?"

COMPRESSED *Foffils*, this term is applied by naturalifts to various extraneous fubftances found in the earth, which feem to have fuffered a flattening or change of fhape, from the weight of the fuperincumbent ftrata; this is not uncommon with foffil fhells, of large fize compared with their thicknefs, as echini, &c., and fhould be particularly noted in defcribing the circumftances of any ftratum, where fuch compreffed foffils appear.

The mountains of Quedliac and Portfiallet in Norway, contain an argillaceous pudding-ftone, the filiceous pebbles of which have been thought by fome to be compreffed, becaufe thofe in the lower part of the ftratum are progreffively thinner than thofe above (Kirwan's Geo. Exp. 8.); but this probably was their original fhape. The fmall black chert pebbles, which form uniform layers in the lower part of the London clay ftratum, are all of them fomewhat flat, but certainly not by compreffion, we think.

Bituminized wood, or the refemblance of trunks of trees in wood-coal, is often found flattened, as at Todi, and near Aqua-Sparta in Umbria, at Thun in Switzerland, in Iceland, &c. Siliceous petrifactions have frequently fomewhat the appearance of compreffed wood, and have been fo denominated; but a careful examination of feveral fpecimens, in which the tranfverfe fection prefented two equal fegments of circles joined together by their chords, inftead of a diftorted ellipfis, which would probably be the form of round wood when compreffed, has induced us to think that thefe, and probably many extraneous foffils faid to be compreffed, may originally not have been round.

Peat-foffils of the prefent race, fuch as the trees found in the fea at Sutton in Lincolnfhire, and in other places, have without doubt been flattened, by the weight of peat and earth lying upon them, when in a foft and decaying ftate.

COMPRESSION, from the Latin *compreffio*, is the act of preffing, or fqueezing matter together, fo as to force its parts nearer to one another, and enable the whole to occupy a fmaller fpace; or the effect produced by that caufe. *Compreffion* and *condenfation* denote the production of the fame effect; that is, the reduction of a certain quantity of matter into a fmaller fpace; with this difference, however, that when the effect is produced by the application of any external force, as by the preffure of a fuperincumbent fluid, or by means of mechanical engines, it is more properly denominated *compreffion;* but when the effect is produced by fome internal action, as by the efcape of caloric in cooling, it is then called CONDENSATION, which fee.

Compreffion takes place in various natural proceffes, and it is alfo practifed by art for various mechanical and economical purpofes. The inquiries which may be made concerning it, are, 1ft, the principal cafes in which compreffion is produced in nature; 2dly, the mechanical methods which are ufed for compreffing bodies in manufactories and in civil economy; and 3dly, the principal effects which refult therefrom. Of the natural compreffions, thofe which arife from the weights of fuperincumbent folids are fufficiently obvious, and they will, befides, be particularly examined under the articles GRAVITY, and MECHANICS; but thofe which are occafioned by fluids, being much lefs evident, are feldom fufficiently underftood even by thofe who are concerned with them.

Water and air are the two fluids with which mankind is naturally and unavoidably concerned; and the preffures of thofe fluids differ materially from each other. The preffure of water is proportionate to its perpendicular height and not to its quantity, and that preffure is exerted in every direction; for inftance, let two veffels of the fame height, but of different fizes, as a fmall pipe and a large refervoir, be filled with water to the fame height; then if you meafure a fquare inch in the bottom of the fmall pipe, and a fquare inch in the bottom of the refervoir, the preffure upon thofe two different fquare inches is the fame; though the refervoir may

may contain twenty or thirty thouſand times more water than the pipe. Alſo, if you take a ſquare inch on the ſide of the veſſel cloſe to the bottom, the lateral preſſure upon it will be equal to the preſſure on the ſquare inch of the bottom; excepting indeed a trifling difference which ariſes from the perpendicular height of the water above the latter, which barely exceeds the perpendicular height of the water above the former.

But though water preſſes upon every body that is immerſed in it in proportion to its perpendicular height, and tends to force the parts of thoſe bodies cloſer to each other, provided that thoſe bodies have not pores large enough to admit the water; yet water is not itſelf ſuſceptible of compreſſion, unleſs it be in a very ſlight, and ſcarcely perceptible degree; hence at different depths, water is nearly, if not exactly, of the ſame denſity.

The air of the atmoſphere, as well as the other aerial fluids, is highly elaſtic, in conſequence of which it not only preſſes upon all bodies that are immerſed in it; but, by preſſing upon itſelf, its own denſity is rendered different at different altitudes. The bulk of a given quantity of air has been found to decreaſe in the direct ratio of the force with which it is compreſſed; hence it has been demonſtrated, that if the altitudes above the ſurface of the earth be taken in arithmetical progreſſion, the denſities of thoſe altitudes will be in geomtrical progreſſion decreaſing If a very long tube, cloſed at one end be filled with water, and then be inverted in a baſon of water, that fluid will remain ſuſpended in it to the height of about 33 feet, that weight of water being counterpoiſed by the preſſure of the atmoſphere: (ſee the articles Atmosphere, Pneumatics, and Hydrostatics.) Therefore, ſince a man on the ſurface of the earth is preſſed by the weight of the atmoſphere; if he places himſelf at 33 feet below the ſurface of the water, he will be preſſed by twice the above-mentioned weight of the atmoſphere; if he places himſelf at 66 feet below the ſurface of the water, he will ſuſtain a preſſure equal to three atmoſpheres, and ſo on.

If the abovementioned experiment be tried with a tube filled with and inverted in a cup of quickſilver, inſtead of water, it will be found that the quickſilver will remain ſuſpended in it to the height of about 30 inches, the ſpecific gravity of quickſilver being much greater than that of water. As the preſſure of the atmoſphere counterpoiſes a perpendicular pillar of quickſilver about 30 inches high, or, more accurately ſpeaking, between 28 and 31 inches; for it varies between thoſe limits (ſee Barometer); the weight of ſuch a pillar, let its baſe be what it may, ſhews the preſſure of the atmoſphere upon a ſurface equal to that baſe. A pillar of quickſilver, whoſe baſe is an inch ſquare, and whoſe altitude is a mean between 28 and 31 inches, weighs $14\frac{1}{2}$ pounds avoirdupoiſe; therefore, at a mean, the preſſure of the atmoſphere upon every ſquare inch on the ſurface of the earth, is equal to $14\frac{1}{2}$ pounds; and by the rule of proportion, or by ſimple multiplication, we may determine the weight of the atmoſphere upon any other given ſurface. Thus the preſſure of the atmoſphere on a ſquare foot, (which is equal to 144 ſquare inches) is 2088 pounds. The preſſure on the body of a middle ſized man, whoſe ſurface is equal to about 12 ſquare feet, is 25056 pounds; and the preſſure on the ſurface of the whole earth is equal to about 11642019840000000000 pounds. For further explanation of the mechanieal properties of fluids in general, ſee the articles referred to above, and likewiſe the article Elasticity.

The artificial methods of compreſſing ſubſtances, either ſolid or fluid, as employed in the arts, and for economical purpoſes, are very numerous; different compreſſing inſtruments being uſed for almoſt every particular purpoſe. Thus there are hammers, levers, ſcrew-preſſes, hydraulic preſſes, condenſing engines, rolling or flatting mills, &c. Thus the apothecary obtains his expreſſed oils by means of a ſcrew-preſs, the book-binder compreſſes the leaves of his books, both with the hammer, and with a ſcrew-preſs of a different form; the gold-beater compreſſes and ſtretches his metallic plates firſt through the rolling (or flatting) mill, and then by the ſtrokes of a hammer, and ſo forth. Deſcriptions of thoſe inſtruments may be ſeen under their different names.

Beſides the above-mentioned mechanical properties, compreſſion produces ſome remarkable phyſical effects, of which it will be neceſſary to give a diſtinct account. We ſhall, however, previouſly to this, briefly ſtate the diſcoveries that have been made with reſpect to the compreſſibility of water, which, as has been already mentioned, is ſo very ſlight as to be next to nothing.

Water was, during a very long period, conſidered as a fluid perfectly unelaſtic; that is, unyielding, or incompreſſible; and this opinion was corroborated by an experiment of the Academy del Cimento in Italy. About a century and a half ago the members of that academy endeavoured to aſcertain whether water was capable of being compreſſed in any degree. For this purpoſe, they filled a hollow metallic ſphere with that fluid, and ſtopped the aperture very accurately. This ball then was preſſed in a proper machine, but no contraction could be obſerved, nor indeed was the apparatus capable of manifeſting ſmall degrees of compreſſion. Hence they concluded that water was not capable of compreſſion. This opinion prevailed until the year 1761, when the ingenious Mr. Canton diſcovered the compreſſibility of water, and of other liquids, which he immediately made known to the Royal Society. He took a glaſs tube, having a ball at one end; filled the ball and part of the tube with water, which he had deprived of air as much as it was in his power; then placed the glaſs thus filled under the receiver of an air-pump; and on exhauſting the receiver, which removed the preſſure of the atmoſphere from over the water and the glaſs veſſel which contained it, in conſequence of which the water roſe a little way into the tube, *viz.* expanded itſelf. He then placed the apparatus under the receiver of a condenſing engine, and on forcing the air into it, which increaſed the preſſure upon the water, a diminution of bulk evidently took place; the water deſcending a little way within the tube. "In this manner," Mr. Canton ſays, "I have found by repeated trials, when the heat of the air has been about 50°, and the mercury at a mean height in the barometer, that the water will expand and riſe in the tube by removing the weight of the atmoſphere, one part in 21740; and will be as much compreſſed under the weight of an additional atmoſphere. Therefore the compreſſion of water by twice the weight of the atmoſphere is one part in 10870."

"Water has the remarkable property of being more compreſſible in winter than in ſummer, which is contrary to what I have obſerved, both in ſpirit of wine and oil of olives."

By the ſame means, and in the ſame circumſtances, Mr. Canton aſcertained the property of being compreſſed in ſome other fluids, and the reſults are as in the following table:

Compreſſion	of ſpirit of wine	66	millionth parts.
	of oil of olives	48	
	of rain water	46	
	of ſea water	40	
	of mercury	3	

Mr.

Mr. Canton was of opinion that the above-mentioned diminution of bulk under the receiver of the condenfing engine, is not to be attributed to any air contained in the water, or any of the other fluids; becaufe when he tried the experiment with water which had been forced to imbibe more than an ufual quantity of air, the compreffion did not appear to be greater. Yet it may be obferved, that confidering the flight degree of compreffion which water is capable of, and the difficulty of depriving water entirely of air, one might ftill be induced to doubt whether that compreffion is not to be attributed to the air. See Canton's account of thofe experiments in the 52d and 54th vols. of the Philofophical Tranfactions.

With refpect to the effects produced by compreffion, it is in the firft place to be remarked, that certain bodies, when preffed, fuffer a derangement of form; but as foon as the preffure is removed, they recover their former fhape. Thofe bodies are faid to be *elaftic*, and they are diftinguifhed into *perfectly elaftic*, when they recover their former bulk and fhape entirely, as is the cafe with common air, and *imperfectly elaftic*, when they recover their former fhape only in part, which is the cafe with far the greateft number of bodies.

When the bulk of a body is reduced by compreffion, the fpecific gravity of that body is proportionately increafed; thus the fpecific gravity of fine gold, that has been fufed only, is 19,258; but the fpecific gravity of the fame, after having been hammered, is 19,362. The fpecific gravity of pure filver, that has only been fufed, is 10,474; that of the fame hammered, 10,511. The fpecific gravity of copper, fimply fufed, is 7,788; that of the fame hammered, is 8,878, and fo forth.

Whenever the bulk of a body, and efpecially of a metallic one, is diminifhed in bulk by hammering, flattening between rollers, or by any other fort of compreffion, its hardnefs or rigidity is increafed at the fame time; thus foft brafs, or filver, or copper, by hammering, or preffing, is rendered hard and elaftic. By the application of a degree of heat, fomewhat lower than incandefcence, that hardnefs or elafticity of the metal is removed, and at the fame time its fpecific gravity becomes equal to what it was before the hammering. This procefs is called *annealing* or *foftening*.

The other remarkable effects of preffure may be reduced to three; namely, a modification of the action of the fame degree of heat on bodies, an extrication of heat, and an extrication of light. When heat is applied to any body, the effects differ according as the application takes place under different atmofpherical preffures. On the tops of mountains, where the preffure of the atmofphere is confiderably lefs than it is on the level of the fea (in confequence of which the quickfilver does not ftand fo high in the barometer in the former place as it does in the latter), water boils at a lower temperature; and fo do other fluids. At the level of the fea, water boils at about the temperature of 212° of Fahrenheit's thermometer; but Mr. Sauffure found on Mount Blanc (which is reckoned the higheft mountain of any in Europe; where the barometer ftood at 17,05 Englifh inches), that the heat of boiling was $185\frac{1}{2}$°. From the experiments of Sir George Shuckburgh, and of Mr. De Luc, the following table of the heats of water boiling under different preffures of the atmofphere, which are indicated by the altitudes of the mercury in the barometer, was calculated by Mr. Kirwan.

Heat of boiling water under different barometrical altitudes

Barom^r.	Heat.	Barom^r.	Heat.
30	212°	21	195,36
29	210,28	20	193,36
28	208,52	19	191,06
27	206,73	18	188,46
26	204,91	17	185.56
25	203,06	16	184,36
24	201,18	15	180,86
23	199,27	14	176,70
22	197,33		

Mr. Watt obferved, that in a very good vacuum water boils, or produces copious vapours, even when its heat is not greater than 70°. On the other hand, when water is caufed to boil under a great preffure, a much greater degree of heat muft be applied: thus, in Papin's digefter (being a ftrong veffel in which a quantity of water is confined) the water may be rendered nearly red-hot; and in that ftate the diffolving property of water is increafed prodigioufly. In Iceland a natural difcharge of hot water comes out of a deep pit, and when this water falls upon the furface of the earth, it depofits a white powdery filiceous fubftance, which, it is fuppofed, the water was enabled to diffolve by the volcanic heat, that acted upon it under a great degree of compreffion.

Dr. Hutton, like fome other geologifts, has afcribed the formation of the various minerals chiefly to the action of fubterraneous fire; but he thought that that action was modified by the compreffion of the fuperincumbent ftrata of the earth, which rendered it capable of producing fuch effects as could not be eafily imitated on the furface of the earth; for it feemed to him, that under a great degree of compreffion, volatility would expofe to a high degree of heat fuch fubftances as generally fly off in our fires, on the flighteft application of heat. Hence, by their chemical relations peculiar combinations might arife; fuch as are dug from the bowels of the earth. What Dr. Hutton fuppofed, was in a great meafure verified by fir James Hall, bart., who, by his numerous and well imagined experiments, has fhewn a variety of remarkable effects, on different fubftances, by the action of heat modified by compreffion; but his interefting experiments will be defcribed amongft the effects of heat.

The other two remarkable effects of compreffion on bodies, are an extrication of heat and an extrication of light. Thefe effects having been obferved with all thofe bodies which may be fubjected to decifive experiments; it may be prefumed from analogy, that the fame effects take place in various degrees, with all bodies which are fufceptible of compreffion, but not with thofe which are not compreffible; and, in fact, liquids which are only compreffible in the flighteft degree imaginable, cannot be heated by agitation, which is friction amongft their particles; and there is no friction without compreffion. As heat is evolved from a body when compreffed, fo when the bulk of a body is enlarged, heat is abforbed, in confequence of which the furrounding bodies are cooled; and this abforption of heat feems to be directly proportioned to the enlargement of bulk. The following inftances will illuftrate the nature of thefe remarkable effects. The blackfmith, by about twenty ftrokes of the hammer upon a piece of iron bar not thicker than a man's little finger, can render one extremity of it red-hot, vifible in the day light. But it is to be remarked, that the fame extremity of the iron bar cannot be rendered red-hot

red-hot a second time, unless it be previously softened in the fire. The condensation of common air, quickly performed, produces a considerable degree of heat; so much so, that cotton has been set on fire, and so has heated charcoal, by compressing the air quickly upon it. An ingenious mechanic in Paris is said to have kindled tinder in tubes, or compressing pumps, of about a quarter of an inch in diameter, and six inches in length, by a single stroke of the piston. Steam, also, by mechanical compression, may be made to yield its latent heat. A mixture of oxygen and hydrogen gases, if quickly compressed, takes fire and explodes with great force. The discharge of an air-gun is attended with a faint flash of light, visible in a darkened room; and the sudden compression of the air in a tube, to the end of which a strong glass is fitted for the purpose of manifesting what passes within, is likewise attended with light.

In explanation of these phenomena, it is supposed, that independent of the specific caloric, peculiar to every body, a quantity of it is lodged in the pores of each body, and that this may be extricated by compression, in the same manner as water is squeezed out of a sponge. But a farther examination of facts will throw more light upon the subject.

It is well known, that friction amongst solids generates heat, which often occasions actual inflammation and combustion. Thus the axles of wheels of carriages, and other machines, are sometimes set on fire by the violence of the friction; thus, in a turning lathe, the pieces of work are heated to a great degree; thus, the violent collision of a steel against a flint, renders the abraded particles of the former perfectly red-hot. Count Rumford, willing to investigate the origin of the heat produced by means of friction, instituted an interesting series of experiments in the workshops of the military arsenal at Munich, where cannons are bored; in which case a degree of heat far exceeding that of boiling water is produced. After having examined the temperature of the metallic shavings, their quantity, capacity for containing caloric, &c. and finding reasons sufficient to account for the production of that remarkable quantity of heat which was manifested in the course of the boring, he began to consider which way that heat might be derived, whether from the contiguous metal or from the air, and in order to determine the matter by means of actual experiment, he contrived a suitable apparatus, the principal part of which was intended to turn a piece of metal in a box full of water, whilst a blunt borer acted forcibly against it, so as to produce a considerable degree of friction, without abrading from the piece of metal more than an inconsiderable quantity of it in a scaly powdery state. With this apparatus, in which both the piece of metal and the borer were plunged in water of the temperature of the atmosphere, no heat could be derived from the air. The machine which turned the piece of metal being put in motion, the water in the box, &c. began to be heated soon after, and in $2\frac{1}{2}$ hours time, from the commencement of the operation, the water actually boiled. The result of this experiment shewed, that the heat, which had caused the water to boil, was not derived from the air, and from computation it appeared, that the abraded metallic powders could not furnish it in consequence of the change of their capacity. "Is it possible," count Rumford says, "that the heat could have been supplied by means of the iron bar, to the end of which the blunt steel borer was fixed? or by the small neck of gun-metal by which the hollow cylinder was united to the cannon?" "These suppositions appear more improbable even than either of those before-mentioned; for heat was continually going off, or *out of the machinery*, by both these passages, during the whole time the experiment lasted. And in reasoning on this subject, we must not forget to consider that most remarkable circumstance, that the source of the heat generated by friction, in these experiments, appeared evidently to be *inexhaustible*. It is hardly necessary to add, that any thing which any insulated body, or system of bodies, can continue to furnish without limitation, cannot possibly be a *material substance*; and it appears to me to be extremely difficult, if not quite impossible, to form any distinct idea of any thing, capable of being excited and communicated in the manner the heat was excited and communicated in these experiments, except in *motion*." Phil. Trans. for the year 1798.

It seems strange that so distinguished a philosopher as Count Rumford should be induced to admit the immateriality of heat from the result of the above-mentioned experiment, without adverting to the compression which the metal must have received from the action of the borer.

Having mentioned the principal effects which arise from compression, amongst which the extrication of heat has been reckoned the most interesting; we might now state several instances of the contrary effect, namely, of the absorption of heat attending the enlargement of bulk which takes place in several bodies after the removal of the cause which occasioned their compression. With respect to this, however, we need not be very prolix in this place. The hydraulic engine at Schemnitz furnishes a strong instance of the latter effect. That engine operates by causing a fall of water to compress air in a strong vessel, the re-action of which forces other water to rise in another pipe for certain purposes. Now, in consequence of the great height of the superincumbent column of water, the air in the air-vessel of this machine, is very much compressed, and it is said that if the stop cock of this vessel is opened, the air, in rushing out of it and expanding itself, absorbs so much heat, and, of course, cools the adjacent bodies so much, as to produce a copious deposition of moisture from the atmosphere, and the actual formation of ice upon the stop-cock. The cold produced by the evaporation of water, and especially by that of spirituous liquors, might be likewise adduced as instances of the above-mentioned property. But the farther investigation of these latter phenomena belongs to other branches of natural philosophy, which will be explained in other places.

The term *compression*, in astronomy and geography, has often been used to denote that diminution of the curvature of the surface of the earth, which has been observed about the poles, as if the earth had been compressed at the poles by some external force, which caused it to lose its perfect spherical form, and to assume nearly that of an oblate spheroid; it being, however, well known that the spheroidical figure arises from the centrifugal force of the parts distant from the poles, which is likewise the case with the other planets. The precise quantity of deviation of the polar regions of the earth from the spherical form, or the difference between the equatorial and polar diameters, has been variously stated by different astronomers. Sir Isaac Newton, supposing the density of the earth to be uniform, has assigned $\frac{1}{230}$ for the difference of the above-mentioned two diameters. Boscovich, taking a mean of all the different measurements, found the difference of the two diameters equal to $\frac{1}{248}$. From other measurements and calculations since made by other able mathematicians, this difference has been reckoned equal to $\frac{1}{311}$ or $\frac{1}{300}$ by De la Lande; to $\frac{1}{321}$ by De la Place; to $\frac{1}{307}$ by Sejour; to $\frac{1}{305}$ by a late anonymous writer. These latter results agree pretty well with the lengths of the pendulums, which have been

been found to vibrate feconds in different latitudes ; fo that upon the whole $\frac{1}{300}$, or a fraction not much differing from this, feems to be the neareft to the true difference of diameters ; and the difagreement between the different meafurements probably arifes from the imperfection of inftruments, from the partial attraction of mountains, and from the unequal denfity of the earth. See profeffor Playfair's paper on the figure of the earth, in the Tranfactions of the R. Society of Edinburgh, vol. v. p. 1.

Compression, in *Surgery*, not only fignifies the act of compreffing, but denotes a clafs of difeafes produced by the preffure of an extraneous body ; and, in fome cafes, a compreffion will caufe the moft ferious confequences. For example, compreffion of the brain, arifing from a fracture of the cranium, and a portion of the bone in a depreffed ftate, may occafion inflammation, fuppuration, and deftruction of that part of the brain to which the mechanical effect is applied ; which will be, more or lefs, attended by comatofe fymptoms, and privation of fenfe or voluntary motion. In fuch cafes, the furgeon endeavours to remove the caufe, by elevating the edge of the bone, or extracting it entirely, either with or without trepanning, as the circumftances may indicate. (See Trepanning and Trephine.)

When the fymptoms of a compreffed brain are evidently marked, no time ought to be loft in fetting about an examination of the ftate of the cranium, wherever appearances point out, or even lead us to conjecture, in what part a fracture may be fituated. For this purpofe an incifion is to be made upon the fpot through the integuments to the furface of the bone, which muft be fufficiently expofed to admit of a free examination. Some authors have recommended a crucial incifion ; others one in form of the letter T ; while many advife a confiderable part of the integuments to be entirely removed. But as it is more agreeable to the prefent mode of practice to fave as much of the fkin as poffible, a fimple incifion is generally preferred, unlefs the fracture run in different directions, and then the incifion muft vary accordingly. It will frequently happen, that a confiderable part of the integuments muft be feparated from the fkull, in order to obtain a diftinct view of the full extent of the fracture ; but no part of the integuments is to be entirely removed. When blood-veffels of any confiderable fize are divided, either before or at the time of the examination, they ought to be allowed to bleed freely, as in no cafe whatever is the lofs of blood attended with more advantage than the prefent. When, however, it appears that the patient has loft a fufficient quantity, the veffels ought to be fecured.

After the integuments have been divided, if the fkull be found to be fractured and depreffed, the nature of the cafe is rendered evident ; but even where there is no external appearance of fracture, tumour, difcolouration, or other injury, if the patient continue to labour under fymptoms of a compreffed brain, if the pericranium has been feparated from the bone, and efpecially if the bone has loft its natural appearance, and has acquired a pale white or dufky yellow hue, the trepan ought to be applied without hefitation, at the place where thefe appearances mark the principal feat of the injury. Again, although no mark, either of fracture or of any difeafe underneath, fhould appear on the outer table of the bone, yet there is a poffibility that the inner table may be fractured and depreffed. This indeed is not a common occurrence, but it happens perhaps more frequently than furgeons have been aware of ; and where it does happen, the injury done to the brain is as great, and attended with as much danger, as where the whole thicknefs of the bone is beaten in. The application of the trepan is therefore ufually deemed a neceffary meafure.

But if, after the application of the trepan, it happens that no mark of injury appears either in the outer or inner table in that part, or in the dura mater below it, and that the fymptoms of a compreffed brain ftill continue, a fracture in fome other part is to be fufpected ; or that kind of fracture termed by practitioners *counter-fiffure*, where the fkull is fractured and fometimes depreffed on the oppofite fide to, or at a diftance from, the part where the injury was received. This is fortunately not a very frequent occurrence, and has even been doubted by fome ; but different inftances of it have, beyond all queftion, been found. If therefore the operation of the trepan has been performed, and no fracture is difcovered, no extravafation appears on the furface of the brain ; and if blood-letting and other means ufually employed do not remove the fymptoms of compreffion, the operator is to fearch for a fracture on fome other part. The whole head fhould again be examined with much accuracy ; and, by preffing deliberately but firmly over every part of it, if the fmalleft degree of fenfibility remains, the patient will fhew figns of pain, either by moans or by raifing his hands, when preffure is made over the fractured part. In this way, fractures have been frequently detected, which might otherwife have been concealed.

Having here confidered every thing preparatory to the operation of the trepan, we fhall point out the means beft adapted for the removal or elevation of a depreffed portion of the bone, by the ufe of that inftrument, under the article Trepan. After the operation, the patient fhould be placed in as eafy a pofition, in bed, as poffible, with his head and fhoulders elevated a little more than ordinary. If the operation be attended with fuccefs, he will foon begin to fhew figns of increafing fenfibility, and the original bad fymptoms will gradually difappear. In this ftate, he ought to be kept as quiet as poffible ; proper laxatives being occafionally adminiftered, and fuch as may be leaft of a naufeating nature. His food ought to be fimple and eafy of digeftion, and his drink of the moft diluent kind. If he complain of the wound being uneafy, an emollient poultice fhould be immediately applied, and renewed three or four times in the twenty-four hours. By thefe means there will commonly be a free fuppuration from the whole furface of the fore.

Every time the wound is dreffed, the purulent matter ought to be wiped off from it with a fine warm fponge ; and if any degree of floughinefs takes place on the dura mater or parts adjacent, it will then be completely feparated. Granulations will begin to form, which will continue to increafe till the whole arife to a level with the furface of the cranium. The edges of the fore are now to be dreffed with fome mild cerate, and the reft of it covered with fine lint, kept gently preffed on it by a night-cap properly fecured. In this way the cure will go on favourably ; luxuriance of granulations will commonly be prevented ; the parts will cicatrize kindly ; and as all the fkin has been preferved in making the firft incifion, the cicatrix will be but little obferved.

But things do not always proceed in this favourable manner. Sometimes, in a few hours after the operation, the patient is feized with a kind of reftleffnefs, toffing his arms, and endeavouring to move himfelf in bed, while the fymptoms of a compreffed brain remain nearly the fame as formerly. In this cafe, efpecially if the pulfe be quick and ftrong, the patient ought to be bled freely, as there will be reafon to fufpect fome tendency to inflammation in the brain. Sometimes, though the trepan has been properly applied, the fymptoms are not relieved, on account of extravafated fluids collected internally under the dura mater, or between the pia mater and brain, or in the cavity of the ventricles. The danger in thefe cafes will be in proportion to the depth of the

the collection. Particular attention, therefore, ought always to be paid, to the ftate of the dura mater after the perforation has been made. If blood be collected below the dura mater, this membrane will be found tenfe, dark coloured, elaftic, and even livid; in which cafe, an opening becomes abfolutely neceffary to difcharge the extravafated fluid. Gentle fcratches are to be made with a fcalpel, till a probe or directory can be introduced; upon which the membrane is to be fufficiently divided in a longitudinal, or fometimes even in a crucial, direction, till an outlet to the fluid be given.

After the dura mater has been cut in this manner, there is a poffibility of the brain protruding at the opening; but the danger from this is not equal to that arifing from effufed fluids compreffing the brain. A troublefome appearance alfo now and then follows the operation of the trepan; namely, the excrefcences called *fungi* (fee FUNGUS), formerly fuppofed to grow immediately from the furface of the brain, but which, in general, originate from the furface of the dura mater or cut edge of the bone granulating too luxuriantly. After the wound is cured, only a fmall cicatrix will remain, and, in general, the parts will be nearly as firm as at firft, but when much of the integuments hath been feparated or deftroyed, as they are never regenerated, the bone will be left covered only by a thin cuticle, with fome fmall quantity of cellular fubftance. When this is the cafe, the patient ufually wears a piece of filver, copper, or tin, properly fitted and lined with flannel, to protect it from the cold and other external injuries.

This is the method now commonly practifed in cafes of compreffion: but it frequently happens, that inftead of compreffion, fuch a degree of concuffion takes place that no affiftance from the trepan can be attended with any advantage; for the effects of concuffion (fee CONCUSSION) are totally different from thofe of compreffion, and therefore to be removed in a different manner. In Part III. of his Surgical and Phyfiological Effays, Mr. Abernethy fays, the degree of preffure which the brain can fuftain without great injury to the fyftem, probably may vary according to the difpofition of that organ to be affected by it, the fuddennefs of its application, and the direction in which it is made; and although it muft be very difficult to obtain any precife knowledge on this fubject, yet there is great reafon to believe that the brain can bear more preffure without injury to it, than was formerly fuppofed. The firft of thefe circumftances feems evident; for, in fome perfons, a flight preffure produces fevere fymptoms; whilft in others a much greater degree is borne without inconvenience. Where a compreffing caufe does not, in the firft inftance, occafion bad effects, if inflammation of the brain enfues, it feems then to act injurioufly; which probably arifes from the increafed fufceptibility of the brain. We can rarely judge of the effects of preffure when any part of the cranium is beaten in by a blow: for in that cafe the fhock generally occafions ftupefaction. Internal hæmorrhages, perhaps, afford us the beft criterion whereby to determine the effects of preffure on the brain. A cafe (the feventh) which Mr. Abernethy relates, fufficiently illuftrates this remark, for it appears that a confiderable hæmorrhage muft have taken place before it deprived the patient of his faculties; fince he walked home, undreffed himfelf, and went to bed, after the trunk of the middle artery of the dura mater had been ruptured. In cafes of apoplexy, alfo, the hæmorrhage is generally very large, before it produces thofe confequences which deftroy life.

Compreffion of the brain will fometimes arife from the luxuriant growth of a part of the inner table of the fkull, or a fmall projecting piece of bone, which may have advanced fpontaneoufly; and it has now and then been difcovered that epileptic fits arofe from this caufe. In apoplexy, the common caufe of a compreffion of the brain is effufed blood or ferum. When perfons have a palfy of the lower extremities from incurvation of the fpine, the paralyfis arifes from compreffion made on fome part of the fpinal marrow by a difeafe of the vertebræ; and nothing can relieve a patient effectually in this cafe, unlefs the preffure be removed by extending the fpinal column mechanically. (See *Curvature of the* SPINE.)

A dangerous compreffion may be produced in different parts of the body, by the exiftence of tumours, by diflocation of the joints, or by fractures, &c. See TUMOUR, DISLOCATION, and FRACTURE.

COMPRESSOR *Naris*, or *Narium*, in *Myology*, is a mufcle of the nofe, defcribed alfo under the name of conftrictor nafi. It arifes from the root of the ala nafi, where its fibres are ftrongly connected with the depreffor labii fuperioris et alæ nafi, and are alfo mixed with thofe of the depreffor alæ nafi. It afcends on the dorfum of the nofe, and fcatters its fibres between the ala and the offa nafi; they are partly joined with the fibres of the oppofite mufcle, and partly connected with thofe of the frontal portion of the fronto-occipitalis. By drawing down the moveable part of the alæ nafi, and bringing it to the feptum, it clofes the aperture of the noftrils: in this cafe the depreffor alæ nafi muft concur with it, in order to render the inferior part of the ala fixed. If this latter mufcle does not act at the fame time, the compreffor naris will elevate the lower portion of the ala, and thereby expand the noftril. Cowper calls it elevator alæ nafi: Santorini and Winflow, tranfverfalis nafi.

COMPRESSOR *proftatæ*. It feems doubtful whether this fhould be confidered as a diftinct mufcle, or only as a portion of the levator ani. It arifes from the under furface of the arch of the pubis, and is loft between the proftate and rectum. It will therefore have the power of elevating or compreffing the former part.

COMPRINT, a furreptitious printing of one bookfeller's copy by another perfon, for gain; which was contrary to common law, and is now, under certain limitations, reftrained by ftatute. See LITERARY *Property*.

COMPRISE NIENT. See NIENT.

COMPROMISE, a treaty or contract, whereby two contending parties eftablifh one or more arbitrators, to judge of and terminate their differences in an amicable way.

The regular way of appointing a compromife is by a writing, expreffing the names of the arbitrators, the power of choofing an umpire, or fuper-arbitrator, in cafe of need, a time limited for the arbitrage, and a penalty on the party who does not abide by the decifion.

By the civil law, a flave cannot make a compromife without the leave of his mafter, nor can a pupil without the authority of his guardian, or a wife without that of her hufband. So a flave, a deaf or dumb man, a minor, and the perfon who is a party in the caufe, are incapable of being chofen arbitrators in a compromife.

The occafions on which a compromife is not allowed of, are reftitutions, marriage-caufes, criminal affairs, queftions of ftate; and, generally, any thing wherein the public intereft is more concerned than that of private perfons.

In our law, a compromife is not of fo much extent. Weft defines it the faculty, or power of pronouncing fentence between perfons at controverfy, given to arbitrators by the mutual private confent of the parties, without public authority.

Matters compromiſed are alſo matters of law referred, or made an end of. See ARBITER and ARBITRATION.

COMPROMISE is alſo uſed in beneficiary matters; where it ſignifies an act, whereby thoſe who have the right of election, transfer it to one or more perſons, to elect a perſon capable of the office or dignity.

COMPS, in *Geography*, a ſmall town of France, in the department of the Var, and chief place of a canton in the diſtrict of Draguignan; ten miles N. of Draguignan. It contains 739 and the canton 2949 inhabitants. The territory includes 325 kiliometres and 9 communes.

COMPSA, CONZA, in *Ancient Geography*, a town of Italy, in Samnium, towards the ſouth-eaſt, upon the Aufidus. At the ſiege of this city was killed Milo, ſo well known by Cicero's oration on occaſion of his murder of Clodius. See COMPZA.

COMPSATUS, a river of Thrace, mentioned by Herodotus, which ran from north to ſouth, and diſcharged itſelf into the lake Biſtonis, near Abdera.

COMPTE, LEWIS LE, in *Biography*, a native of Bourdeaux, and of the order of jeſuits, went to China in the character of miſſionary in the year 1685. Upon his return, he publiſhed "Memoirs on the preſent State of China," &c., in two vols. As an hiſtorian he has been accuſed of a too great partiality for the character and manners of the Chineſe, and of attributing to them earlier advances in civilization and improvement than he was warranted by real facts. His work was proſcribed, and condemned to the flames, as the beſt means of refuting his opinions He died at his native place in the year 1729. Nouv. Dict. Hiſt.

COMPTE, NICHOLAS DE, a French monk, a native of Paris, is known as the author or editor of different works which have met with a favourable reception. Among others, he publiſhed "The remarkable Travels of Peter della Valle, a Roman Gentleman, tranſlated from the Italian, in 4 vols. 4to."—"A new and intereſting Hiſtory of the Kingdoms of Tonquin and Laos, in 4to." tranſlated from the Italian of father Manni, in 1666. In the year preceding this, he publiſhed the third volume of father Lewis Coulon's "Hiſtory of the Jews." He died at Paris in 1689.

COMPTING, or COUNTING-HOUSE, an office in the king's houſhold, under the direction of the lord ſteward, ſo called, becauſe the accompts for all expences of the king's houſhold are there taken daily by the lord ſteward, comptroller, cofferer, maſter of the houſhold, the clerks of the green-cloth, and the clerks comptrollers. They alſo there make proviſion for the houſhold, and make payments, and orders, for the good government thereof.

In the compting-houſe is the board of green-cloth.

COMPTON, HENRY, in *Biography*, an eminent Engliſh biſhop, was the youngeſt ſon of Spencer, the ſecond earl of Northampton. He was born in the year 1632, and, though deprived of his father by death at a very early age, was initiated with great care in the rudiments of learning, after which he was entered at Queen's college, Oxford, where he proſecuted his ſtudies with much diligence, till the year 1652. From the univerſity he went to the continent, with a view of perfecting himſelf in the modern languages, and of acquiring an accurate knowledge of foreign eſtabliſhments, eccleſiaſtical and civil. On his return, he accepted under Charles II. a cornet's commiſſion in the king's horſe guards, which he ſoon reſigned and devoted himſelf to the ſervice of the church. He was immediately admitted to the degree of maſter of arts in the univerſity of Cambridge, and afterwards obtained the grant of the next vacant canonry of Chriſt-church, Oxford. In 1666, he was admitted canon-commoner of that college, and ſhortly after was in poſſeſſion of the rectory of Cottenham in Cambridgeſhire. He was in the following year made maſter of St. Croſſe's hoſpital near Wincheſter, and in 1669 inſtalled canon of Chriſt-church. Without farther delay he took the degrees firſt of bachelor of divinity, and then of doctor of divinity. In 1674 he was nominated to the biſhopric of Oxford, where he remained but a ſingle year, when he was appointed dean of the royal chapel, and tranſlated to the ſee of London. For theſe valuable and highly important preferments, Dr. Compton was indebted as well to his own excellent character as to his family connections. Soon after he had been made biſhop of London, he was ſworn in of his majeſty's privy council, and undertook the ſuperintendency of the religious education of the princeſſes Mary and Anne. To the conſcientious diſcharge of his duty as a preceptor may be juſtly aſcribed the zealous attachment of his pupils, afterwards ſovereigns of England, to the Proteſtant religion, as by law eſtabliſhed. This worthy prelate endeavoured to deviſe methods of reconciling the diſſenters to his own church; his intentions were unqueſtionably good, but ſome of the means which he uſed to effect his purpoſe could not be juſtified on the principles of proteſtantiſm. Under the pretence of guarding the church from hereſy, he obtained a royal mandate to prohibit certain diſcuſſions on the doctrine of the Trinity: he nevertheleſs ſhewed himſelf a decided friend to the Proteſtant reformation, and encouraged his clergy to defend it with Chriſtian zeal, when the principles of popery, or a moſt blameable indifference to all religion, were encouraged by the profligate court of Charles II. His conduct, in this reſpect, which cannot be too highly applauded, rendered him obnoxious to the king and to his brother, who ſoon after aſcended the throne as James II. The name of the excellent prelate was immediately after this event ſtruck out of the liſt of the privy council, after which he was deprived of his office as dean of the royal chapel. For refuſing to become an inſtrument of eccleſiaſtical tyranny among his own clergy, and to ſanction various unconſtitutional meaſures of the king, he was, in 1686, ſuſpended from his epiſcopal office. In 1688 the dread of a revolution in favour of the prince of Orange, induced the king to attempt regaining the affection of Dr. Compton, and that of the other clergy, who had been ſimilarly treated, by reſtoring them to their office. It was, however, too late to effect a reconciliation, and the biſhop ſhortly after took a decided part in favour of the new order of things. He joined in conducting the princeſs Anne of Denmark from London to Nottingham; in ſigning the aſſociation begun at Exeter, and in waiting on the prince of Orange at the head of his clergy, to thank him for his interference in preſerving the laws and liberties of the nation; and in the houſe of peers he voted for the prince and princeſs of Orange in the room of the abdicated king. Immediately after this event had been determined on, he was reſtored to the office of privy counſellor, and to that of dean of the royal chapel; he had alſo the honour of performing the ceremony at the coronation of king William and queen Mary, inſtead of archbiſhop Sancroft, who refuſed to take the oaths to the new government. In the year 1689 he was appointed one of the commiſſioners for reviewing the liturgy, and preſident of the convocation, in which certain propoſed amendments were to be diſcuſſed. In this ſituation he at firſt joined the moderate party, who were for comprehending diſſenters by adapting the liturgy to their minds, but afterwards he united himſelf with thoſe members who adviſed and obtained the diſcontinuance of the convocation ſeſſion. Dr. Compton was appointed, as biſhop of London, a commiſſioner of trade and plantations, and in this capacity he ſelected and ſent over

over to the colonies in America, ſuch clergymen as he thought beſt adapted, by their talents and zeal, to promote the intereſts of the church of England. In the year 1690, he attended the king, at his own expence, to the congreſs at the Hague, where the grand alliance againſt France was concluded. From this period he united himſelf more cloſely with the tory party, in conſequence of which his influence at the court of king William was greatly diminiſhed, if not wholly terminated; but in the reign of queen Anne, he recovered his former power and intereſt. Dr. Compton was in the commiſſion for promoting the union of Scotland with England; he was aſſiduous in obtaining the act for augmenting ſmall livings, by a grant of the firſt fruits and tenths; and he maintained a friendly correſpondence with the foreign Proteſtant churches, and the univerſity of Geneva, with a view of impreſſing them with favourable ſentiments towards the Church of England, and of obtaining their diſapprobation of thoſe who ſhould diſſent from its diſcipline. He died at Fulham in the year 1713, in the eighty-firſt year of his age. For ſome time before his deceaſe he is repreſented to have been much in the power of others, and to have followed their will rather than the dictates of his own mind. Through the whole of a long life he was exemplary in his moral conduct, and diſplayed the manners of a gentleman. He was a warm friend, a generous patron, and truly charitable to the wants of thoſe about him. As a biſhop he maintained the intereſts of the church, and was attentive to the conduct and advancement of his clergy, but as a preacher he was extremely dull and inanimate. His character as a literary man was reſpectable, though his works are not numerous nor of the firſt rank in merit. He publiſhed a tranſlation from the Italian of "The Life of Donna Olympia Maldachini, who governed the church during the time of Innocent X." "The Jeſuits' Intrigues with private Inſtructions of that Society to their Emiſſaries," tranſlated from the French. "A Treatiſe of the Holy Communion," and letters to the clergy at different periods, which were reprinted in 1686, under the title of "Epiſcopalia, or Letters of the Right Reverend Father in God, Henry Lord Biſhop of London, to the Clergy, &c." He alſo publiſhed "A Letter on Non-reſiſtance," which may be ſeen in memoirs of Mr. John Kettlewell. Biog. Brit. Tindal's Continuation of Rapin, vol. vi. &c.

COMPTON, *Little*, in *Geography*, a town of the United States of America, in Rhode iſland.

COMPTONIA, in *Botany*, (ſo named by Dr. Solander, in honour of the right reverend Henry Compton, lord biſhop of London, who cultivated many exotics at Fulham.) L'Herit. Stirp. Nov. Schreb. 1764. Willd. 1644. Gært. 564. Claſs and order, *monœcia triandria*. Nat. Ord. *Amentaceæ*.

Gen. Ch. *Male flowers*. *Catkin* cylindrical; looſely imbricated all round with concave, kidney-ſhaped, acuminate, caducous, one-flowered ſcales. *Cal.* Perianth two-leaved; leaves equal, boat-ſhaped, ſhorter than the ſcale. *Cor.* none. *Stam.* Filaments three, ſhorter than the calyx, forked; anthers ſix, two-valved. *Female flowers*. *Catkin* egg-ſhaped, cloſely imbricated with ſcales ſimilar to thoſe of the male. *Cal.* Perianth ſix-leaved; leaves oppoſite, in pairs, filiform, membranous at the baſe, many times longer than the ſcale. *Cor.* none. *Piſt.* Germ roundiſh; ſtyles two, capillary. *Peric.* none. *Seed.* Nut oval, one-celled, without valves.

Eſſ. Ch. Male flowers in a catkin. Calyx two-leaved. Corolla none. Anthers forked. Female flowers in a catkin. Calyx ſix-leaved. Corolla none. Styles two. Nut oval.

Sp. C. *aſplenifolia*. Hort. Kew. 3. 334. Mart. Willd. Gært. tab. 90. fig. 7. (Liquidambar aſplenifolium; Linn. Sp. Pl. Myrica. Linn. Hort. Clif. Gale mariana. Pet. Muſ. 773. Myrti brabanticæ affinis americana; Pluk. alm. 250. tab. 100. fig. 6, 7.) *Stems* near three feet high, ſhrubby, ſlender, hairy, branched. *Leaves* from three to four inches long, half an inch broad, alternately ſinuated almoſt to the midrib, reſembling thoſe of ſpleenwort, dark green, hairy underneath, ſitting cloſe to the ſtalks. *Male catkins* lateral, erect. *Nut* oſſeous, turgidly lenticular, naked, ſmooth, ſhining, obſoletely ſtriated, of a bay colour. A native of New York, Pennſylvania, Virginia, and Carolina; cultivated by the dutcheſs of Beaufort in 1714; flowering from March to May. Boſc was well acquainted with it in Carolina, and obſerved, that the branches generally died at the end of the third year, the new wood then ſucceeding to the old, as in the rubi; it was alſo ſeldom found in fruit, though it flowered abundantly.

COMPTROL, or CONTROLE, is properly, a double regiſter, kept of acts, iſſues, &c. of the officers or commiſſioners in the revenue, army, &c. in order to perceive the true ſtate thereof, and to certify the truth, and the due keeping of the acts ſubject to that enregiſterment. See REGISTER.

COMPTROLLER, an officer eſtabliſhed to comptrol, or over-ſee public accounts, and to certify, on occaſion, whether things have been comptrolled and examined, or not. Thus, we have a *comptroller of the king's houſhold*, or of the accounts of the board of green-cloth: *Comptroller-general* of the cuſtoms; *comptroller* of the navy; *comptroller* of the mint; *comptroller* of the exciſe; *comptrollers* of the accounts of the army; of the chamber, &c. See CLERK.

COMPTROLLER *of the Artillery*, is the perſon who inſpects the artillery-muſters, makes out the pay liſts, takes the accounts of ſtores and the remains of them, and is accountable to the office of ordnance.

COMPTROLLER is alſo the name of an officer, who ſuperintends, examines, and inſpects the accounts of the army at large.

COMPTROLLER *of the hanaper*, is an officer in chancery, attending the lord chancellor daily in term and ſeal time. This officer is to take all things ſealed from the clerk of the hanaper, incloſed in bags of leather, and to note the juſt number and effect thereof; to enter them in a book, with all the duties belonging to the king and other officers for the ſame, and ſo charge the clerk of the hanaper with them. See CLERK and HANAPER.

COMPTROLLERS *of the pells*, are officers of the exchequer, whereof there are two, *viz.* two chamberlains clerks, who keep a comptrol of the pell of receipts, and goings-out; originally they took notes of other officers' accompts, in order to diſcover if they did amiſs.

COMPTROLLER *of the pipe*, an officer of the exchequer, who writes out ſummonſes twice a year, to levy the farms and debts of the pipe. See EXCHEQUER and PIPE.

He was anciently called *duplex ingroſſator*.

COMPTROLLER'S *bay*, in *Geography*, a bay of the Pacific ocean in the N.W. part of America, ſituated to the north of Cape Suckling, and of an iſland, ſtretching S. E. and N.W. about 3 leagues, and lying on the N.W. ſide of the N. E. end of Kaye's iſland. N. lat. 60° 6′. W. long. about 215° 30′.

COMPULSION, and *inevitable Neceſſity*, in *Law*, conſtitute a ſpecies of defect of will, and they denote ſuch a conſtraint upon the will, by which a man is urged to do that which his judgment diſapproves; and which, it is to be preſumed, his will (if left to itſelf) would reject. As puniſhments

punifhments are only inflicted for the abufe of that free will, which God has given to man, it is highly juft and equitable that a man fhould be excufed for thofe acts, which are done through unavoidable force and compulfion. Of this nature is the obligation of *civil* fubjection, whereby the inferior is conftrained by the fuperior to act in a manner contrary to what his own reafon and inclination would fuggeft; as when a legiflator eftablifhes iniquity by a law, and commands the fubject to do an act contrary to religion or found morality. How far the excufe will be admitted "in foro confcientiæ," or whether the inferior in this cafe is not bound to obey the divine rather than the human law is a queftion, which admits of no doubt. Neverthelefs, obedience to exifting laws is unqueftionably a fufficient extenuation of civil guilt before the municipal tribunal. The fheriff, who burnt Latimer and Ridley, in the bigotted days of queen Mary, was not liable to punifhment from Elizabeth, for executing fo horrid an office; being juftified by the commands of that magiftracy, which endeavoured to reftore fuperftition under the holy aufpices of its mercilefs fifter, perfecution. As to perfons in private relations, the principal cafe where conftraint of a fuperior is allowed as an excufe for criminal mifconduct, is with regard to the matrimonial fubjection of the wife to her hufband; for neither a fon nor a fervant is excufed for the commiffion of any crime, whether capital or otherwife, by the command or coërcion of the parent or mafter; (1 Hawk. P. C. 3.) though in fome cafes the command or authority of the hufband, either exprefs or implied, will privilege the wife from punifhment, even for capital offences. And, therefore, if a woman commit theft, burglary, or other civil offences againft the laws of fociety, by the coërcion of her hufband; or even in his company, which the law conftrues a coërcion; fhe is not guilty of any crime; being confidered as acting by compulfion, and not of her own will. (1 Hal. P. C. 45.) This doctrine is at leaft a thoufand years old in this kingdom, being found among the laws of king Ina the Weft-Saxon. (cap. 57.) This rule, however, with regard to crimes, admits of an exception in crimes that are "mala in fe," and prohibited by the law of nature, as murder and the like. Alfo in treafon, no plea of coverture fhall excufe the wife. In inferior mifdemeanors there is likewife an exception; for a wife may be indicted and fet in the pillory with her hufband, for keeping a *brothel*. And in all cafes where the wife offends alone, without the company or coërcion of her hufband, fhe is refponfible for her offence, as much as any feme-fole. Another fpecies of compulfion or neceffity is what our law calls *durefs per minas*; which fee. A third fpecies of neceffity, diftinguifhable from the actual compulfion of external force or fear, is, when a man has his choice of two evils fet before him, and being under a neceffity of choofing one, he chufes the leaft pernicious of the two. Of this fort is that neceffity, where a man by the commandment of the law is bound to arreft another for any capital offence, or to difperfe a riot, and refiftance is made to his authority; it is in this cafe juftifiable and even neceffary to beat, to wound, or perhaps to kill the offenders, rather than permit the murderer to efcape, or the riot to continue. 1 Hal. P. C. 53. There is another cafe of neceffity, which has occafioned much fpeculation among the writers upon general law; *viz.* whether a man in extreme want of food or cloathing may juftify ftealing either, to relieve his prefent neceffities. Grotius and Puffendorf, and many other of the foreign jurifts, maintain the affirmative; alleging that in fuch cafes the community of goods by a kind of tacit conceffion of fociety is revived. Some of our own lawyers have held the fame opinion (See Britton, c. 10. Mirr. c. 4. § 16.); though it feems to be an unwarranted doctrine, borrowed from the notions of fome civilians: at leaft, it is now antiquated; the law of England admitting no fuch excufe at prefent. 1 Hal. P. C. 54. However, the founders of our conftitution have thought it better to veft in the crown the power of pardoning particular objects of compaffion than to countenance and eftablifh theft by one general undiftinguifhing law. Blackft. Com. vol. iv.

COMPULSOR, formed of the verb *compellere, to oblige, conftrain*, an officer under the Roman emperors, difpatched from court into the provinces, to compel the payment of taxes, &c. not paid within the time prefcribed.

Thefe were charged with fo many exactions, under colour of their office, that Honorius cafhiered them by a law in 412.

The laws of the Vifigoths mention military compulfors; who were officers among the Goths, whofe bufinefs was to oblige the tardy foldiers to go into the fight, or to run to an attack, &c.

Caffian mentions a kind of monaftic compulfors, whofe bufinefs was to declare the hours of canonical office, and to take care the monks went to church at thofe hours.

COMPULTERIA, in *Ancient Geography*, a town of Italy, in Campania. It abandoned the Romans to furrender itfelf to Hannibal; but Fabius reftored it by the fword.

COMPUNCTION, formed from *compungere*, of *pungere, to prick*, in *Theology*, an inward grief in the mind for having offended God.

The Romanifts own their confeffion infignificant, unlefs attended with compunction, or pricking of heart. See CONFESSION.

Among fpiritualifts, compunction bears a more extenfive fignification; and implies not only a grief for having offended God, but alfo a pious fenfation of grief, forrow, and difpleafure, on other motives. Thus, the miferies of life, the danger of being loft in the world, the blindnefs of the wicked, &c. are to pious people motives of compunction.

COMPURGATOR, in *Law*, one that by oath juftifies, or clears, another's innocence. They were introduced as evidence in the jurifprudence of the middle ages, and their number varied according to the importance of the fubject in difpute, or the nature of the crime with which a perfon was charged. In fome cafes thefe compurgators were multiplied to the number of three hundred. (Præf. Nicol. ad Wilkins, p. 11.). But the ufual number was eleven. It has, indeed, been held by later authorities, that fewer than eleven compurgators will anfwer the purpofe; but fir Edward Coke is pofitive that there muft be this number; and his opinion is founded both on better authority and on better reafon, for as wager of law is equivalent to a verdict in the defendant's favour, it ought to be eftablifhed by the fame or equal teftimony, namely, by the oath of twelve men. Thus Glanvil expreffes it (l. 1. c. 9.) "jurabit duodecima manu;" and in 9 Hen. III. when a defendant in an action of debt waged his law, it was adjudged by the court "quod defendat fe duodecima manu." Thus too, in an author of the age of Edward I., we read, "adjudicabitur reus et legem fuam duodecima manu." And the ancient treatife, entitled, "Dyverfite des courts," exprefsly confirms fir Edward Coke's opinion.

This device, which was adopted for rendering the purgation by oath more certain and fatisfactory, was found to be ineffectual. It was a point of honour with every man in Europe, during feveral ages, not to defert the chief on whom he depended, and to ftand by thofe with whom the ties

ties of blood connected him. Whoever then was bold enough to violate the laws, was fure of devoted adherents, willing to abet and eager to fcreen him in whatever manner he required. The formality of calling compurgators proved an apparent, not a real fecurity, againft falfehood and perjury; and the fentences of courts, while they continued to refer every point in queftion to the oath of the defendant, became fo flagrantly iniquitous as to excite univerfal indignation againft this method of prevention. See OATH and WAGER *of Law*.

COMPUTATION, the manner of accounting and eftimating time, weights, meafures, and money.

The word is fometimes alfo ufed among mathematicians in the like fenfe as CALCULATION.

COMPUTATION *of a planet's motion*. See PLANET.

COMPUTATION is particularly ufed in *Law* in refpect of the true account, or conftruction of time, fo underftood, as that neither party do wrong to the other, nor the determination of time be left at large, or be taken otherwife than according to the judgment and intention of law.

A deed, dated May 11, to hold from the day of the date, fhall be conftrued to begin on the 12th day of May.

If indentures of demife be ingroffed, bearing date May 11, 1769, to have and to hold the land in S. for three years from henceforth; and the indentures be delivered the 4th of June following: in this cafe, *from henceforth* fhall be computed from the day of the delivery, and not from the date. And if the indentures be delivered at four of the clock in the afternoon, the faid 4th of June, the leafe fhall end the third day of June in the third year; the law, in fuch computation, rejecting all fractions or divifions of the day, on account of that uncertainty which is the mother of contention. In writings, ordered by the ftat. 27 Hen. VIII. to be inrolled within fix months, if fuch writings have date, the fix months fhall be accounted from the date, and not from the delivery: if they want date, it fhall be accounted from the delivery. Coke, lib. 5.

If a deed be fhewn to a court at Weftminfter, it fhall remain in court (by judgment of law) all the term in which it is fhewn: for all the term is but as one day in law. Coke, ibid.—If a church be void, and the patron does not prefent within fix months, the bifhop of the diocefe may collate his chaplain; but thefe fix months fhall be computed according to 28 days of the month; and not according to the calendar.

COMPUTATION *of Miles*, after the Englifh manner, allows 5280 feet, or 1760 yards to each mile; and the fame fhall be reckoned, not by ftraight lines, as a bird or arrow may fly, but according to the neareft and moft ufual way. Cro. Eliz. 212.

COMPUTO, a writ thus called from its effect, which is to compel a bailiff, chamberlain, or receiver, to yield his accompts. It is founded on the ftatute of W. & M. 2. c. 12.

The fame lies for executors of executors; and againft the guardian in focage, for wafte made in the minority of the heir.

COMPUTO *vicecomitis habendo refpectu*. See RESPECTU.

COMPZA, in *Ancient Geography*, a town of Italy, in the territory of the Hirpini, towards the frontiers of Lucania. Hannibal, after the battle of Cannæ, was invited into the country of the Hirpini by Statius, who promifed to furrender to him the town of Compza. The modern name is CONSA or CONZA. See alfo COMPSA.

COMRADE is a common appellation for a fellow-foldier in the fame regiment, troop, or company.

COMSHE, in *Geography*. See COMCHE.

COMTAT VENAISSIN, a country fituated in the fouth of France, formerly belonging to the pope, by whom it was ceded, together with its chief city Avignon, to the French government, foon after the revolution of 1789. It now forms part of the department of Vauclufe.

COMTE, COUNT. The titles of *comte*, of *duc*, of *vicaire*, of *centenier*, or *thungen* before the time of Charles the Bald, were not hereditary in families. Thefe officers adminiftered the finances and juftice in the provinces: they were, at the fame time, magiftrates and military characters; they convoked the *ban* and *arriere-ban*. They affembled and conducted the troops to the general rendezvous. And when they judged a caufe they had their fhields on.

COMTE *du Palais*. See MAJORDOME.

COMUM, in *Ancient Geography*, a town of Gallia Tranfpadana, fituated towards the north, on the fouthern bank of the lake Larius. It was founded by the Gauls, became a Roman colony, and was enlarged by Scipio. Julius Cæfar eftablifhed Greeks in it, and then called it the new Comum, but upon their departure it loft this epithet. It was a municipal town. Pliny founded in it fchools and a public library. See COMO.

COMUS, in *Mythology*, the god of jollity or feftivity. There is great reafon to believe he was the Chamos of the Moabites; Baal-Phegor, Baal-Peor, Priapus, and Bacchus. He is reprefented under the appearance of a young man, with an inflamed red countenance, his head inclined, and crowned with flowers; his air drowfy; leaning on a huntfman's fpear in his left hand, and holding an inverted torch in his right. His ftatue was placed at the chamber doors of new married perfons; his pedeftal crowned with flowers.

CON, *Ital.* a propofition, placed before many mufical terms; as *Con ario*, with the bow, after a *pirricato*, which fee. *Con fordini*, with the fordini or mute. *Con affetto*, tenderly. *Con furia*, furioufly. *Con difcrezione*, difcreetly, as to rapidity. *Con violini*, with violins, &c.

CONADIPSAS, in *Ancient Geography*, an ancient town of Scythia, on the other fide of Imaus.

CONAFADOS, an epifcopal town of Arabia, under the metropolis of Boftra.

CONAJOHARY, in *Geography*, a poft town of America, on the fouth fide of Mohawk river, in the ftate of New York, 36 miles above Schenectady, and 318 from Philadelphia.

CONAME, in *Botany*, the name given by Aublet to a genus formed by him for a fhrub found in Cayenne, which has fince been confidered as a phyllanthes. He gives it the following character. Male and female flowers on different plants. *Calyx* fix-cleft. *Cor.* none. *Stam.* numerous. *Pift.* Germ ftriated; ftyle bifid; ftigma villous. *Peric.* Capfule fix celled.

CONANA, in *Ancient Geography*, an epifcopal town of Afia, in Pamphylia.

CONANICUT, in *Geography*, an ifland near the coaft of America, a little to the eaft of Rhode ifland. N. lat. 41° 25'. W. long. 71° 20'.

CONANT, JOHN, in *Biography*, was born at Yeatenton, Devon, in the year 1608. He was entered at Exeter college, Oxford, in 1626, where he acquired great reputation for his diligence and for his talents as an able difputant. As a claffical fcholar he was remarkable for the purity of his Latin ftyle, and for his intimate and extenfive acquaintance with the Greek language. He was alfo well verfed in the feveral oriental tongues. In 1633, he was chofen fellow of Exeter college, where his fame, as a tutor, procured him pupils from many very refpectable families. The

commencement of the civil wars obliged him to retire from the univerfity, and he officiated for fome time at the living of Lymington, where he was plundered of his property, and imprifoned. As foon as he was liberated he went to London, and became domeftic chaplain to lord Chandos. While he continued in his lordfhip's houfe at Hanfield in Middlefex, he preached a gratuitous lecture at Uxbridge on a week day to numerous audiences. On the 7th of June 1649, he was unanimoufly chofen rector of Exeter college, without any folicitation on his own part. Shortly after this he was in danger of being driven out of all public employment, by the parliament's requiring his fubfcription to the "engagement," by which a promife was to be given to be true and faithful to the commonwealth of England, without a houfe of lords. This he at firft declined; having however a fortnight given him to reconfider the matter, he fubmitted; but under a declaration, fubfcribed at the fame time with the "engagement," which rendered that inftrument almoft nugatory. He now entered upon his office as rector with increafed zeal, and difcharged the feveral duties incumbent upon him, with the utmoft diligence and fidelity. In December 1654, he was appointed divinity-profeffor of the univerfity of Oxford, and in three years afterwards he was raifed to the dignity of vice-chancellor of that univerfity, which he retained till Auguft 5, 1660. While he held this high office, he was very inftrumental in procuring Mr. Selden's valuable collection of books for the public library; he diftinguifhed himfelf by the correction of abufes, and by the regulation of the public exercifes in fuch a manner, as proved highly beneficial to the interefts of folid learning. By fome of his biographers, Mr. Conant has been applauded for the fhare which he took in defeating a project for erecting an univerfity in the county of Durham. Praife on this account to us feems very ill beftowed, becaufe the intended object was worthy of a great nation, whofe places of public inftruction cannot be regarded as fufficiently numerous, to fuperfede the neceffity of others in diftant parts of the kingdom. Upon the reftoration of Charles II. Dr. Conant, in his official capacity, came to London, attended by the proctors, and others, and being introduced to the king he made a Latin fpeech on the occafion, and prefented his majefty with a book of verfes written by the members of the univerfity. He was appointed, in March 1661, a commiffioner with others to review the book of common prayer, and he affifted at the Savoy conferences. After this, upon the paffing of the act of uniformity, he was deprived of his preferments, becaufe he refufed to conform. During eight years he lived in retirement, when, upon ferious deliberation on the nature and lawfulnefs of conformity, he refolved to comply, and fubmitted to a re-ordination by Reynolds, bifhop of Norwich, whofe daughter he had married nearly twenty years before. Preferments were now immediately offered to his choice; and he accepted of the vicarage of All-Saints, Northampton, in which town he had for feveral years refided, in the higheft eftimation of the moft refpectable inhabitants. In Sept. 1675, his church and the greater part of the parifh were deftroyed by fire; but his own houfe efcaped. In the fucceeding year the bifhop of Norwich offered him the archdeaconry, with this high compliment, "I do not expect thanks from you, but fhall be very thankful to you, if you will accept of it." He conceded to this handfome requeft, and difcharged the office worthily, as long as his health would allow. In December 1681, he was inftalled a prebendary in the church of Worcefter, at the requeft of the earl of Radnor, who afked for it of the king, faying he came to beg preferment for a very deferving perfon, who never fought any thing for himfelf. He had long laboured under a weaknefs of fight, which terminated in total blindnefs in the year 1686. This heavy calamity, and the weight and infirmities of old age, he bore with exemplary refignation to the divine will till his death, which happened March 12, 1693. He was interred in his own parifh church of All-Saints in Northampton, where a handfome monument was erected to his memory. Dr. Conant was a man of folid and extenfive learning, but his great diffidence led him to conceal his acquirements. We have fix volumes of his fermons, of which one was dedicated by himfelf to the inhabitants of Northampton, the others were publifhed after his death, by Dr. John Williams, afterwards bifhop of Chichefter, and Mr. Coates principal of Magdalen-hall. Biog. Brit.

CONARIUM, in *Anatomy*, a term which has been applied to the pineal gland of the brain, in confequence of its conical figure. See Brain.

CONATUS, *endeavour*, a term frequently ufed by philofophical and mathematical writers; nearly equivalent to *nifus*. Conatus feems to be the fame, with refpect to motion, that a point is with refpect to a line; at leaft the two have this in common, that as the point is inceptive of the line, or the term from which it commences; fo is the beginning of all motion called the *conatus*. Add, that as in mathematical demonftrations, the extenfion of the point is conceived as if it were nothing at all; fo, in the *conatus* of motion, there is no regard to the time wherein, or the length which, it advances. See *Laws of* Nature.

Hence, fome define conatus to be a quantity of motion not capable of being expreffed by any time or length. Accordingly, all motion tends precifely the fame way wherein the moveable is acted on, or determined by the fame moving power. See Motion.

CONAWANGO, in *Geography*, a northern branch of Alleghany river, in Pennfylvania, which rifes from Chataughque lake.

CONCA, Cav. Sebastiano, in *Biography*, an hiftorical painter of confiderable reputation in the 18th century. He was born at Gaeta in the year 1676, and became the difciple of F. Solemene, the moft celebrated mafter of the fchool of Naples at that period. At the age of forty, Conca eftablifhed himfelf at Rome, and fpent five whole years in drawing from the fineft productions of ancient and modern art, in the vain hope of uniting to the graceful facility he had acquired from his mafter, a greater purity and correctnefs of defign. But it was too late; bred a mannerift, he had infenfibly imbibed thofe maxims which were to decide his future character; and at length he had the good fenfe to adopt the advice of the fculptor Le Gros, by purfuing the track which had originally been pointed out to him. He foon became an able machinift *(pittore di macchina)*, in a ftyle not very unlike that of Cortona. He united to facility of invention, and rapidity of pencil, a gay and fafcinating diftribution of colour; but his flefh has generally too green a hue in the fhadows. Amongft his large works at Rome, the "Affumption," at the church of St. Martino, and the "Prophet Jonas," at St. Giovanni Laterano, are of the beft. Many of his other productions are at Loretto, Ancona, and other towns of the ecclefiaftical ftate, befides an infinity of cabinet pictures difperfed throughout all parts of Europe. This artift died in 1764. He had a brother, Giovanni Conca, who affifted him in the execution of many of his large works, and is faid to have been an excellent copyift. Lanzi, Storia Pittorica.

Conca, in *Geography*, a town of the ifland of Corfica, 12 miles N. of Porto Vecchio.—Alfo, a market town in a fmall lake in the Campagna di Roma, in Italy.—Alfo, a fmall

ſmall river of Italy, which has its ſource in the duchy of Urbino, and flows into the gulf of Venice.

Concale. See Cancale.

Concale *Bay*, in the channel, on the coaſt of the department of Ille and Vilaine in France, is a fine bay, in which the Engliſh effected a landing in June 1758, and whence they proceeded to the port of St. Malo, where they burnt above 100 veſſels of different ſizes.

CONCAMERATED, among *Builders*, an appellation given to ſuch roofs as are arched in the vaults.

CONCAMERATIO, was an arched room in our ancient churches, between the eaſt end of the church and the high altar; ſo formed, that in proceſſions they might ſurround it.

CONCAN, or Cockun, in *Geography*, a tract of country on the weſtern coaſt of Hindooſtan, ſituated between Bombay and Goa, and ſeparated from the reſt of the continent by a ridge of high mountains called the Gauts. When the Moguls ſeized on Hindooſtan, they found this coaſt infeſted with pirates, and fitted out a fleet to protect their veſſels. The Mahrattas, finding their piracies interrupted, armed againſt the Moguls, ravaged their poſſeſſions, and fitted out a fleet to protect their pirates. Conagy Angria, who by his courage had acquired the ſupreme command, was appointed governor of Severndroog, one of the beſt fortreſſes on the coaſt, where he formed an independent ſtate, and in a little time extended his dominions for the ſpace of 40 leagues along the coaſt, and ſix leagues wide towards the mountains. His ſucceſſors aſſumed the name of Angria, and made peace with the Mahrattas on paying an annual tribute. They continued to make depredations on the coaſt, and ſeize all veſſels that paſſed that way till the year 1756, when their fleet was deſtroyed, and the ſtrong fort of Gheriah, in which the chief reſided, was taken by admiral Watſon and colonel Clive. The country now belongs to the Mahrattas. The principal towns are Choul, Fort Victoria, Dabul, Severndroog, Gheriah, Tamana, and Sunderdoo.

CONCANA, in *Ancient Geography*, a town of Spain, towards the north-eaſt of Lucus Aſturum, and to the ſouth of Salia, near the ſea. Horace ſays, that the inhabitants of this city took pleaſure in drinking the blood of horſes: and although a change took place in the manners of the people in Spain under the dominion of the Romans, Silius Italicus, who wrote under Trajan, gives an account of them ſimilar to that of Horace.

CONCANGIUM, a Roman ſtation, under the government of the honourable the duke of Britain, not mentioned in the Itinerary, but recorded in the Notitia Imperii, and generally believed to have been ſituated at Watercrook, near Kendal, where are viſible remains of a Roman ſtation, and where Roman antiquities have been found.

CONCARNEAU, or Conquerneau, in *Geography*, a ſmall, but neat ſea-port town of France, in the department of Finiſtere, and chief place of a canton in the diſtrict of Quimper, 42 miles S.E. of Breſt. The place contains 2,200, and the canton 6,320 inhabitants; the territory includes 125 kiliometres, and 4 communes. Its principal and almoſt only trade, is in pilchards, of which the average annual ſhipment is 600 barrels. The price of a barrel varies from 150 to 300 livres. N. lat. 47° 55′. E. long. 3° 45′.

CONCATENATION, in *Philoſophy*, a connexion of things, in manner of a chain.

The concatenation of ſecond cauſes is an effect of Providence. See Cause.

CONCAVE is applied to the inner ſurface of a hollow body; particularly if it be circular.

Concave is particularly underſtood of mirrors and lenſes: concave lenſes are either concave on both ſides, called *concavo-concave*; or concave on one ſide, and plane on the other, called *plano-concave*; or concave on one ſide, and convex on the other, called *concavo convex*, or *convexo-concave*, as the one or the other ſurface is a portion of a leſs ſphere.

The property of all concave lenſes is, that the rays of light, in paſſing through them, are deflected, or made to recede from one another; as in convex lenſes they are inflected towards each other; and that the more, as the concavity and convexity pertain to leſs circles.

Hence, parallel rays, as thoſe from the ſun, by paſſing through a concave lens, become diverging; diverging rays are made to diverge the more, and converging rays are either made to converge leſs, or become parallel, or go out diverging.

Hence, objects viewed through concave lenſes appear diminiſhed; and the more ſo, as they are portions of leſs ſpheres; and this in oblique, as well as in direct rays. See Lens.

Concave mirrors have the contrary effect to lenſes: they reflect the rays which fall on them, ſo as to make them approach more to, or recede from, each other than before, according to the ſituation of the object; and that the more as the concavity is greater, or the ſpheres whereof they are ſegments, leſs.

Hence, concave mirrors magnify objects preſented to them; and that in a greater proportion, as they are portions of greater ſpheres. See Mirror.

Hence, alſo, concave mirrors have the effect of burning objects, when placed in their focus. See Burning-glass.

CONCAVITY. An arch of a curve has its concavity turned one way, when the right lines that join any two of its points are all on the ſame ſide of the arch.

Archimedes, intending to include ſuch lines as have rectilinear parts, in his definition, ſays, a line has its concavity turned one way, when the right lines that join any two of its points are either all upon one ſide of it, or while ſome fall upon the line itſelf, none fall upon the oppoſite ſide. Archim. de Sphær. and Cyl. Def. 2. Mac Laurin's Fluxions, art. 180.

When two lines, having their concavity turned the ſame way, have the ſame terms, and the one includes the other, or has its concavity towards it, the perimeter of that which includes, is greater than the perimeter of that which is included. Archim. ib. ax. 2.

CONCEALERS, in *Law*, ſuch as find out concealed lands, *i. e.* lands kept privily from the king, by common perſons, having nothing to ſhew for their title, or eſtate therein.

They are thus called *per antiphraſin, a concelando*; as *mons* is *a movendo*, &c. Lord Coke calls them *turbidum hominum genus*.

CONCEALMENT *of baſtard's death*. See Bastard.

Concealment *of Treaſon*. See Misprision.

CONCELHO de Anciaens, in *Geography*, a town of Portugal, in the province of Tra-los-Montes, 8 miles W.N.W. of Mirandela.

Concelho *de Jaes*, a town of Portugal, in the province of Tra-los-Montes, 10 miles W. S.W. of Mirandela.

CONCELLANA, a town of Naples, in the province of Baſilicata; 5 miles S. of Acerenza.

CONCENTEYNA, a town of Spain, in the province of Valencia; 25 miles N. of Alicant.

CONCENTRATION, in general, denotes the retiring, or withdrawing of a thing inwards, towards the centre, or middle.

External cold is faid to concentrate the heat within bodies: after meals, the natural warmth retires, and as it were concentrates to promote the digeftion.

CONCENTRATION is alfo ufed by Dr. Grew for the higheft degree of mixture, *viz.* that wherein two or more atoms or particles touch, by a reception, and intrufion of the one within the other. See MIXTION.

This he takes to be the cafe of all fixed bodies without tafte or fmell; their conftitution being fo firm, that till the particles be detached from each other by fome extraordinary means, they cannot affect thofe fenfes.

CONCENTRATION, in *Chemiftry*, the act of increafing the ftrength of fluids, which are rendered ftronger by abftracting a portion of the mere menftruum. This is generally effected by evaporation, where the menftruum is driven off at a lower heat than is required to drive off the fubftance with which it is united. Thus, dilute fulphuric acid may be confidered as a mixture of the real acid with water, and by applying a certain heat, the water may be evaporized, leaving the acid behind in a ftate of concentration. When concentrated as much as poffible, its fpecific gravity is about twice as great as that of water, but it can rarely be obtained denfer than 1,85. When concentrated to 2,000 it contains a confiderable portion of water, as has been proved by combining it with barytes or potafh, in which cafe water remains behind, and does not enter into the combination. Again, vinegar confifts of an acid and water, and brandy of alcohol and water, and in proportion as the acid and alcohol are freed from the water, they are faid to be more or lefs concentrated. This may be performed, 1. Either by fimple diftillation, in which cafe the acid or fpirit comes over firft, leaving the water behind; or, 2. By expofing the vinegar or brandy to fevere froft, when the water will be frozen, and the acid or alcohol will be found in a ftate of concentration in the middle of the ice; the greater the cold, the higher the ftate of concentration; M. Lowitz has found, that the acid, however concentrated, congeals at—22°. Sulphuric acid, on the other hand, expofed to a much lefs fevere cold, cryftallizes, and to effect this, it muft not be greatly concentrated. 3. Another mode of concentrating the acetic acid, is by diftilling acetate of copper, reduced to powder, in a retort; at firft there comes over a liquid nearly colourlefs, and almoft infipid, and afterwards a highly concentrated acid tinged with green; but being diftilled a fecond time in a moderate heat, it is colourlefs, tranfparent, exceedingly pungent and concentrated. 4. The moft perfect method of obtaining this acid in a concentrated ftate, was difcovered by M. Lowitz of Peterfburg; it is thus: diftil a mixture of three parts of acetate of potafh, and four parts of fulphuric acid, till the acetic acid has come over into the receiver. To feparate it from the fulphuric acid, with which it is flightly contaminated, it muft be diftilled over a portion of acetate of barytes. By the experiments of Adet, Darracq, and others, on concentrating the acetic and acetous acids, it is afcertained that they differ only in concentration, each containing precifely the fame proportion of oxygen. Concentrated acetic acid is capable of an accefs of oxygen, and in that ftate it is called oxygenated acetic acid. Sulphuric and nitric acids, whether diluted or concentrated, are ftill the fame fulphuric and nitric acids; but fulphur*ic*, and fulphur*ous*, or nitr*ic* and nitr*ous* acids, whatever be the ftate of concentration, have different properties, and are of courfe fpecifically different acids. Elem. de Chymie. Thompfon's Chemiftry, Gren's Principles.

CONCENTRATION, in *Diftillery*. Dr. Shaw, in his "Effay on the Diftillery," is for introducing a method of concentrating the fermentable parts of vegetables from which their fpirits are to be drawn by diftillation; which, if it can be brought to be practifed in the large way, will prove of very great ufe to the Britifh diftillery, as it will greatly fhorten the diftiller's bufinefs; which, at prefent, including the brewing, fermenting, &c. is much too long. He propofes only to evaporate carefully the wort, or other tinctures or decoctions of vegetables made for the diftilling of their fpirits, to the confiftence of treacle: in this form they might be fold to the diftiller, who might keep them by him as long as he pleafed, and occafionally ufe them, by the eafy method of reducing them into wort, by mixing warm water with them.

CONCENTRIC, in *Geometry* and *Aftronomy*, fomething that has the fame common centre with another.

The word is principally ufed in fpeaking of round bodies and figures, *viz.* circular, elliptical ones, &c. but may be likewife ufed for polygons, drawn parallel to each other, upon the fame centre.

Concentric ftands oppofite to excentric.

To find the area of the fpace included between the circumferences of two concentric circles; fee ANNULUS.

Nonius's method of graduating inftruments, confifts in defcribing with the fame quadrant 45 concentric arches, dividing the outermoft into 90 equal parts, the next into 89, &c. See NONIUS.

CONCENTRICITY *of the Strata*, in *Natural Hiftory*. The idea has very generally prevailed among geologifts and mineralogical writers, that the feveral layers of matter or ftrata, which compofe the furface of the earth we inhabit, were originally formed or depofited in uniform and level beds, or concentric to the centre or mafs of the earth. Among thefe Mr. Whitehurft, in his "Enquiry into the Original State and Formation of the Earth," 1ft edit. p. 192, fays, the ftrata "obtained an uniform concentric arrangement, furrounding the centre of the earth, as fo many fhells may be fuppofed to furround an egg." And nearly fimilar have been the opinions of a large portion of writers on this fubject. Mr. Kirwan, "Geological Effays," p. 22, fuppofes, that the cryftallization of ftrata from the chaotic or polygenous fluid, in fome cafes, began at the furface, as we fee happen to fome falts and to lime water under evaporation, and that thus extenfive ftrata might have been formed and funk to the bottom, moftly in an horizontal pofition, but often from accidental ruptures during their fall, in an oblique or nearly vertical pofition. Dr. Townfon, "Philofophy of Mineralogy," p. 68, fays, "we muft not fuppofe that the ftrata regularly furround the globe like the concentric circles of an onion; they are rather like the fcales of a lily; rather *fquamofus* than *tunicatus*. Though, in general, they are of great extent when not broken and loft, they are known to have a natural termination." In the "Philofophical Tranfactions," No. 391, Mr. John Stracey gives a figure for explaining a fuppofition of his on this fubject, *viz.* that the ftrata were originally formed while in a foft ftate, as fo many wedges, each pointing to and terminating in the axis of the earth; and that by the diurnal revolution of the earth from weft to eaft, thefe became bent into fpirals, each lapping round each other, for fome diftance, and then ending, in fucceffion.

Whimfical as this laft idea muft have appeared, when it was firft publifhed, now more than 80 years ago, we are

fomewhat

ſomewhat ſurprized that it had not the effect of occaſioning ſubſequent geological obſervers to notice, more particularly, the endings of the ſtrata, and the remarkable prevalence of their dip towards the ſouth-eaſt, compared with thoſe in any other direction; eſpecially when practical miners muſt have ſo often mentioned the dip "towards the 10 o'clock ſun," as being the moſt common. Under the articles COAL, and COLLIERY, the writer of this has endeavoured to ſhew that the ſtrata of the Britiſh iſlands end in ſucceſſion in proceeding from the ſouth-eaſtern part of England towards the north-weſt; the general dip being towards the ſouth-eaſt or nearly ſo, except in immenſely diſlocated parts of the country, as the wealds of Suſſex, Kent, and Surry, the peak of Derbyſhire and Staffordſhire, &c. of which ſome further and curious particulars will be given under the articles DENUDATION, ELEVATION, and ENDINGS *of Strata*. From all which, it is expected that it will be made evidently to appear, that the ſtrata were not originally concentric with the earth's centre, but that the ſame formed planes or zones, inclined eaſtward in a ſmall angle with the horizon, which were of amazing extent, and were perfectly regular in their poſition, before they experienced the rude and almoſt inconceivable violence, which broke and tore the earth in pieces, and left it in its preſent form.

CONCEPTACULUM, in *Botany*, was originally applied by Linnæus to that kind of ſeed-veſſel which he afterwards termed *folliculus*, and which conſiſts of one valve only, burſting longitudinally, as in the natural order of *aſclepiadeæ*. Gærtner uſes the term *conceptaculum* in a general and lax ſenſe for a ſeed-veſſel, nor is it at preſent technically applied to any particular kind of fruit.

CONCEPTION, in *Geography*, otherwiſe called *Penco*, a city of Chili, in South America, and capital of a juriſdiction or biſhopric, ſuffragan of the archbiſhop of Lima, and having a chapter, conſiſting of a biſhop, dean, archdeacon, and two prebendaries. The ancient city ſtood at the mouth of the river St. Pierre, E. of Talcaguana, on the S.W. ſhore of a beautiful bay, and on a ſmall declivity, having a little river running through it, in S. lat. 36° 43′ 15″, and in longitude from the meridian of Teneriff, according to Father Feuillée, 303° 18′ 30″. The houſes were built with mud or burnt bricks, and covered with tiles; the churches, and alſo the Franciſcan, Auguſtine, and Dominican convents, as well as thoſe belonging to the fathers of mercy, were ſmall and mean, but the college of the Jeſuits was conſtructed in a ſuperior ſtyle of architecture. This city was firſt founded by captain Pedro de Valdivia in the year 1550; but the powerful revolt of the Indians of Arauco and Tucapel, obliged its inhabitants to remove to Santiago. Pedro de Valdivia, its founder, was killed in this conteſt, and his ſucceſſor in the command ſhared the ſame fate. The inhabitants, however, petitioned the audience of Lima for leave to return to their original city; they were again either ſlain or diſpoſſeſſed by the Indians; but thoſe that ſurvived were afterwards reſtored to their former poſſeſſion, which they for ſome time continued to enjoy with apparent ſecurity. In 1603 a more general confederacy was formed againſt the city, by which it was almoſt wholly deſtroyed; but receiving freſh ſuccours, it was again repaired. Subject, however, to dreadful earthquakes, and conſiſting of buildings ill adapted for permanent duration; it was totally deſtroyed by an earthquake in 1751 and nothing but its ruins are now viſible on the ſpot where it once ſtood. After the deſtruction of this town, which, during the earthquake, was ſwallowed up rather by the ſea than by the land, the inhabitants diſperſed and encamped in the environs. In 1763 they ſelected another ſpot, ſituated about a quarter of a league from the river Biobio, and three leagues from the ancient town of Conception, and the village of Talcaguana. On this ſpot they erected a new town, to which the biſhopric, the cathedral, and the religious houſes were transferred. The houſes conſiſt only of one ſtory, that they may be able more effectually to reſiſt the ſhock of earthquakes, which occur in thoſe parts almoſt evey year. This town occupies a large extent of ground. The inhabitants are about 10,000; and here is the reſidence of the biſhop and a colonel of horſe, who is the military governor. The biſhopric is nominally bounded on the north by that of Santiago, the capital of Chili, where the governor-general reſides, and on the eaſt by the Cordilleras, and extending on the ſouth as far as the ſtraits of Magellan. But its true limit is the river Biobio, about a quarter of a league from the town. M. de la Perouſe ſays of this part of Chili, that it is the moſt fertile ſpot in the world. Corn, he ſays, produces ſixty-fold, and the vine is equally abundant; the fields are covered with innumerable flocks, which, without requiring any care, multiply beyond all calculation. The only care neceſſary is to keep ſeparate the different property of individuals; and oxen, horſes, mules, and ſheep herd together in the ſame paſtures. A large ox is commonly worth eight dollars, a ſheep $\frac{3}{4}$ of a dollar; but there are no purchaſers, ſo that the inhabitants kill every year a great quantity of cattle, the ſkins and tallow of which are ſent to Lima. They alſo cure ſome proviſions for the conſumption of the ſmall coaſting veſſels which navigate the ſouth ſeas. The climate is remarkably healthy, and M. Pérouſe found ſeveral in this town that had completed 100 years; but notwithſtanding all theſe advantages, the colony is not thriving, which he attributes principally to the prohibitory regulations that extend through every part of Chili. This kingdom, he ſays, of which the productions, increaſed to their maximum, would ſupply all Europe; whoſe wool would be ſufficient for the manufacture of France and England, and whoſe herds, converted into ſalt proviſion, would produce a vaſt revenue; has no commerce. Four or five ſmall veſſels bring every year from Lima tobacco, ſugar, and ſome articles of European manufacture, which the miſerable inhabitants receive after having been charged with heavy cuſtoms at Cadiz, at Lima, and, laſtly, at their arrival at Chili; in exchange for which they give their tallow, hides, ſome deals, and their wheat, which, however, bears ſo low a price, that the cultivator has no inducement to extend his tillage. Unfortunately, ſays Pérouſe, for this country, it produces a ſmall quantity of gold; the annual amount of which in the dioceſe of Conception is eſtimated at about 200,000 piaſtres. The adminiſtration of juſtice is very defective. To theſe ſeveral circumſtances it is owing that the land remains uncleared, that commerce is in a low ſtate, that the houſes of the moſt opulent inhabitants of La Conception are almoſt deſtitute of furniture, and that the only workmen in the town are foreigners. The dreſs of the women conſiſts of a plaited petticoat, diſcovering half the leg, formed of gold and ſilver ſtuffs, which, being reſerved for extraordinary occaſions, is transferred, like jewels, from grand-mother to grand-daughter, ſtriped ſtockings of red, blue, and white, and very ſhort ſhoes, but ſuch ornaments are only within the reach of a few; the reſt having ſcarcely clothes to cover their nakedneſs. The idleneſs, together with the credulity and ſuperſtition of the inhabitants, has filled this kingdom with convents, both for men and women. The common people are a mongrel race, much addicted to theft, and the women are very eaſy of acceſs. Nevertheleſs, thoſe of a ſuperior claſs, or the

true Spaniards, are extremely polite, and hofpitable. The inhabitants, and even the women, excel in horfemanfhip; they are very dextrous in managing the lance and noofe; and they rarely mifs their aim, though at full fpeed, with the noofe, which they throw 40 or 50 yards, and thus halter the object of their diverfion or revenge. The noofe is made of thongs of cow-hides, which they twift with oil, till it is rendered fupple and pliant, and fo ftrong, as to hold, it is faid, a wild bull which would break a halter of hemp of double thicknefs. De Ulloa's, &c. Voyage to South America, vol. i. Peroufe's Voyage round the World, vol. i.

Conception, *the bay of,* is one of the moft commodious that can be found in any part of the world. The length from Terra-firma, N. and S. is nearly 3½ leagues, and its breadth from E. to W. almoft 3 leagues, which is contracted by the ifland of Quiriquina, forming two entrances; of thefe, that on the eaft fide is the fafeft, being two miles broad, and accordingly frequented by moft fhips. The weft entrance is between the ifland and Talcaguana point, and is near half a league in breadth. In the principal entrance of this bay is 30 fathom water, which depth afterwards decreafes to 11 and 10, till within about a mile of the fhore, oppofite to the entrance. The weftern entrance, though the numerous rocks and breakers in it make it to appear very dangerous, has a channel with water fufficient for the largeft fhip, the depth being at firft 30 fathom, and never lefs than eleven. Within the bay are three roads or harbours, where fhips anchor; for though the bottom be every where clear, it is only in one of thefe three places that fhips can ride in fafety, being no where elfe fheltered from the wind. The firft, called Puerto Tome, lies eaft and weft, with the north point of Quiriquina, contiguous to the coaft of Terra-firma. The anchoring place is about half a league diftant from the land; in about 12 fathom water. But this road is ufed only when the fhips come in during the night; it being difficult to reach either of the other two before day-light, as feveral tacks muft be made for that purpofe. In this bay the principal port is that of Talcaguana. It is properly an elbow, and bears S. S.W. from the fouth point of Quiriquina. This is much the moft frequented, fhips in general anchoring here, as it has not only better ground than any other part of the bay, but is moft fheltered from the north winds. Whereas at Cirillo Verde, a little green mountain, fituated near the city, they lie expofed not only to thefe winds, but alfo to the fouth winds; the land which fhould intercept them being low. Befides, the bottom is of a loofe mud, fo that the anchors in a hard gale of wind generally come home; and confequently the fhips are in great danger of being ftranded on the coaft. From thefe inconveniences it may be concluded, that the only fhips which anchor here are fuch as happen to be in thefe parts in the midft of fummer, for which this road is moft convenient, as it is neareft to the city. Although the tide rifes in this bay fix feet three inches, the water is fmooth, and there is fcarcely any current. It is high water here at the full and change of the moon, at 45 minutes paft one. The bay is open only to the north winds, which never blow but in the winter, that is, from the end of May to October. Two rivers empty themfelves into this bay; one of which paffing through the city of Conception bears its name; the other is called St. Pedro. The firft is the watering place for fhips anchoring at Cirillo Verde; whereas thofe at Talcaguana fupply themfelves from ftreams that flow from the adjacent eminences; they eafily take on board a fufficient quantity of wood, of which there is plenty, and alfo of all other neceffaries. Ships, before they enter the bay of Conception, endeavour to make the ifland of Santa Maria, and then coaft along it keeping at the fame time a good look out for a reef of rocks which ftretches out almoft three leagues from the north-weft point; thence they continue their courfe, keeping at a little diftance from the main, there being no rocks befides thofe that are above the water. After weathering the rocks on the ifland of Santa Maria, they fteer directly for Talcaguana point, at the diftance of about half a league; from which fea-ward is a rock called Quiebra-ollas, which fhould be carefully avoided, as it is furrounded with fhoals. After being abreaft of this rock, they fteer for the north point of Quiriquina; off which lie two rocks fwarming with fea-wolves; but as there is a fufficient depth of water all round them, there is no other danger in ftanding near them befides that which is vifible. After paffing them, the courfe is continued as near as poffible to the ifland of Quiriquina, care being taken to avoid fome other rocks lying along the fhore. In making feveral tacks to get into Conception-bay, the ifland of Quiriquina muft be avoided on the eaft and fouth fides, as there is a fhoal on the fouth extending to a confiderable diftance from the fhore. At a third part of the diftance between the road at Talcaguana, and the point of the fame name, is another fhoal, running about half a league towards the eaft, in the middle of which is a ridge of rocks. To avoid this fhoal, it is beft at entering the bay with a land wind, to fteer directly for the middle of a fpot of red earth on a mountain of middling height, fituated at the bottom of the bay, continuing this courfe till the fhip has paffed the fhoal; and then to fteer directly for the houfes at Talcaguana, till within about half a mile from the fhore, which is the ufual anchoring place in 5 or 6 fathom water. The fame care is alfo neceffary to avoid another reef of rocks, lying between the Morro and the coaft of Talcaguana.

Conception, or *Conception de los Pampas*, a town of South America, in Paraguay, on the S. fide of the river Plata. S. lat. 36° 30′. W. long. 57° 11′.

Conception, *La*, a fea-port town of America, in the province of Veragua, on the Spanifh main, with a harbour, formed by the river Veragua; 90 miles W. of Panama. N. lat. 8° 52′. W. long. 81° 51′.

Conception, a river of America, on the ifthmus of Darien, which runs into the Spanifh main. N. lat. 9° 4′. W. long. 78° 15′.

Conception *Bay*, a large bay on the eaft coaft of Newfoundland ifland, whofe entrance is between Cape St. Francis on the fouthward, and Flamborough head on the northward. It runs a great way into the land in a fouthern direction, having numerous bays on the W. fide, in which are two fettlements, Carboniere and Havre de Grace. Settlements were made here in 1610, by about 40 planters, under governor John Guy, to whom king James had granted a patent of incorporation. N. lat. 47° 40′. W. long. 52° 40′.

Conception *de Salava,* or *of Salaye*, a fmall town of North America, in the province of Mechoacan, in Mexico. It was built by the Spaniards, as well as the ftations of St. Michael and St. Philip, to fecure the road from Mechoacan to the filver mines of Zacatea. N. lat. 10°. W. long. 83° 5′. They have alfo given this name to feveral boroughs of America, to a fea-port of California, &c. &c.

Conception *de la Vega*, a town of Hayti, in what was formerly the Spanifh part of Hifpaniola, or St. Domingo. It gave the title of duke to the family of Columbus, the immortal difcoverer of America.

Conception, in *Grammar*. See Syllepsis.

Conception, in *Logic* and *Metaphyſics*, the ſimple apprehenſion or perception which we have of any thing, without proceeding to affirm or deny any thing about it.

The ſchoolmen uſually make two kinds of conception; the one formal, the other objective.

The firſt is defined to be the immediate and actual repreſentation of any thing propoſed to the mind: on which footing, it ſhould be the ſame thing to the underſtanding, that a word or voice is to the ear; whence ſome alſo call it *verbum mentis*.

The ſecond is the thing itſelf repreſented by a formal conception. But others explode the notion of an objective conception, as being, in reality, no conception at all; excepting where the mind contemplates its own acts, &c.

Formal or proper conceptions, are ſubdivided into univocal, where ſeveral things are diſtinctly repreſented as under ſome common ratio, or in the ſame degree of perfection; analogous, where ſeveral things are repreſented as under ſome proportional likeneſs; and equivocal, where they are repreſented immediately as ſuch, without regard to any common ratio or likeneſs.

Dr. Reid, in his "Inquiry into the Human Mind, on the Principles of Common Senſe," and alſo in his "Eſſays on the Intellectual Powers of Man," (Eſſ. iv.), ſubſtitutes the word conception inſtead of the ſimple apprehenſion of the ſchools, and employs it in the ſame extenſive ſignification. He alſo uſes it, in common with ſome other writers, as ſynonymous with *Imagination*, which ſee. To this purpoſe, he ſays, that "conceiving, imagining, apprehending, underſtanding, and having a notion of a thing, are common words to expreſs that operation of the underſtanding, which the logicians call "*Simple* Apprehension;" which is defined by them to be the bare conception of a thing without any judgment or belief about it. However, although conception may be exerciſed without any degree of belief, even the ſmalleſt belief cannot take place without conception; for he who believes muſt have ſome conception of the object of his belief. Dr. Reid, without attempting a definition of this operation of the mind, explains ſome of its properties, ſtates different theories concerning it, and points out ſome miſtakes of philoſophers in their account of it. In every operation of the mind, ſays this writer, and in every thing which we call thought, there muſt be conception. Our ſenſes cannot give us the belief of any object, nor can we remember or reaſon, nor exert any of our active powers, without this mental operation; but in bare conception, there can, he thinks, be neither truth nor falſehood, becauſe it neither affirms nor denies. In this reſpect, conception differs from opinion; as an opinion, though ever ſo wavering, or ever ſo modeſtly expreſſed, muſt be either true or falſe; whereas a bare conception, which expreſſes no opinion or judgment, can be neither; to this purpoſe, Mr. Locke obſerves very juſtly, if we ſubſtitute conceptions for ideas, that our ideas, being nothing but bare appearances, or perceptions, in our minds, cannot properly and ſimply in themſelves be ſaid to be true or falſe, no more than a ſimple name of any thing can be ſaid to be true or falſe. Mr. Locke, following the example of Des Cartes, Gaſſendi, and other Carteſians, has given the name of perception to the bare conception of things; and he has been followed in this reſpect by biſhop Berkeley, Mr. Hume, and many late philoſophers, when they are diſcuſſing the ſubject of ideas. They have been probably led into this impropriety, ſays Dr. Reid, by the common doctrine concerning ideas, which teaches us, that conception, perception by the ſenſes, and memory, are only different ways of perceiving ideas in our own minds; and if that doctrine be well founded, he thinks that it will be very difficult to find any ſpecific diſtinction between conception and perception. He adds, there is reaſon to diſtruſt any philoſophical theory, when it leads men to corrupt language, and to confound, under one name, operations of the mind, which common ſenſe and common language teach them to diſtinguiſh. This author further obſerves, when he is tracing the analogies that ſubſiſt between the operations of body and thoſe of the mind in the plaſtic arts, and particularly in painting, that nothing more readily gives the conception of a thing than the ſeeing of an image of it; and hence, by a figure common in language, conception is called an image of the thing conceived. Nevertheleſs, the image in the mind is not the object of conception, nor is it any effect produced by conception as a cauſe, but it is conception itſelf. In this mode of illuſtrating conception, Dr. Reid differs from many other philoſophers, who have generally maintained, that in conception there is a real image in the mind, which is its immediate object, and diſtinct from the act of conceiving it. This author proceeds to trace the analogy that ſubſiſts, not only between conceiving and painting in general, but between the different kinds of our conceptions, and the different works of the painter. As this artiſt makes fancy-pictures, or copies from the painting of others, or paints from the life, that is, from real objects of art or nature which he has ſeen, our conceptions, in Dr. Reid's opinion, admit of a very ſimilar diviſion. Some conceptions may be called fancy-pictures, being commonly called creatures of fancy or of imagination, which are not the copies of any original that exiſt, but are originals themſelves. There are other conceptions, which may be called copies, becauſe they have no original or archetype, to which they refer, and with which they are believed to agree; and we call them true or falſe conceptions, as they agree or diſagree with the ſtandard to which they are referred. Theſe are of two kinds, *viz.* ſuch as are analogous to pictures taken from the life, or ſuch a we have of individual things that really exiſt; and ſuch as are analogous to the copies which the painter makes from pictures done before, which are the conceptions we have of what the ancients called univerſals, or of things which belong or may belong to many individuals. Theſe univerſals are always expreſſed by general words; and all the words of language, proper names excepted, are general words, or the ſigns of general conceptions, or of ſome circumſtances relating to them. Such general conceptions are formed for the purpoſe of language and reaſoning.

Having thus ſtated the three different kinds of our conceptions, and illuſtrated them at large, our author proceeds to deſcribe their different properties. Accordingly he obſerves, that our conception of things may be ſtrong and lively, or it may be faint and languid in all degrees. In this connection it is ſaid, that imagination, when it is diſtinguiſhed from conception, ſeems to ſignify one ſpecies of conception, *viz.* the conception of viſible objects. Again, our conceptions of things may be clear, diſtinct, and ſteady; or they may be obſcure, indiſtinct, and wavering. Moreover, when we barely conceive any object, the ingredients of that conception muſt either be things with which we were before acquainted by ſome other original power of the mind, or they muſt be parts or attributes of ſuch things Thus, a man cannot conceive colours, if he never ſaw, nor ſounds, if he never heard. If man has not a conſcience, he could not conceive what is meant by moral obligation, or by right and wrong in conduct. Nevertheleſs, we are unconfined with regard to the arrangement of the ingredients of our conception; and this laſt property of the faculty of conception, and that which eſſentially diſtinguiſhes it from every

every other power of the mind, is this, that it is not employed folely about things which have exiftence.

The powers of fenfation, of perception, of memory, and of confcioufnefs, are all employed folely about objects that do exift or have exifted; but conception is often employed about objects that neither do, nor did, nor will exift. To prevent impofition in this matter, we ought to diftinguifh between that act or operation of the mind, which we call conceiving an object, and the object which we conceive. When we conceive any thing, there is a real act or operation of the mind; of this we are confcious, and can have no doubt of its exiftence; but every fuch act muft have an object; for he that conceives muft conceive fomething. For the different theories of conception ftated by Dr. Reid, with his obfervations upon them, we muft refer to the article IDEA. This author clofes his account of the faculty of conception with an enumeration of what he conceives to be the errors into which writers have fallen in their difcuffion of the operations of the mind. In all judgment and in all reafoning, he fays, conception is included. We can neither judge of a propofition, nor reafon about it, unlefs we conceive or apprehend it; and therefore thofe are miftaken who fo diftinguifh between conception, judgment, and reafoning, as to imply, that a propofition, or even a fyllogifm, may not be fimply apprehended. Dr. Reid further obferves, that the divifion, commonly made by logicians, of fimple apprehenfion into fenfation, imagination, and pure intellection, feems to be, in feveral refpects, very improper. Senfation, and the perception of external objects by the fenfes, are, in his opinion, very different operations of the mind; and, though commonly conjoined by nature, they ought to be diftinguifhed by philofophers. Neither fenfation, nor the perception of external objects, is fimple apprehenfion; becaufe both, as he thinks, include judgment and belief, which are excluded from fimple apprehenfion. Moreover, thofe who diftinguifh imagination from pure intellection, by referring to the imagination an image in the brain, and to pure intellection an image in the intellect, ground their diftinction upon an hypothefis; fince we have no evidence, as he apprehends, that there are images either in the brain, or in the intellect. See IMAGINATION. Dr. Reid further obferves, that it is a miftake to reprefent fimple apprehenfion as the firft operation of the underftanding, and judgment as a compofition or combination of fimple apprehenfions, which miftake probably has arifen from fuppofing that fenfation and the perception of objects by the fenfes, are nothing but fimple apprehenfion. Although thefe are very probably the firft operations of the mind, they are not fimple apprehenfions. See PERCEPTION. Inftead of faying, that the more complex operations of the mind are formed by compounding fimple apprehenfions, we ought rather to fay, that fimple apprehenfions are obtained by analyfing more complex operations. In this connection, Dr. Reid obferves, that a fimilar miftake pervades the whole of Mr. Locke's Effay. It is this, that our fimpleft ideas or conceptions are got immediately by the fenfes, or by confcioufnefs; and the complex afterwards formed by compounding them. He notices alfo another miftake concerning conception, which is, that our conception of things is a teft of their poffibility; fo that, what we can diftinctly conceive, we may conclude to be poffible; and of what is impoffible, we can have no conception. This opinion has been held by philofophers for more than 100 years, without contradiction or diffent, as Dr. Reid believes; and he confiders it as a neceffary confequence of the received doctrine of ideas; fince it is evident, that there can be no diftinct image, either in the mind, or any where elfe, of that which is impoffible. Our author has inveftigated this opinion, and urged a variety of objections againft it. Whatever, he fays, is declared to be poffible or impoffible is expreffed by a propofition; and every propofition, of which you underftand the meaning diftinctly, is poffible. Farther, every propofition, that is neceffarily true, ftands oppofed to a contradictory propofition that is impoffible; and he that conceives one, conceives both: thus, a man who believes that two and three neceffarily make five, muft believe it to be impoffible that two and three fhould not make five. Again, mathematicians have, in many cafes, proved fome things to be poffible, and others to be impoffible; which, without demonftration, would not have been believed; "yet I have never found," fays Dr. Reid, "that any mathematician has attempted to prove a thing to be poffible, becaufe it can be conceived, or impoffible, becaufe it cannot be conceived." Moreover, mathematicians often require us to conceive things that are impoffible, in order to prove them to be fo; and this is the cafe in all their demonftrations, "ad abfurdum." For other particulars connected with the fubject of this article, and a fuller view of Dr. Reid's illuftration and reafoning, we muft refer to his Effays above cited.

A late excellent writer, to whom thofe who wifh to underftand the philofophy of the human mind are under great obligation, though they may not admit all his principles and reafoning, has particularly confidered the power of conception. By conception profeffor Dugald Stewart (fee his "Elements of the Philofophy of the Human Mind," ch. iii.) means, that power of the mind which enables it to form a notion of an abfent object of perception, or of a fenfation which it has formerly felt. Although this is not exclufively the proper meaning of the word, yet he thinks that the faculty now defined deferves to be diftinguifhed by an appropriated name. Conception is often confounded with other powers: memory recognizes the features of an abfent or deceafed friend, and every act of this faculty includes an idea of the paft; whereas conception implies no idea of time whatever. Thus confidered, the word conception correfponds to what was called by the fchoolmen *fimple apprehenfion*; with this difference only, that they included, under this name, our apprehenfion of general propofitions; whereas the profeffor wifhes to limit the application of the word *conception* to our fenfations, and the objects of our perceptions. By thus reftricting the application of the term, more than Dr. Reid has done, our ideas become more diftinct; and for fuch a reftriction the authority of philofophers in an analogous cafe may be juftly pleaded. In ordinary language, we apply the fame word *perception* to the knowledge which we have by our fenfes of external objects, and to our knowledge of fpeculative truth; and yet an author would be juftly cenfured, who fhould treat of thefe two operations of the mind under the fame article of perception. "Thus," fays the profeffor, "there is as wide difference between the conception of a truth, and the conception of an abfent object of fenfe, as between the perception of a tree, and the perception of a mathematical theorem." For this reafon, he has confined conception to that faculty, whofe province it is to enable us to form a notion of our paft fenfations, or of the objects of fenfe which we have formerly perceived. The bufinefs of conception, thus defined, is to prefent us with an exact tranfcript of what we have felt or perceived. The firft remarkable fact which ftrikes us with regard to conception is, that we can conceive the objects of our fenfes much more eafily than thofe of others. Thus, we can conceive an abfent vifible object much more eafily than a particular found, a particular tafte, or a particular pain, which we have formerly felt. This peculiarity feems to arife from this

this circumſtance, that when we think of a ſound, or of a taſte, the object of our conception is one ſingle detached ſenſation; whereas every viſible object is complex, and the conception which we form of it as a whole, is aided by the aſſociation of ideas, which connects the different parts together, and preſents them to the mind in their proper arrangement; whilſt the various relations which theſe parts bear to one another in point of ſituation equally contribute to ſtrengthen the aſſociations. This power of conceiving viſible objects may be much improved by habit. Theſe obſervations, together with others adduced by our author, are applicable to conception as diſtinguiſhed from imagination, though the two powers are very nearly allied, and often ſo blended, that it is difficult to ſay to which of the two ſome particular operations of the mind are to be referred. Among logicians, it is a common, and almoſt an univerſal doctrine, that conception (or imagination, often uſed as ſynonymous with it) is attended with no belief of the exiſtence of its object. To this purpoſe, Dr. Reid ſays, "perception is attended with a belief of the preſent exiſtence of its object; memory with a belief of its paſt exiſtence; but imagination is attended with no belief at all; and was therefore called by the ſchoolmen *apprehenſio ſimplex*." Profeſſor Stewart controverts the truth of this principle, and alleges ſeveral circumſtances in juſtification of his doubts concerning it. "If it were a ſpecifical diſtinction between perception and imagination, that the former is always attended with belief, and the latter with none; then the more lively our imagination were of any object, and the more completely that object occupied the attention, the leſs ſhould we be apt to believe its exiſtence; for it is reaſonable to think, that when any of our powers is employed ſeparately from the reſt, and there is nothing to withdraw the attention from it, the laws which regulate its operation will be moſt obvious to our obſervation, and will be moſt completely diſcriminated from thoſe which are characteriſtical of the other powers of the mind. So very different however is the fact, that it is matter of common remark, that when the imagination is very lively, we are apt to aſcribe to its objects a real exiſtence, as in the caſe of dreaming or madneſs; and we may add, in the caſe of thoſe who, in ſpite of their own general belief of the abſurdity of the vulgar ſtories of apparitions, dare not truſt themſelves alone with their own imaginations in the dark. That imagination is in theſe inſtances attended with belief, we have all the evidence that the nature of the thing admits of; for we feel and act in the ſame manner as we ſhould do, if we believed that the objects of our attention were real; which is the only proof that Metaphyſicians produce, or can produce, of the belief which accompanies perception." The author acknowledges, however, that in moſt caſes it is true that imagination is attended with no belief, if by belief we mean a permanent conviction which influences our conduct. But if the word be uſed in the ſtrict logical ſenſe, he inclines to think, that the exerciſe both of conception and imagination is always accompanied with a belief that their objects exiſt. From a variety of obſervations, which we cannot ſtate within the limits of this article, the ingenious profeſſor infers, that when the conceptions of the mind are rendered ſteady and permanent, by being ſtrongly aſſociated with any ſenſible impreſſion, they command our belief no leſs than our actual perceptions; and, therefore, if it were poſſible for us with our eyes ſhut to keep up for a length of time the conception of any ſenſible object, we ſhould, as long as this effort continued, believe that the object was preſent to our ſenſes. See NOMINALS, REALISTS, and UNIVERSALS.

CONCEPTION, in *Phyſiology*, denotes the changes which take place in the internal organs of generation of the female ſex, connected with the developement and growth of the embryo. See GENERATION.

CONCEPTION, *in Animals*, is ſaid to be occaſioned by ſomething emitted by the male, in the act of coition, impregnating and vivifying the rudiments of an animalcule contained in the female. To explain in what manner this is effected, and to ſhew

> "How the dim ſpeck of entity began
> T' expand its recent form and ſtretch to man,"
> Garth.

has been the object of anxious inquiry from the earlieſt ages. But though much learning has been expended on the ſubject, and ſeveral ingenious theories contrived, to explain the myſtery (ſee GENERATION), yet very little of real knowledge has been obtained.

In this place, without deciding whether the male ſperm contains the animalcule, or only a ſubtle aura, giving life to ſomething engendered in the female, it will be ſufficient to obſerve, that the firſt effect of impregnation, or conception, will be found in one of the ovaries, or female teſticles, as they are called (ſee OVARY), and not in the uterus, as was generally believed.

That the ovaries are neceſſary to conception, has been long known, as is evident by the practice of ſpaying (that is, taking out the ovaries of) ſows and other animals, to prevent their breeding. The late Mr. John Hunter took one of the ovaries out of a ſow (Obſ. on the Animal Œcon. 4to.), and found ſhe left off breeding two years ſooner, and produced fewer pigs at each litter, than another ſow, kept with her, that was perfect. The perfect ſow continued breeding ſix years, and produced 162 pigs; the half-ſpayed ſow continued to be fruitful only four years, and brought only 76 pigs: whence he concluded, that there is a certain limited number of eggs in each of the female ovaries, and when they are exhauſted, the animal is no longer fit for conception.

Anatomiſts, in the courſe of their examination of the bodies of females, have found hair, teeth, and other organiſed parts in the ovaries; and ova, containing fœtuſes, have been found in the Fallopian tubes. (See FALLOPIAN *tubes*, alſo FOETUS *extra-uterine*.)

On carefully examining into the contexture of the ovaria, they are found to conſiſt of cluſters of veſicles, like bunches of grapes, which are ſuppoſed to be ova or eggs.

When one of the veſicles, or eggs, as they are called, become ripe, it enlarges, and puts on a yellowiſh hue, and if at this time it ſhould be impregnated by the male ſperm, it burſts the thin membrane that confines it to the ovarium, enters the fimbriated end of the Fallopian tube, and thence deſcends into the uterus.

The rent in the ovarium, through which the ovum had paſſed, forms a cicatrice, which is called, from its colour, *corpus luteum*. (See CORPUS *luteum*.) On diſſecting the ovaria, there are always found as many of theſe corpora lutea, as the woman, the ſubject of the diſſection, had borne children.

While impregnation, or conception, is taking place in the ovarium, and the fertilized ovum is deſcending through the Fallopian tube, a proceſs is going on in the uterus, to prepare it for its reception. The veſſels of the uterus, which were before ſo extremely minute, as not to be viſible, begin to be conſpicuous; the whole organ is enlarged, and a ſecretion of a mucus takes place, and lines its internal ſurface. This mucus ſoon puts on the appearance of a rough and ſhaggy membrane, deſtined to become the medium of connection between the ovum and the uterus. The late Dr. William

William Hunter called this membrane the decidua, becaufe it is caft off at the birth of the fœtus. He was fuppofed to have firft difcovered it; but Needham, who publifhed his "Obfervations de formato Fœtu," in 1667, gives a clear defcription of it and of its office, but acknowledges that his account is taken from brutes; he never having had an opportunity of opening the body of a woman who had died undelivered. There are three membranes, he fays, lining the uterus of viviparous animals when pregnant; "extima prorfus fibrofa eft, nulla vena, aut arteria vifibili donata," p. 176: it ferves as a fheath, he fays, to the other membranes. Though he gives no name to this membrane, yet, as he places it between the chorion and the uterus, it can be no other than the decidua. Harvey defcribes it alfo ftill more diftinctly. Before any veftige of the conception can be feen, he fays, "mucofa quædam filimenta tanquam aranearum telæ, ab ultimo five fuperiore cornuum angulo ducuntur; quæ fimul juncta membranofam ac mucilaginofam tunicam, five manticam vacuam referunt." Exercit. fexagefima nova.

The ovum being received into the uterus, in a little time, pufhes out fmall fibres, or veffels, principally, perhaps, from that part by which it had been connected to its calyx in the ovarium, in a manner not diffimilar to that by which an acorn is joined to its cup, or a hazel nut to its outer green fhell. Thefe veffels, piercing the decidua, which affords a fupport to them, infinuate themfelves into the pores of the uterus, and abforb the moifture from it, for the fupport and increafe of the ovum, as the young fibrils, or flender radicles of plants and trees, abforb their nourifhment from the earth. Although the uterus is intended by nature, and is thus prepared for the reception of the ovum, yet if it happens to be detained in the Fallopian tube, or to fall into the cavity of the abdomen, it there puts forth its radicles, and attaches itfelf to the part it happens to fall upon, or be in contact with, and the inclofed fœtus is nourifhed and comes to maturity nearly in the fame manner, as if it had been received in its proper matrix. (See Foetus *extra uterine*, alfo Foetus, *Nourifhment of, in Utero*.)

On examining the ovum, foon after its defcent into the uterus, it appears to contain a clear glutinous fluid, like the white of an egg; in a little time a concretion, like a fmall maggot, is feen in the centre of the fluid, which is the primordium of the embryo. Very minute blood-veffels are now vifible, branching upon a part of the chorion, hereafter to become placenta; the little galba, or maggot, being attached to it by flender threads, fcarce a line in length, the future funis umbilicalis. At one extremity of the concrete three veficles are feen, the rudiments of the eyes and brain; and beyond them, a crimfon moving point, the punctum faliens, or heart. Soon after, fine white filaments are perceived, varioufly circumvoluted, the inteftines. The reft of the vifcera are now faintly delineated; then the integuments covering and confining the vifcera; then the extremities, or limbs, begin to fprout, at firft fhort ftumps, without hands or feet, which at length emerging, complete the transformation. The whole fœtus is faid to be completely formed, by the end of the fourth week from the time of conception. See Harvey, De Generat. Anim.: and his predeceffor, under whom he ftudied at Padua, Fabricius ab Aquapendente. For the further developement and growth of the fœtus, fee Embryo, and alfo Foetus.

Conception, *Symptoms of, in Women*. As foon as a woman hath conceived, a train of fymptoms commence, which announce fome confiderable alteration has taken place. "Mulier ubi concipit," Hippocrates fays, "ftatim inhorrefcit, et incalefcit, ac dentibus ftridet, et articulos reliquumque corpus, convulfio prehendit, et uterum torpor." A woman, as foon as fhe has conceived, fhivers, and then becomes hot, her teeth chatter, and fhe fuffers a flight convulfive motion of her whole body. And in another place, "Pregnantem mulierem, fi aliter non cognofcas, oculi tracti, et caviores fiunt, et candidum oculorum albedinis naturam non habet, fed lividius exiftit." Op. Om. cura Vand. Linden, t. ii. p. 285. In pregnancy the eyes become hollow, the whites of them lofe their clearnefs, and become thick and muddy. If towards the end of the term of uterine geftation, he adds, the eyes become hollow, and the face and the whole body are affected with œdema, if the tips of the ears and of the nofe are white, and the lips livid, the child will be found to be difeafed or dead. Andreas Laurentius, who was phyfician to Henry IV. of France, recites the following circumftances, as indicative of a woman having conceived. "Nos mulierem concepiffe exiftimamus," he fays, "fi in feminum concurfu totum corpus leviter cohorruerit, aut titulatu quodam uterum contrahi perceperit; fi exceptum cum voluptate femen non exciderit; fi uteri os internum exquifitè conniveat; fi menftrua fubfiftat purgatio; fi lenis doloris fenfus circa umbilicum et hypogaftrium oberret; fi mammæ obdurefcant, extuberant, perdoleant; fi veneris appetentia languefcat; fi ocyffimè lætatur, et fubinde mærore afficiatur; denique fi in eduliis faftidium." We know a woman to have conceived, if immediately after copulation fhe is affected with fhivering; if the femen, received with pleafure, is not fuffered to efcape; if the mouth of the womb is found to be completely clofed; if a flight fenfe of pain is perceived about the navel; if fhe ceafes to menftruate, and the breafts become large, hard, and painful; if the appetite for venery abates; if fhe has frequent and fudden changes from mirth to fadnefs; and, laftly, if fhe has a loathing to her ufual food, and a defire for things before indifferent, or to which fhe had an averfion. Thefe obfervations are in general juft, and may ferve to fhew the accuracy with which the ancients noticed the minuteft circumftances; but they are for the greater part fuch as we can make little ufe of in practice; as we fhould neither be permitted to inquire whether a fuperior degree of pleafure was felt at the moment of coition, or whether the femen was retained, or to examine whether the os uteri was completely clofed. Waving, therefore, thefe minutiæ, it will be fufficient to defcribe the moft ufual fymptoms attendant on conception and pregnancy, in the order they occur, and to make fome obfervations on each of them, with the view of fhewing the caufes from which they are derived, and the means by which they may be mitigated, or appeafed, when they are fo violent as to endanger abortion, or are likely to occafion any permanent evil to the conftitution.

The firft fymptom by which women judge themfelves to have conceived, is an intermiffion of the regular difcharge of the menfes. This is fo general, that women who have been accuftomed to be regular, always date their conception from the time they firft mifs their courfes, as they are popularly called; and in this judgment, they are almoft conftantly right, unlefs fever, or fome other caufe has intervened, to which the interruption of them may be attributed.

Naufea and vomiting are alfo pretty conftant attendants on pregnancy. Thefe are moft troublefome in the morning, and often commence before the period for meftruation arrives. They have been fuppofed to be occafioned by the fubfidence of the uterus into the pelvis, dragging part of the bowels with it. But as they come on before the uterus has obtained fufficient bulk to difturb the bowels by its weight, they are with more propriety afcribed to fympathy, between

between the ſtomach and the uterus. Nauſea and vomiting, unleſs uncommonly violent, are rather to be eſteemed ſalutary than dangerous, and it has been obſerved, that women, attacked with theſe ſymptoms, are leſs liable to miſcarry, than thoſe who are free from them. Blood has even been known to be thrown up from the ſtomach, from the violence of the ſtraining, without any ſubſequent ill conſequence. When, however, the vomiting is extremely violent, and obſtinate, if there are alſo ſigns of plethora, or general fulneſs of the veſſels, two or three ſmall bleedings have often proved ſalutary. In the mean while the body ſhould be kept open, by adminiſtering gentle eccoprotics, which the coſtive ſtate of the bowels, incident alſo to pregnancy, makes particularly neceſſary. Infuſion of ſenna, with ſoluble tartar, or the bitter purging ſalt; lenitive electuary, rhubarb, magneſia, or caſtor oil, may be conveniently uſed, or emollient and opening glyſters, adminiſtered advantageouſly for this purpoſe. In the relaxed ſtate of the bowels, to which ſome delicate women are inclined, the confectio alkermes, or aromatica, given in weak cinnamon water, with three or four drops of the tincture of opium, twice or thrice a day, or from a quarter of a grain to a grain of opium may be given advantageouſly every night at bed time; where theſe have failed, the diarrhœa has been removed, by giving occaſionally, in addition to the above, ſmall doſes of ipecacuanha; or, laſtly, by change of air, all other methods having proved unſucceſsful.

The diſpoſition to vomiting uſually ceaſes between the fourth and fifth month, or ſoon after the woman has quickened, (ſee Quickening). The uterus now riſing above the brim of the pelvis, and entering into the cavity of the abdomen, is leſs preſſed upon by the neighbouring parts, and has more room for diſtenſion; perhaps alſo having been long uſed to the irritation, occaſioned by the increaſe of the ovum, it is leſs ſenſibly affected by it. In ſome conſtitutions, however, the ſickneſs and vomiting continue to haraſs the women through the whole courſe of pregnancy: yet even in theſe caſes, although the vomiting is ſo inceſſant, that the whole of what is taken into the ſtomach ſeems to be ejected that way, yet ſuch women have ordinarily as favourable labours, produce as healthy children, and recover from child-birth as ſpeedily and completely as thoſe who paſs through their pregnancy with only the uſual ſickneſs.

Subſidence, or falling in of the abdomen, ſo as to be leſs prominent than uſual, is conſidered as another of the early ſymptoms of pregnancy.

Dans une ventre plat
Un enfans il y a,

as the old French proverb has it. This has been ſaid to be occaſioned by the deſcent of the uterus into the pelvis, drawing with it a portion of the bowels, but with little propriety. The real cauſe ſeems to be emptineſs of the bowels: Women not only vomiting up the greater part of the food they take in, during the firſt five or ſix weeks of their pregnancy, but being uſually during that time ſo troubled with nauſea, as to have little inclination to take ſuſtenance.

The aureola, or circle round the nipple, which in virgins is of a beautiful pink colour, becomes darker, it is ſaid, after conception. It is certain, the aureola is darker in women who have had children, than in thoſe who were never pregnant, and in ſome women who have borne many children, it becomes of a dark chocolate colour, but as that colour continues after child-birth, no indication can be taken thence, whether the woman is actually pregnant, unleſs perhaps with the firſt child.

Enlargement, hardneſs, and tenderneſs of the breaſts, with pains darting through them, and a diſcharge of a thin paliſh milk, or whey, are commonly attendant on a pregnant ſtate. This alteration in the ſtate of the breaſts uſually takes place in the third or fourth month after conception, ſometimes earlier, and is indicative of the preparation making in them for the ſecretion of milk, the future nouriſhment for the child. If from this plump and firm ſtate, the breaſts ſubſide, and become looſe and flaccid, unleſs a violent diarrhœa may have ſupervened to occaſion it, the fœtus may be expected to be weak, ſickly, or dead.

Cardialgia, or heart-burn, is a frequent and troubleſome attendant on pregnancy. (See Cardialgia). This has obtained its name cardialgia, from its being ſuppoſed to be an affection of the cardia, or upper orifice of the ſtomach. A ſenſe of burning, or of intenſe heat, moleſts the patient, which demands almoſt inceſſant drinking to appeaſe it. As the uterus enlarges, it thruſts the inteſtines higher into the abdomen, hence the liver, and other viſcera, are diſturbed and ſtraightened, and thence probably a more plentiful ſecretion of bile, which flowing into the ſtomach, is thought to occaſion this uneaſy ſenſation, which is obſerved to be more troubleſome in a recumbent, than in an upright poſture. Pills with ſoap and rhubarb, Columbo root, magneſia, and other teſtaceous powders, are found to be the moſt uſeful medicines in this complaint. Milk and water, pyrmont and other chalybeate waters, bark and tonics are alſo ſerviceable; but it ſometimes reſiſts every medicine, and only ſubſides after the food is digeſted, and the ſtomach is nearly emptied. This points to the only preventive, abſtinenee. Women ſubject to this complaint ſhould content themſelves with the lighteſt diet, and that taken in ſmall quantities. In the mean while, the rhubarb, ſoap, and Columbo, ſhould be perſiſted in to help digeſtion, and to cleanſe and empty the bowels.

Cramp, attacking the legs, thighs, or belly, is alſo a frequent attendant on the pregnant ſtate. This is probably occaſioned by the preſſure of the head, or other part of the fœtus on the iliac or neighbouring nerves, and conſequently becomes more troubleſome the farther the woman advances in her pregnancy. An unnaturally irritable ſtate of the nervous ſyſtem ſeems to be the pre-diſpoſing cauſe of this complaint. Hence, perſons in the higher ranks of life, whoſe conſtitutions are debilitated by ſitting up late at nights, by large companies, luxurious diet, &c. are moſt frequently tormented by it. A more ſimple diet, early hours, exerciſe in the open air, keeping the bowels empty, bark, and other bitter and tonic medicines, promiſe moſt, both in preventing and curing this troubleſome complaint.

Of the ſymptoms here enumerated, many are equivocal, as happening indifferently in the pregnant, or in the unimpregnated ſtate; and none of them are ſingly of ſufficient validity, to enable us to form a deciſive opinion from them; but from the conjunction of ſeveral of them, a pretty certain conjecture may be formed. If a woman accuſtomed to be regular, ſoon after marriage ceaſes to be ſo, and about the ſame time is affected with nauſea and vomiting, there would be little hazard in pronouncing ſuch a perſon to be pregnant. But where the ſymptoms are equivocal, it is always beſt to defer giving a deciſive opinion, until the commencement of the ſixth month, when from the motion of the fœtus, and the increaſed bulk of the abdomen, we may be enabled to determine with certainty.

About this time, a new train of ſymptoms ſucceeds, principally dependent on mechanical cauſes. The volume of the uterus, daily enlarging, preſſes on, and flattens the urinary bladder, and diminiſhes its capacity. Hence a more fre-

quent neceffity for making water. The uterus, at the fame time, preffing on the rectum, occafions the alvine fæces to be difcharged with difficulty; hence coftivenefs, and the return of the blood by the iliac and hæmorrhoidal veins being prevented, by the fame caufe, the piles; hence, alfo, œdematous fwellings of the legs, thighs, and labia pudendi.

The labia pudendi, confifting almoft entirely of cellular membranes, are fometimes fo enormoufly diftended as to prevent the perfon from walking, and to occafion confiderable pain. Scarifying the labia, or making two or three punctures with a lancet, the parts being afterwards fomented with warm water, fometimes fucceeds in reducing thefe fwellings. Bleeding and moderate purges are alfo neceffary. However formidable the appearance of the labia, when thus enlarged, may be, they offer no impediment to the labour, which is frequently, in thefe cafes, uncommmonly expeditious. In thefe leuco-phlegmatic habits, the fibres feem to have loft their tone or power of refifting, and to give way to the flighteft impulfe, fo that the child is frequently expelled by the moft trifling effort. The hæmorrhoids, or piles, are not fo tractable, but frequently elude every attempt to cure them, until after delivery, when they ufually foon fubfide.

Varices, or enlargement of the veins of the legs and thighs, being dependent on the fame caufes, the preffure of the uterus, preventing the return of the blood from the lower extremities, can only be palliated, until after the birth of the child, when they gradually vanifh. It will be right, while waiting for this event, to moderate the diftenfion of the veins, and prevent their burfting, by keeping in a recumbent pofture, and by wearing bandages around the parts. The piles may be relieved by taking a defert fpoonful of cream of tartar every day, and by anointing them with a preparation, confifting of galls of Aleppo reduced to an impalpable powder, and mixed to the confiftence of an ointment with cold drawn linfeed oil, or green tea, macerated in boiling water, may be applied as a poultice.

An idea prevails among women, that it is neceffary they fhould take a greater quantity of nourifhment during the pregnant ftate, than at other times, as they are then to furnifh fuftenance to an additional being; and they frequently, at the exhortation of their friends, take in a greater quantity of food than they have any inclination for, left they fhould deprive the child of its neceffary nourifhment. But as no more of the food they fwallow can be of ufe for that purpofe, than what is properly digefted, and as all the fymptoms fhew the depreffed ftate of the ftomach, it is evident that by loading that organ unneceffarily, all the complaints incident to the pregnant ftate will be aggravated and increafed. The greater part of the bile being difcharged by vomiting, during pregnancy, a fufficiency does not remain to complete the digeftion of the food, to which it greatly contributes. Hence the chyle, admitted in too crude a ftate into the veffels, by its ftimulus, excites after every meal a kind of hectic, by which the body is emaciated, the face is contracted, or fhrunk, and the eyes, as Hippocrates obferved, become funk or hollow. In this ftate, therefore, an increafed quantity of food, by increafing the labour of digeftion, adds to the mifchief. A moderate diet, with a due quantity of vegetables, and of ripe fruit, with country air, when it can be obtained, are the beft remedies, and are to be recommended in every cafe during pregnancy.

It has been obferved, that the ceffation of the menfes is one of the earlier figns of pregnancy; but fome women continue to have a difcharge of blood from the pudenda, recurring at longer or fhorter intervals, for the firft four, five, or fix months of their pregnancy; but the return of thefe difcharges is rarely regular, recurring at the end of the fecond, third, or fourth week, and fometimes at the end of longer intervals. The quantity alfo varies, being fometimes more fparing, at others more profufe than the menfes ufually are. Thefe difcharges happen whenever any portion of the placenta, or membranes, is detached from the uterus, and generally terminate in abortion, or the premature birth of the fœtus; or if the woman carries her burthen to the end of the ninth month, the child is ufually weak, fickly, or dead born. "Si pregnanti," Hippocrates fays, in the place laft quoted, "purgationes menftruæ curfum fuum teneant, bene valere fœtum eft impoffibile." A flender diet, with occafional fmall bleedings, and mild purges are the beft preventives, in thefe cafes.

Pica, or an irregular or depraved appetite, exciting women to long for, or intenfely defire, fome particular kind of food, is fometimes an attendant on pregnancy. (See Pica.) This formerly, from an improper indulgence of the appetites and fancies of pregnant women, was a very troublefome, and fometimes a formidable affection; as not only the health and life of the mother, but the perfection of the fœtus, were fuppofed to depend on gratifying thefe longings. If a child happened to be born with fome mark or blemifh on its body, the memory of the female relatives or friends was racked, to recollect fome defire of the woman that had been difappointed, to which the accident was attributed. Sometimes, however, thefe marks were fuppofed to have been occafioned by the fudden fight of fome object, which it was thought to refemble.

This idea of the power of the imagination of the mother, in marking or disfiguring the fœtus, is fo ancient that we can fcarce trace its origin. We read in Genefis, that Jacob placed peeled rods before the ewes when in company with the rams, "and it came to pafs, that when the ewes looked at the rods, that the lambs they yeaned, were party-coloured, and ftreaked." And Hefiod, the moft ancient of the Greek poets, fays, "Ne quis rediens e funere, liberis operam det, ne imaginatio rei triftis, in proles tranfeat, eafque permutet." Let no one returning from a funeral, embrace his wife, left the melancholy he had contracted, fhould make an impreffion on the fœtus. Dr. Daniel Turner, who was an intire convert to the opinion, has made a large collection of ftories of monftrous births, all occafioned, he fays, by the difappointed longings of their mothers, or by their being frighted by the fight of fome hideous or mifhapen objects. See his Treatife, De Morbis cutaneis. lib. xii. Turner's book was anfwered by Dr. Blondee, in a mafterly and fatisfactory manner. The opinion is now wearing away very faft, and bids fair in a little time to be totally obliterated. See Imagination.

When the appetite, during pregnancy, is inordinate or depraved, requiring improper food, it may be remedied by taking fmall dofes of ipecacuanha, of rhubarb and magnefia, of Columbo, and other bitter and tonic medicines.

Conception, *immaculate*, of the Holy Virgin, is a feaft eftablifhed in honour of the Holy Virgin; particularly with regard to her having been conceived and born immaculate: *i. e.* without original fin; held in the Romifh church on the 8th of December.

The Latin church, fays Gibbon, (Hift. of the Decline and Fall of the Roman Empire, vol. ix. p. 265.) has not difdained to borrow from the Koran the immaculate conception of the virgin-mother. It is darkly hinted in the Koran (c. 3. p. 39.) and more clearly explained by the tradition of the Sonnites. (Sale's Note, and Maracci, tom. ii. p. 112.) In the 12th century, the immaculate conception

tion was condemned by St. Bernard as a prefumptuous novelty. However Allatius, in his Prolegomena on Damafcenus, endeavours to prove this feaft to have been celebrated by feveral churches in the Eaft, as early as the eighth century. It was firft eftablifhed about the year 1138, though it is not known, with any degree of certainty, by whofe authority it was introduced, nor in what place it was firft celebrated; about 1140 certain churches in France began to obferve it; but it had been obferved in England, in confequence of the zeal of archbifhop Anfelm, before this period.

The church of Lyons in France was one of the firft that adopted this new feftival, but the canons of Lyons were feverely cenfured by St. Bernard for the innovation, and he vigoroufly oppofed the immaculate conception of the Virgin, becaufe it fuppofed her being honoured with a privilege which belonged to Chrift alone. Thus commenced a controverfy, which occafioned two parties in the Chriftian church that contended with each other for feveral centuries.

This has been a great fubject of controverfy between the Scotifts and Thomifts; the former maintaining, and the latter impugning it.

The Dominicans efpoufed the party of St. Thomas, and held out a long time in defence of the Virgin's being conceived in original fin. When this controverfy was renewed at Paris in 1384, by John de Montefono, a native of Arragon, a Dominican friar and profeffor of divinity, who publicly afferted that all who believed the immaculate conception were enemies of the true faith, the college of divines, and the whole univerfity of Paris, condemned this and fome other tenets of Montefonus. Upon this the Dominicans, together with their champion Montefonus, appealed from the fentence of the univerfity to pope Clement VII. at Avignon, (the name affumed by cardinal Robert of Geneva, on his election during the pontificate of Urban VI.) and raifed an outcry, that St. Thomas himfelf was condemned by the judgment paffed upon their brother. But, before the pope could decide the affair, the accufed friar fled from the court of Avignon, went over to the party of Urban VI., who refided at Rome, and thus, during his abfence, was excommunicated. Whether or not the pope approved the fentence of the univerfity of Paris is not afcertained. The Dominicans, however, deny that he did, and affirm, that Montefonus was condemned merely on account of his flight; though there are many others who affert, that his opinion was alfo condemned. And as the Dominicans would not acknowledge the fentence of the univerfity to be valid, they were expelled in the year 1389, and were not reftored to their ancient honours in that learned body till the year 1404. The council of Trent, feff. v. in the decree of *original fin*, declares it not to be the intention of the council to include the Virgin under it; her conception it calls immaculate; and appoints the conftitutions of Sixtus IV. to be obferved with regard to it.

This controverfy between the Dominicans and Francifcans was revived in the feventeenth century; and a feftival was appointed by Clement XI. in 1708, to be celebrated throughout the Romifh church: however, the Dominicans perfift in denying the obligation of this law, and in maintaining their ancient doctrines.

In the three Spanifh military orders of St. James of the Sword, Calatrava, and Alcantara, the knights take a vow, at their admiffion, to defend the immaculate conception. This refolution was firft taken in 1652.

Peter d'Alva and Aftorga have publifhed forty-eight huge volumes in folio, on the myfteries of the conception.

Conception, *Order of*, in Germany, was inftituted in 1618, by Charles de Gonzaguez of Cleves, duke of Nivernois and Rheteblois, and was confirmed by pope Urban VIII. in 1624. The badge of this order was a golden crofs of eight points enamelled blue; in the centre a medallion rayonnated gold, thereon the image of the Virgin ftanding on a crefcent, holding in her arms our Saviour, and round her head 12 ftars all enamelled proper; the reverfe was enamelled as the front, and on the medallion St. Michael; the whole of the ftar environed with the cordon of St. Francis, tied at the bottom: this badge was worn round the neck pendent to a fky-blue ribbon.

Conception, *religious of the order of*. See Theatines.

CONCEPTUALISTS, in *Logic* and *Metaphyfics*, a denomination given to a party of nominalifts, who took a middle road between the two fects of nominalifts and realifts, into which the fcholaftic philofophers were divided from the beginning of the twelfth century. That univerfality, which the realifts hold to be in things themfelves, and the nominalifts in name only, the conceptualifts hold to be neither in things nor in names only, but in our conceptions, whence they derived their appellation; but being expofed to the batteries of both the oppofite parties, they made no great figure. It is not an eafy matter, fays profeffor Dugald Stewart (Elem. of the Philofophy of the Human Mind, p. 192), to afcertain precifely the meaning of the conceptualifts on the point in queftion, their language on the fubject being indiftinct and inaccurate; but the profeffor thinks that, upon the whole, it amounted to the two following propofitions: firft, that we have no reafon to believe the exiftence of any effences, or univerfal ideas, correfponding to general terms; and, fecondly, that the mind has the power of reafoning concerning genera, or claffes of individuals, without the mediation of language. In denying the exiftence of univerfals, the conceptualifts agreed with the nominalifts. To what then, can we fuppofe, fays the profeffor, that they differed from them, but about the neceffity of language, as an inftrument of thought, in carrying on our general fpeculations? Mr. Locke is referred by Dr. Reid (Effays on the Intellectual Powers of Man, p. 478) to the clafs of conceptualifts. He does not maintain, that there are things which are univerfal; but that we have general or univerfal ideas which we form by abftraction; and this power of forming abftract and general ideas, he conceives, to be that which makes the chief diftinction in point of underftanding between men and brutes.

If Mr. Locke, fays profeffor Stewart (ubi fupra), had any decided opinion on the point in difpute, it did not differ materially from what is ftated in the general propofitions, which we have already cited. The apparent inconfiftencies which occur in that part of his Effay in which the queftion is difcuffed, have led fubfequent authors to reprefent his fentiments in different lights; but as thefe inconfiftencies plainly fhew, that he was fatisfied neither with the fyftem of the realifts, nor with that of the nominalifts, they feem to demonftrate that he leaned to the intermediate hypothefis already mentioned, notwithftanding the inaccurate and paradoxical manner in which he has expreffed it. Dr. Reid's opinion feems to the profeffor to coincide nearly with that of the conceptualifts; or, at leaft, to coincide with the two propofitions, which are fuppofed to contain a fummary of their doctrine. The abfurdity of the ancient opinion concerning univerfals, as maintained both by Plato and Ariftotle, he has expofed by the cleareft and moft decifive arguments; and by his own very original and important fpeculations concerning the ideal theory, he has, in the

ingenious

ingenious profeffor's opinion, completely deftroyed that natural prejudice from which the whole fyftem of univerfal ideas gradually took rife. If, even in the cafe of individuals, we have no reafon to believe the exiftence of any object of thought in the mind, diftinct from the mind itfelf, we are at once relieved from all the difficulties in which philofophers have involved themfelves, by attempting to explain, in confiftency with that ancient hypothefis, the procefs of the mind in its general fpeculations. On the other hand, it is no lefs clear from Dr. Reid's criticifms on Berkeley and Hume, that his opinion does not coincide with that of the nominalifts; and that the power which the mind poffeffes of reafoning, concerning claffes of objects, appears to him to imply fome faculty, of which no notice is taken in the fyftems of thefe philofophers. However, he has no where pofitively afferted, that language is not an effential inftrument of thought in our general reafonings. At the fame time, as he has not affirmed the contrary, and as he has declared himfelf diffatisfied with the doctrines of Berkeley and Hume, his readers are naturally led to conclude, that this is his real opinion on the fubject. His filence on this point is the more to be regretted, as it is the only point about which there can be any reafonable controverfy among thofe who allow his refutation of the ideal hypothefis to be fatisfactory. In confequence of that refutation, the whole difpute between the realifts and the conceptualifts falls at once to the ground; but the difpute between the conceptualifts and the nominalifts (which involve the great queftion concerning the ufe of figns in general fpeculation) remains on the fame footing as before. See CONCEPTION.

CONCERT, an affembly of muficians, or a band of mufical performers affembled for the entertainment of mufical hearers.

CONCERT *Spirituel*, Fr. A concert of facred mufic, originally eftablifhed at Paris in 1725, by permiffion of the manager of the opera; which permiffion was purchafed by the brother of the celebrated Philidor, to perform concerts in Lent, on the days the theatres were clofed, at the price of 1000 livres a year, for three years, on condition that no French mufic or felections from the opera fhould be performed at thefe concerts. This firft gave birth to the ufe of foreign mufic and foreign muficians in France. The licence was renewed from time to time, but always at an advanced price, till it amounted, in 1749, to 9000 livres a-year. In 1734, the two celebrated Bezzozi's, from Turin, performed at the concert fpirituel, one on the hautbois and the other on the baffoon, with more applaufe than any foreign muficians had ever before received in France. The celebrated Mondonville had the direction of this concert for feveral years, and compofed exprefsly for its ufe motets for a fingle voice, accompanied by a rapid and difficult harpfichord leffon. It was at the concert fpirituel, which, like our oratorios, takes place when no dramatic performances are allowed, that Giornovichi, La Motte, Viotti, the Agujari, Madame Mara, the Todi, Savoi, and David, were firft heard in France; and afforded the inhabitants of Paris an opportunity of comparing the mufic and performance of foreign muficians with their own.

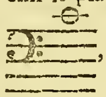
In 1749, during Lent, Geminiani had a concert of facred mufic at Drury-lane theatre, the vocal pieces were all Italian to Latin words. Geminiani himfelf led the band on this occafion, and played one of his own folos. This performance, in imitation of the French, was called CONCERTO SPIRITUALE.

In Italy and Spain, *academia*, Ital. implies a concert. In France, Academie Royale de Mufique, was the title given at Paris to the eftablifhment of the opera under Lulli by Louis XIV. in 1672, which it retained till the revolution. Rouffeau, the fcourge of French mufic and French muficians, traduced both fo much in his famous letter on French mufic, that he was burnt in effigy at the Opera-houfe door. And in the article ACADEMIE *Royale de Mufique*, in the Encyclopedie, and Dict. de Mufique, he has given great offence by a pun; when after barely mentioning this academy, he only adds—"I fhall fay nothing further concerning this celebrated eftablifhment, except that of all the academies in the world, this is that which has made the *moft noife*," *(le plus de bruit)*.

CONCERT-*Pitch*. This term, among muficians, implies that particular elevation of tone, as to gravity or acutenefs, which ought to obtain between different mufical inftruments intended to be ufed in concert, which, when thus adjufted, are faid to be tuned, or in tune. In concerts entirely vocal, or thofe wherein adjuftable or perfect inftruments only are ufed, as violins, violincellos, &c., any precife pitch being fixed for the notes is immaterial, fo that all the inftruments derive their notes from fome *one* found, within moderate limits of the pitch in general ufe, and for which the inftruments were by their dimenfions calculated; fingers therefore ufually derive their pitch from a fimple wind inftrument called a PITCH-PIPE (fee that article), becaufe the fame admits of taking their key-note a little higher or a little lower than the note marked on the ftopper of the pipe, according to circumftances, and the nature of the piece of mufic to be performed. Violin performers, when no keyed-inftruments are prefent, ufually derive their pitch from a fimple fteel fork, tuned to the note A, called a TUNING-FORK (fee that article.)

Inftruments, which either from their large and complicated conftruction, as organs, piano-fortes, &c., or the fixed nature of their notes, as baffoons, oboes, flutes, &c., cannot admit of the occafional variation in the pitch of all their notes which we have mentioned above, are regulated by the makers and tuners of them, to what is called by fome the *concert-pitch*, and by others the *opera-pitch*; though others maintain that the latter, or that ufed by the Italian opera band, is higher than the ufual concert-pitch of the country. It were much to be wifhed, that one invariable pitch were adopted and ufed, but this cannot be hoped for, until the fame is accurately expreffed by the number of pulfes or vibrations excited in the air in a given time by the given note; and the number of thefe vibrations is effential to be known, before the theory of *beats*, as laid down by Dr. Robert Smith in his "Harmonics," the only general and accurate method of tuning inftruments to a required temperament, can be applied. We fhall therefore firft explain the different methods which have been invented for afcertaining the exact number of vibrations made by any given mufical found, and confequently of fixing its *pitch*, and then relate fuch experiments as have fallen within our knowledge for determining what is the prefent concert-pitch in this country.

The problem being of confiderable importance, we fhall enumerate eight different methods of folving it; in order that experiments may be varied in different ways, both for obtaining greater accuracy, and that the coincidence of their refults may infpire confidence in the minds of fuch as have not fufficient mathematical knowledge or patience to go through the inveftigations, on which the theory of the vibrations of a mufical ftring, and the *beats* of an imperfect confonance are founded: and fince the note C-*fol-fa-ut*, or that

that on which the tenor-cliff is placed, being alſo the ledger line above the baſe ſtaff , or the ſame below the treble ſtaff of muſic , is now generally made the key-note, in ſtating the notes of the octave, whether diatonic or tempered, we ſhall adopt each of the formulas, to the finding of the pulſes made by this note in ten ſeconds of time, to be determined by a ſtop-watch, a ſecond pendulum clock, or a ſimple pendulum, uſed for the expreſs purpoſe of determining periods of 10″ each. (See PENDULUM.)

The *firſt* method was ſuggeſted by Pere Merſenne. It conſiſts in a wire or catgut ſtring, of about 15 to 17 feet in length, over two fixed bridges at its extremities; and after this, dividing the diſtance between the bridges accurately into eight equal parts; then fixing another bridge at one of thoſe diviſions from the end; taking care that the new bridge, which ſhould have a tolerably ſharp edge or top, does not ſtrain the ſtring, or force it out of its ſtraight line. The tuning-fork, pipe, or ſtring C, upon the inſtrument whoſe pitch is to be determined, is now to be compared with the ſound of the $\frac{1}{8}$th part of the ſtring; and if its double octave below nearly agrees therewith, the tenſion of the whole ſtring is to be altered, as in tuning a ſtringed inſtrument, either tightening or ſlackening it, until the $\frac{1}{8}$th part is in exact uniſon with the double octave below the note C, without any beats or undulations: if the ſound of the $\frac{1}{8}$th of the ſtring ſhould be found on trial to give a clear muſical note, and yet differ very materially from the double octave below C, it may be neceſſary to aſſume a greater or leſſer length between the extreme bridges, and to determine anew the place of the bridge for the $\frac{1}{8}$th part thereof: and after the $\frac{1}{8}$th part has been nicely adjuſted to the double octave below the note C, as above, it will be proper again to compare the meaſure of the $\frac{1}{8}$th part of the ſtring with its whole length, to ſee that the points of bearing on the bridges are accurately adjuſted to theſe proportions. Now remove carefully the middle bridge, and cauſe the whole ſtring to vibrate, which it will be found to do ſo ſlowly, as not to cauſe an audible ſound, [if any ſound is heard, it will be one of the HARMONICS of that note, ſee that article, and TRUMPET], but ſo that its number of vibrations in 10″ can be ſeen and counted, eſpecially if a quill be held ſo near to the middle part of the ſtring, that it may touch it at each extremity of its vibration; 32 times the number of theſe vibrations will give the number of pulſes or complete vibrations made by C in 10″, and may be called its pitch.

The *ſecond* method is that which Dr. Robiſon uſed, wherein a machine, conſiſting of a combination of wheel-work, could be ſo regulated by the motion of a fly, that any given number of the teeth of a wheel ſhould paſs and ſtrike a quill projecting againſt them, during the ſpace of 10″. In uſing ſuch a machine as this, the velocity of the laſt wheel ſhould be ſo regulated, that the ſound produced by the ſnaps of the quill againſt the teeth, ſhould be in exact uniſon with the note C; when the known number of teeth which ſtrike the quill in the given time, will determine the pitch.

The *third* method is by the ſame learned and ingenious gentleman, who contrived an apparatus, regulated in the manner laſt deſcribed, which opened and ſhut the paſſage to an even current of air, produced by a pair of bellows, ſuch as are uſed in organs, any required number of times in 10″; this ſingular apparatus was found to give a clear muſical ſound, which regulated to an uniſon with C, gave the exact pitch thereof, by the number of alternate openings and ſhuttings of the cock in 10″.

The *fourth* method is founded on the following propoſition, by the author laſt-mentioned, *viz.* "An open organ pipe, when ſounding its fundamental note, undulates with one node in its middle, and its undulations are analogous, in reſpect of their mechaniſm, with the vibrations of a wire of the ſame length, and the ſame weight, with the column of air in the pipe, and ſtretched by a weight equal to that of a column of the ſame air, reaching to the top of a homogeneous atmoſphere, or equal to the weight of a column of mercury, as high as that in the barometer." (See PIPES, *Theory of the Sound of,* TRUMPET, &c.) Whence this ſimple practical rule, when the barometer ſtands at about 30 inches, and the thermometer at about 55°, *viz.* divide the number 226620 by the length in inches and tenths, of an open cylindrical pipe which ſounds C, and the quotient will be the number of pulſes or complete vibrations made thereby in 10″.

The *fifth* method conſiſts in ſuſpending a known weight (equal to W grains) at one end of a wire, ſuch as is uſed for the loweſt notes of a piano-forte, the other end of which is lapped round a thumb-peg, ſuch as is uſed for tuning a violin, ſcrewed tightly into the wainſcot, near to an inſtrument whoſe pitch is to be determined; then by turning the peg, lengthen or ſhorten the vibrating part of the wire, until when ſtruck it ſounds exactly a double octave below C; meaſure exactly the length of the vibrating part of the ſtring, between its contact with the peg and the loop which ſuſtains the weight; call this L inches. After this, cut off exactly L inches of this ſame wire and weigh it, call its weight W grains; then will the number of complete vibrations or pulſes made by C in 10″ be found by the following theorem; *viz.* $\sqrt{\frac{154463 \times W}{L \times W}}$. See our article CHORDS.

The *ſixth* method is by Dr. Robiſon, and is as follows. Let a violin-guitar, or any ſuch inſtrument, be fixed up againſt a wall with the finger-board downwards, and in ſuch a manner that a violin-ſtring, ſtrained by a weight, may preſs on the bridge, but hang free of the lower end of the finger-board. Let another ſtring be ſtrained by one of the tuning-pins, till it be in exact uniſon with C, then hang weights on the other ſtring, till upon drawing the bow acroſs both ſtrings at a ſmall diſtance below the bridge, they are found to be perfect uniſons, taking care that the preſſure of the bow on the ſtrings is ſo moderate, as not to affect the tenſion of the ſtring firſt tuned. Then, having noted carefully the weight appended to the firſt ſtring, add one-fortieth part thereof to the ſame. Now draw the bow carefully again acroſs the ſtrings as before, and an audible *beating* will be heard between the ſounds of the two ſtrings; count the number of theſe beats during 10″, and 80 times this will be the number of complete vibrations, or pulſes, made by C in 10″.

The *ſeventh* method, as well as the beſt, depends on tuning a major comma; for which ſeveral rules are given under the article COMMA. From the octave below C tune upwards three ſucceſſive perfect *fifths* upon a ſingle ſtop of an organ, C G, G D, and D A; and thence tune downwards the perfect major *ſixth*, A C; which laſt C will be a major comma above the firſt C, and will beat conſiderably when ſounded therewith; count theſe beats during 10″, and 81 times this will be the number of complete vibrations, or pulſes of C in 10″. See Dr. Smith's Harmonics, p. 195.

The *eighth* method (Harmonics, p. 197.) conſiſts in tuning a major

a major *ſixth*, C A, above C, not perfect, but ſuch that it may beat ſharp B times in 10″; from thence tune downwards three ſucceſſive perfect *fifths*, A D, D G, and G C; which laſt note will be an imperfect octave below C, the beats of which octave are to be counted during 10″, carefully diſtinguiſhing whether it beats ſharp or flat, and calling the number, if ſharp, S, and if flat, F; then will 81S + 16B, or 16B − 81F, according as the caſe may be, expreſs the number of complete vibrations, or pulſes of C in 10″.

It is not in our power to give ſo ſatisfactory an account of what is the preſent concert or opera-pitch in this country, as we could have wiſhed; but we hope that experiments will hereafter be multiplied, for fixing it very exactly (at a mean ſtate of the barometer and thermometer), and after ſuch determination, that the exact number of pulſes or complete vibrations from one extreme of the vibrations of a ſtring until its return to the ſame point, will be reſorted to by inſtrument-makers and tuners, for regulating the pitch of their forks, pipes, and inſtruments.

The vibrations, mentioned in M. Euler's experiment, (after our fifth method, under our article CHORDS) were ſemi-vibrations, or thoſe made, while a point in a muſical ſtring, went from and returned to the axis, or line of reſt, between the two points of ſuſpenſion, and not complete vibrations, or thoſe made while the ſtring went from and returned to the place of its greateſt deviation from the axis: therefore $\frac{392}{2}$, or 196, was the number of complete vibrations per 1″, made by the A, a minor third below our C; whence this made $\frac{6}{5} \times 196 \times 10 = 2351$ complete vibrations in 10″.

Dr. Robert Smith (Harmonics, p. 220 and 271), calculated about the middle of the laſt century, that the tenor clef C note, upon the organ in Trinity college, Cambridge, made $232\frac{1}{5}$ complete vibrations in 1″, or 2322 in 10″, which, he ſays, was above half a mean-tone lower than the London *opera pitch* at that time, and which therefore probably gave about 2460 or 2470 pulſes in 10″. The above experiment of Dr. Smith's was made, after Trinity college organ had been depreſſed a whole tone in its pitch, by making the keys each to act on two pipes lower in the ſcale than they originally did, by which it was reduced (Harmonics, p. 208, and 218) to the Roman *pitch*, or that to which the pitch-pipes, made about the year 1720, were generally tuned. Dr. Thomas Young, in his lectures at the Royal Inſtitution (Syllabus, p. 95), ſtates our C to make 256 vibrations in 1″, apparently only, for the purpoſe of agreeing with an imaginary C eight octaves below, which is to make but 1 vibration in 1″, but which imaginary C, according to the recent determinations of *concert-pitch*, which we are about to mention, ought to make but the $\frac{15}{16}$ part of a vibration in 1″, the 8th octave above which will be moved at the rate of 2400 pulſes in 10 ſeconds.

The late Dr. Robiſon applied our ſecond, third, and ſixth methods, for determining the complete vibrations made by C, and ſtates them all to agree extremely near with 240 in 1″, or 2400 in 10″. Many other experiments are upon record, but generally ſome other note than C was ſelected for the experiment, the exact interval between which and C we are ignorant of, owing to the temperament of the inſtrument; this is the caſe with Dr. Smith's determinations (by the fifth and others of the methods above, Harmonics, p. 192, &c.) of the vibrations made by D *la-ſol re*, upon the organ above-mentioned.

We were lately preſent at an experiment by Mr. John Iſaac Hawkins, at his houſe in Great Titchfield-ſtreet, where he manufactures the finger-keyed viols and double-baſſes, mentioned under our article CLAVIOL, (ſee FINGER-KEYED VIOL) according to our firſt method above: two pieces of hard wood, about an inch thick, were ſcrewed down to the floor in his room, at about 22 feet aſunder, and were pierced for the two ſtring-pegs of a harpſichord wire; ſeveral thin pieces of wood with a ſharp edge at top, and riſing a very ſmall height more above the floor, than the fixed pieces of wood, were provided as moveable bridges. A braſs wire, called No. 15, by the piano-forte makers, and the largeſt ſize which they uſe in grand piano-fortes, which was found to be .033 inch diameter, was lapped round the pins, and ſtretched by turning one of them. From a point marked 0 on the floor, 8 or 10 inches from one of the fixed pieces of wood, the ſeveral diſtances $7\frac{1}{2}$ inches, 15, 30, 60, 120, and 240 inches were carefully meaſured and marked under the ſtring; a bridge was then placed under the ſtring, at the point 0; another at $7\frac{1}{2}$, and another at 240 inches, and one of the tuning pegs was turned until the ſhort portion of the ſtring, 0 to $7\frac{1}{2}$, was in perfect uniſon with Mr. H's ſmall, or mouth tuning-fork, C; [which is a very conſiderable improvement upon the large tuning-forks which require to be ſtruck upon a table, ſee TUNING-FORK] the bridge at $7\frac{1}{2}$ inches was then ſucceſſively moved to 15 and 30 inches, in order to compare the octave and double octave below with the fork, and which on trial appeared to be accurately in tune. This middle bridge was then removed, and the counting of the viſible vibrations of the whole ſtring, 0 to 240, or five octaves below C, was conducted as follows. Mr. H. kneeling down on one knee, placed a ſeconds watch before him, and held a quill with one hand ſlightly againſt the ſtring, about two feet from the bridge, ſo as to be ſtruck by the wire at each vibration; this was for aſſiſting the ſight, in counting the vibrations, by means of the audible ſtrokes thus produced on the quill: for ſome time. Mr. H. continued attentively to notice the vibrations, and to beat down with his toe at every fourth vibration, as a performer on the violin, &c. does in playing in common time; this was purſued, until ſuch a regular rate of beating was obtained by the toe that the experiment was not interrupted by a new twitch or impulſe given to the vibrating ſtring by an aſſiſtant; the counting then commenced, and was continued during 60 ſeconds, in the firſt of which 111 beats of the toe were made, and in a repetition of the experiment, after examining the time of the $\frac{1}{32}$ part of the ſtring, 113 beats were counted; the mean of theſe, or 112 per minute, gave $112 \times 4 \div 6 = 74\frac{2}{3}$ vibrations for the whole ſtring in 10 ſeconds, and conſequently C, five octaves above, gave $47\frac{2}{3} \times 32 = 2386$ vibrations in 10″, which agrees extremely near with Dr. Robiſon's experiments above mentioned, in ſhewing, that 2400 may be taken as the preſent concert-pitch.

We have only to add, that an experiment and calculation ſome years ago by the fifth method above, gave us 2415 pulſes in 10″ for a tuning-fork then in our poſſeſſion, marked C, but whether the ſame had been adjuſted to the acknowledged concert-pitch, we are unable to ſay. The ſtate of the barometer and thermometer ſhould always be noted, at the time of making experiments of this kind, if it is intended accurately to determine the pitch: and it may be well, inſtead of truſting to the ear alone, in determining the uniſon or octave of the fork and ſtring, to count and equalize their *beats* with a third ſound, a little different from both of them, as recommended by Mr. Nicholſon, Phil. Journ. 8vo. i. p. 320, for the making of correct tuning-forks.

Concert *of Ancient Music.* This excellent eſtabliſhment was originally ſuggeſted by the late earl of Sandwich in 1776, in favour of ſuch ſolid and valuable productions of old maſters as an intemperate rage for novelty had too ſoon laid aſide as ſuperannuated, was ſupported with ſpirit and dignity, by the concurrent zeal and activity of other noblemen and gentlemen of the firſt rank, who united with his lordſhip in the undertaking, till 1785, when it was honoured with the preſence of their majeſties, whoſe conſtant attendance ever ſince has given to this inſtitution an elevation and ſplendor, which perhaps no eſtabliſhment of this kind ever enjoyed before. Here the productions of venerable old maſters, particularly thoſe of Purcell and Handel, are performed by a ſelect and powerful band, with ſuch correctneſs and energy, as the authors themſelves never had the happineſs to hear.

Concert, *To,* in a *Military Senſe,* is not only to deliberate upon, but to arrange, form, and agree upon plans of co-operation, for the purpoſes of either offence or defence.

CONCERTANTE, Ital. from *concertare,* to concert, order, arrange. In the muſical technica, it uſed to be equivalent to harmonizing, adding inſtrumental parts to vocal. But at preſent, the term concertante is uſed ſubſtantively, for a ſymphony or full piece dialogued. In which there are ſolo parts for the diſplay of great talents on particular inſtruments. At the concerts of Bach and Abel, ſolo parts were frequently allotted in theſe compoſitions to Cramer, Fiſcher, the younger Stamitz, Hindmarſh, Shields, Holmes, Tacit, and the elder Florio, Abel, on the viol di gamba, and Bach himſelf on the piano-forte. Bach's concertante in C♮, and Pleyel's in E♭, were always heard with rapture; not only from the merit of the compoſition, but exquiſite manner in which they were performed, and the ingenuity of the written cadences, generally furniſhed by Fiſcher.

CONCERTATO, a term in *Muſic,* implying the addition of inſtrumental parts to a vocal compoſition; as *motetto concertato,* a motet or anthem, accompanied by inſtruments.

CONCERTO, ſynonymous with *concento,* which long ſupplied its place. Concento and ſuono implied nearly the ſame things in the days of Boccaccio, as concerto and ſonata ſince; but concertare and concertanti were at firſt applied to the union of inſtruments with voices, in motets and madrigals, by doubling the voice-parts. It was not till late in the ſeventeenth century, that inſtrumental pieces of many parts, began to be called concertos, and of few parts ſonatas.

The earlieſt compoſitions which we found in Italy, for three or more inſtruments of the ſame ſpecies, were Ricercari and Fantaſie. But of theſe none ſeem to have been printed, when the elder Doni publiſhed the ſecond edition of his "Libreria," 1557, as all the inſtrumental muſic that appears in his catalogue of muſical compoſitions, which had then been publiſhed in Italy, are "Intabolature da organi, et da leuto, d'Anton da Bologna, di Giulio da Modena, di Franceſco di Milano, di Jaches Buas, piu di dieci volumi, e la continua."

About the beginning of the ſeventeenth century madrigals, which were almoſt the only compoſitions in parts for the chamber, then cultivated, ſeem to have been ſuddenly ſupplanted in the favour of lovers of muſic by a paſſion for fantaſias of three, four, five, and ſix parts, wholly compoſed for viols, and other inſtruments, without vocal aſſiſtance. And this paſſion ſeems to have ariſen, from the calling in theſe inſtruments to reinforce the voice parts, with which they played in uniſon, in the performance of motets and madrigals, thence termed *concertati.* At length the inſtrumental performers diſcovered that both the poetry and ſinging of the times might be ſpared without any great loſs or injury to muſical effects; as the words, if good, were rendered unintelligible by fugue, imitation, and multiplicity of parts; and the ſinging, being often coarſe and out of tune, could be better ſupplied by their own performance. Thus vocal muſic not only loſt its independence, but was almoſt totally driven out of ſociety; as the ancient Britons, calling in the Saxons to aſſiſt them in their conflicts with the Picts, were themſelves ſubdued and forced from their poſſeſſions, by too powerful auxiliaries. See Fancies and Base-viols.

Simpſon in his "Compendium," ſpeaking of fancies, page 118, ſays: "In my opinion, no nation is equal to the Engliſh in this way, as well for their excellence, as for their various and numerous conſorts of 3, 4, 5, and 6 parts, made properly for inſtruments, of which fancies are the chief."

In the MS. "Memoirs of Muſic," by the hon. Roger North, who ſpeaking of Jenkins, an eminent Engliſh compoſer in the time of Charles I. ſays, that "of all his concerts, none flew about with his name to it, ſo univerſally, as the ſmall piece called his "Five Bell Conſorte." And this is only in three parts, ſo that the import of the term concert, or conſorte was not then ſettled.

Montaigne, who travelled through Italy and Germany in 1580, ſays that the maſs in great churches was accompanied by organs and violins. But though the word concerto occurs ſo early as the year 1587, in the "Trattenimenti" or "Divertimenti" of Scipion Bargagli, it was only applied to ſhort Fantaſie and Ricercari. Salmi concertati was often uſed when inſtruments were added to voices, in concerti eccleſiaſtici.

At the latter end of the 17th century moſt of Baſſani's, Corelli's and Torelli's violin muſic was compoſed for the church. The firſt and third ſet of Corelli's ſonatas, and his firſt eight concertos, we are certain were thus appropriated. Somis, Veracini, and Tartini, compoſed their own ſolo concertos, and performed them likewiſe in the ſeveral churches of Italy. And Pugnani uſed to accompany the "Meſſa Bolla," or Silent Maſs, at the chapel royal in Turin, with his violin ſolo concertos.

Concertos merely inſtrumental, for ſecular uſe, ſeem to have had no exiſtence before the time of Corelli. The honour of the invention has been aſſigned to Torelli, but from no good authority. Six concertos by Aleſſandro Scarlatti, manifeſtly, from the gravity of their ſtyle, compoſed for the church, were printed by Benjamin Cook, in New-ſtreet, Covent-garden, about the year 1730. But at the beginning of the laſt century, beſides the concertos of Corelli, Geminiani, and Handel, concertos by Albinoni, Alberti, Teſſarini, and Vivaldi, were diſperſed all over the kingdom, and heard with great delight at our country concerts, muſic-meetings, and clubs. Theſe were chiefly on the model of Torelli and Corelli, but with melody of a lighter kind. They were all in ſeven or eight parts for two choirs; that is, with ſolo parts for the concertini, or ſolo inſtruments, and ripieno parts for the concerto groſſo, or chorus of the whole band. But theſe were ſoon ſuperſeded by great performers on the violin, ſuch as Locatelli, Tartini, Somis, Veracini, Nerla, and Giardini, who, in order to diſplay their ſuperior powers of execution, rendered them too difficult for general uſe. But theſe being brought into public favour by the admirable performance of their ſeveral authors, were followed by the concertos of Barthelemon, Cramer, La Motte, Lolli, Salomon, Viotti, Giornovichi, &c. who, by ſome peculiar excellence in the knowledge of the finger-board, uſe of the bow,

bow, or accurate performance of double-ftops, feem to have arrived at the acme of perfection in executing folo concertos.

Concerto *Groffo*, a grand concerto, or full piece.

Concerts, *public*. Thefe were firft eftablifhed in London by Banifter, mafter of king Charles II's new band of 24 violins. The firft notice we find of thefe affemblies is in the London Gazette, No. 742, for Dec. 30th, 1672, in which there is the following advertifement: "Thefe are to give notice, that at Mr. John Banifter's houfe, now called the mufic-fchool, over againft the George Taverne, in White Fryers, this prefent Monday, will be mufic performed by excellent mafters, beginning precifely at four of the clock in the afternoon, and every afternoon for the future, precifely at the fame hour."

There are other advertifements from Banifter of the fame kind, in 1674, 1676, and 1678. In that for Dec. 11th, 1676, his mufical performance is faid to be "At the academy in little Lincoln's-inn fields," where it was to begin "with the parley of inftruments, compofed by Mr. Banifter, and performed by eminent mafters."

In Mr. North's manufcript "Memoirs of Mufic," we have a more minute account of thefe performances. "Banifter having procured a large room in White Fryars, near the Temple back-gate, and erected an elevated box or gallery for the muficians, whofe modefty required curtains, the reft of the room was filled with feats and fmall tables, alehoufe fafhion. One fhilling, which was the price of admiffion, entitled the audience to call for what they pleafed. There was very good mufic, for Banifter found means to procure the beft hands in London, and fome voices to affift him. And there wanted no variety, for Banifter, befides playing on the violin, did wonders on the flageolet to a thorough bafe, and feveral other mafters likewife played folos."

Thefe were followed by other public concerts of a fuperior kind, at the Crown and Anchor, the Caftle in Paternofter row, the Swan and King's Arms, Cornhill, York Buildings, Hickford's Room, &c. &c.

CONCESSI, q. d. *I have granted*; a term much ufed in conveyances, &c. Its effect is to create a covenant in law, as *dedi* (I have given) does a warranty. Co. Lit. 384. This word is of a general extent, and is faid to amount to a grant, feoffment, leafe, and releafe, &c. 2 Saund. 96.

CONCESSION, in *Rhetoric*, a figure whereby fomething is granted or allowed to the adverfary, either to prevent being detained by unneceffary incidents, or to make fome advantage of. "I will not conteft with you the reality of the contract; what I plead for, is relief againft the injuftice of it." "True, fhe is fair; but ought fhe not to fhew her acknowledgments to heaven for the favour, by making a virtuous ufe of her beauty?" See Epitrope.

CONCESSIT, Sur, in *Law*, a fpecies of *Fine*; which fee.

CONCEVEIBA, in *Botany*, Lam. Encyc. Aubl. Guian. 924. tab. 353. Clafs and order, *diœcia*. Nat. Ord. *Euphorbiæ*; Lam.

Gen. Ch. *Male* flower not known. *Female. Cal.* one-leafed, flefhy, trigonous near the bottom, with three large glands at its bafe, terminated by five thick acute teeth, each of which has on the inner fide of its bafe a gland preffing upon the germ. *Pift.* Germ fuperior, triangular; ftyle none; ftigmas three, thick, concave, furrowed, incurved. *Peric.* Capfule globular, trigonous, with three furrows, three-celled, three-valved, each valve dividing into two. *Seeds*, one in each cell, roundifh, inveloped in a white pulpy matter which has a fweet pleafant tafte.

Sp. C. *guianenfis*. A fmall tree. *Trunk* ten or twelve feet high, about a foot in diameter, with grey bark and white wood, much branched. *Leaves* alternate, at unequal diftances from each other, oval-oblong, acuminate, toothed, green and fmooth on their upper furface, cinereous underneath. *Stipules* in pairs, fmall, caducous. *Flowers* feffile, alternate, in a terminal fpike, common peduncle flefhy, trigonous. A native of Guiana, on the banks of rivers. When the bark is cut, or the leaves torn, a greenifh juice iffues from the wound.

CONCEZE, in *Geography*, a town of France; in the department of the Correze, and diftrict of Brive; 6 leagues N.W. of Brive.

CONCH, in *Mythology*. See Triton.

CONCHA *Auris*, in *Anatomy*, is the large hollow of the external ear, included between the tragus, antitragus, and anthelix, and having at its anterior part the commencement of the meatus auditorius externus. See Ear.

Concha, Κογχη, in *Antiquity*, a liquid meafure among the Athenians, which contained two *myftra*, or half an ounce. As much oil as it was capable of holding, weighed five drams one fcruple and twenty grains, according to Gor. Defin. Pitifci Lex. & Eifenchom. Others think that the *concha* contained three fpoonfuls, ninety-fix of which filled a pint veffel (*fextarius*;); a *fextarius* was therefore equivalent to thirty-two *conchæ*, and fix *fextarii* made one *congius*, a meafure equivalent to our three quarts, according to Salmaf. Exerc. Plinian and Bodæus in Theophraft. According to Fernelius, the concha was equivalent to two *myftra*, or five fpoonfuls; which, according to Jacobus Sylvius, are equivalent to fix drams. According to Galen, in his work De Ponderibus & Menfuris, cap. 11, the *concha magna* contained the fame quantity with the *acetabulum*, which in liquid meafure was an ounce and a half, and in weight fifteen drams. The *concha minor* was in liquid meafure half an ounce, and in weight five drams.

Concha, in *Conchology*. See Conchology.

Concha, in *Mufic*, a trumpet among ancient inftruments, or a trump-marine, fuch as Triton ufed;

—— Tritona vocat; conchæque fonaci
Infpirare jubet.
Ov. Met. 1.

Concha *anatifera*. See Anatifera.

Concha *anomia*, the name of a foffil fhell-fifh, found in great abundance, and in a great variety of fpecies, but not known in any of them living, on the fhores or in the feas of our own or other countries. In Gloucefterfhire, and fome other of our counties, thefe are found as common as pebbles on the ploughed lands in other places. They are a fort of bivalve fhell, the valves of which are of unequal extent, both of them convex, and the head or beak of the longer valve crooked, and falling over the head of the other.

The great general diftinction of this numerous clafs of bodies, is into thofe which are of a fmooth furface, and thofe which are of a ftriated or rough one.

Others alfo of the fame clafs, or of one very nearly allied to it, are found in many of our inland counties, fome very long from the cardo, or hinge, to the margin; and others very fhort, and very long the contrary way. They are found indifferently in all forts of ftrata, in earth, in ftone, in fand, and among gravel. See Anomia.

Concha *fortificata*, a name given by fome authors to the genus of fhells, called by others the Murex.

Concha *globofa*, the name of a large genus of fhells, called by authors the Dolium, and in French the *tonne*.

CONCHÆ Lapideæ, was the name by which fome writers

writers diftinguifhed the foffil fhells found lodged in the ftrata of the earth, before the whims of certain authors refpecting the *vis plaftica, vis formativa,* &c., by which they attempted to account for the formation of thefe organic remains, had been entirely exploded, and the truth of their being animal exuviæ generally eftablifhed.

CONCHA *margaritifera*, a name fometimes ufed for thofe *mytuli* which produce pearls. See MUSCLE.

CONCHA *margaritifera*, is the name by which fome writers have defcribed a foffil fhell, fomewhat refembling the recent fhells of this genus, in the equality of their valves, the appearance of their guttered and toothlefs hinges, &c.

CONCHÆ *narium*, in *Anatomy*, is a term applied to the turbinated bones of the nofe. See SKELETON.

CONCHA *fpectrorum*, in *Natural Hiftory*, the *fpectre fhell*, a name given by authors to a fpecies of voluta, from fome odd figures defcribed on its furface, reprefenting rough draughts of terrible phantoms. It is an elegant fhell, of a middle fize, and is of a white ground, and the figures are reddifh; thefe form three large and broad bands, furrounding the fhell at top and bottom, and in the middle; and between thefe there are feveral feries of fmall fpots. It is a fcarce fhell, and ufually fells at a large price.

CONCHA *Veneris*, the name by which feveral fpecies of chama are called. The fhell is univalve, wreathed, and has a fmall longitudinal and denticulated chink, or aperture, in it. It is alfo called *concha porcellana*, from its aperture in fome meafure refembling the mouth of a hog; and *concha erythræa*, from its being found in the Red Sea, called *erythræum*. It is alfo called *concha cytheriaca*, from Venus, who received the epithet *cytheræa*, from Cythera, a Grecian ifland. That this fifh was ufed by the ancients as an aliment, we read in Seneca, Ep. 95. Mundius afferts that they prove a ftimulus to venery, and provoke urine. Rondeletius informs us, that thefe fhells are an ingredient in the *pilulæ de bdellio*, for removing fluxes, and curing ulcers in the uterus. But inftead of the *concha venerea*, the apothecaries generally ufe cockles. Excellent dentrifices are prepared from this fhell, which is alfo ufed for curing ulcers in the canthus of the eye, and the *fiftula lachrymalis*. It is remarkably drying, without exciting any heat.

CONCHARUM PROMONTORIUM, in *Ancient Geography*, a promontory of Afia Minor, on the Thracian Bofphorus, in the fouthern part of the Caftacian gulf.

CONCHES, in *Geography*, a town of France, in the department of Eure, and chief place of a canton in the diftrict of Evreux, 12 miles S. E. from Evreux, 39 S. from Rouen, and 87 N. E. from Paris. The place contains 2259, and the canton 13050 inhabitants. The territory includes $257\frac{1}{2}$ kiliometres, and 33 communes.

CONCHES, a town of France, in the department of the lower Pyrenées, and diftrict of Pau; 6 leagues N.N.E. of Pau.

CONCHITES, or CONCHITÆ, in *Natural Hiftory*, a name which has been indifferently ufed by writers, in defcribing foffil bivalve fhells of different kinds.

CONCHITES *marmor*, a name given by the ancients to a fpecies of marble dug near Megara, and remarkable for containing a great number of fea-fhells, and other marine bodies immerfed in it.

CONCHIUM, in *Botany*, from κόγχη, a bivalve fhell, in allufion to the form of the fruit. Smith, Tr. of Linn. Soc. v. 4. 215. Donn. Cant. ed. 3. 21. Vent. Jard. de la Malmaifon, 110. (Hakea; Schrad. Sert. 27. Cavan. Ic. v. 6. 24.) Mufcle-fhrub. Clafs and order, *tetrandria monogynia*. Nat. Ord. *Proteæ*, Juff.

Gen. Ch. *Cal.* none. *Cor.* of four petals, linear, cohering at their bafe, fomewhat dilated and concave at the fummits, nearly equal. *Stam.* four; filaments fhort, inferted towards the fummit of each petal: anthers lodged in the cavity of each petal, erect, oblong, two-celled. *Pift.* Germen fuperior, fmall, ovate, oblique: ftyle afcending, recurved, cylindrical, thick, as long as the corolla; ftigma turbinate, pointed. *Peric.* Capfule ovate, oblique, gibbous and rugged, pointed, of two hard, thick, woody valves, and one fmall eccentric cell. *Seeds* two, elliptical, flat on one fide, convex on the other, filling the cavity of the capfule, each furnifhed with a black, membranous, tranfparent, oblong wing.

Eff. Ch. *Calyx* none. *Petals* four, bearing the ftamens. *Stigma* turbinate, pointed. *Capfule*, of one cell. *Seeds* two, winged.

Sp. 1. C. *gibbofum*. Donn. Cant. 21. (Bankfia gibbofa; White Voy. 224. t. 22. f. 2. Willden. Sp. Pl. v. 1. 536. Hakea gibbofa; Cavan. Ic. t. 534. H. pubefcens; Schrad. Sert. 27.) "Leaves cylindrical, flightly downy, rather longer than the fruit. Corolla fmooth. Capfules roundifh-ovate, gibbous, rugged." Sm MSS. *Stem* fhrubby, branched, rigid, fmooth. Young branches hairy. *Leaves* numerous, evergreen, alternate, feffile, fpreading, cylindrical, near two inches long, fomewhat downy, efpecially when young, each tipped with a fharp fpine. *Flowers* in fmall, axillary, hairy umbels, white. *Corolla* nearly or quite fmooth. *Capfules* folitary, the fize of a walnut, black and rugged, very gibbous underneath; the valves extremely thick, hard and woody, each tipped with a fhort fharp point; cavity very fmall, eccentric, uneven, of a mahogany colour. *Seeds* with black wings like gauze or crape. A native of New South Wales, near Port-Jackfon. It is now frequent in the more curious European green-houfes, but is rather fingular than beautiful. 2. C. *fphæroideum*. "Leaves cylindrical, as long as the fruit, downy as well as the branches. Capfules orbicular, depreffed, fmoothifh." Sm. MSS. A fmaller fhrub than the laft. *Branches* clothed with denfe woolly hairs. *Leaves* about an inch long, very hairy. *Flowers* unknown in Europe. *Capfules* of a rufty brown, the fize of the laft, but much lefs rugged, and when viewed vertically, almoft orbicular, their points fcarcely extending beyond the circumference. Sent from Port-Jackfon with the preceding. 3. C. *aciculare*. Donn. Cant. 21. Vent. Jard. de la Malm. t. 111. (Hakea fericea; Schrad. Sert. 27?) "Leaves cylindrical, fmooth, as long as the fruit. Corolla fmooth. Capfules roundifh-ovate, rugged, elongated at the point." Sm. MSS. Like C. gibbofum, but in all its parts about half as large. *Leaves* in every period of their growth quite fmooth. *Flower-ftalks* and young branches filky. *Fruit* more oblong than in the two preceding, but its lateral protuberances are more globofe. A native of Port-Jackfon, not rare in our gardens. 4. C. *longifolium*. Donn. Cant. 21. (Bankfia teretifolia; Salifb. Prod. 51?) "Leaves cylindrical, fmooth, thrice as long as the fruit. Corolla clothed with filky hairs." Sm. MSS. *Leaves* three inches or more in length, fpinous, as in all the foregoing, always fmooth, as well as the branches. *Corolla* clothed with white, clofe, filky hairs. Perhaps only a variety of C. *pugioniforme* hereafter defcribed, which cannot be determined till the fruit of the prefent fpecies be known. 5. C. *compreffum*. "Leaves cylindrical, fmooth, fcarcely fo long as the fruit. Capfules ovate, compreffed, fomewhat rugged." Sm. MSS. The fruit of this is not more than an inch long, and ovate, partaking but little of the globular protuberant figure of the preceding kinds. *Leaves* fmall and flender. 6. C. *pugioniforme*. (Hakea pugioniformis; Cavan. Ic. v. 6. 24. t.

533. H. glabra. Schrad. Sert. 27. t. 17.) "Leaves cylindrical, fmooth. Corolla clothed with filky hairs. Capfules lanceolate, pointed, befet with fharp tubercles towards the bafe." Sm. MSS. *Leaves* an inch or inch and a half long, bright green, always fmooth, as well as the branches. *Flowers* white and filky. *Capfules* very different from the reft of the genus, being much more flender. This, like all the preceding, is found in the country about Port-Jackfon, New South Wales. 7. C. *trifurcatum.* "Leaves cylindrical, three-cleft; fometimes dilated, fimple, elliptical and flat. Corolla hairy." Sm. MSS. This moft remarkable fpecies, difcovered by Mr. Archibald Menzies, F.L.S. at King George's Sound, on the weft coaft of New Holland, is diftinguifhed by its three-forked leaves, but efpecially by their occafional variation from a cylindrical to a broad flat elliptical figure, on the fame branch, and even in the fame individual leaf. The *flowers* and their ftalks are clothed with rough, fhaggy, not filky, hairs. *Fruit* unknown. 8. C. *dactyloides.* Vent. Tard de la Malm. t. 112. (C. nervofum; Donn. Cant. 21. Hakea dactyloides; Cavan. Ic. v. 6. 25. t. 535. Bankfia dactyloides; Gærtn. v. 1. 221. t. 47. f. 2. B. oleæfolia; Salifb. Prod. 51.) "Leaves obovate-oblong, with a fmall point, triply nerved, veiny. Capfules ovate, acute." Sm. MSS. *Leaves* various in length and breadth, flat, thick, rigid, fmooth, entire, obovate, tapering towards the bafe, marked with three principal nerves united above the bafe, and connected upwards by interbranching veins, forming fometimes fpurious nerves. The young leaves and branches are rufty and downy. *Flowers* numerous, fmall, white, fmooth, on hairy ftalks. *Capfule* ovate, acute, rugged, fcarcely gibbous. Common about Port-Jackfon, and not rare in our gardens, where the varieties to which it is fubject in the leaves, afford the nurferymen an opportunity of furnifhing their friends with many new fpecies. 9. C. *ellipticum.* "Leaves elliptical, bluntifh, pointlefs, with five nerves, reticulated with veins. Capfules ovate, obtufe." Sm. MSS. Allied to the laft, but diftinct. *Leaves* broad, exactly elliptical, fomewhat glaucous, having five ribs, which all fpring from the bafe, and deftitute of any terminal point or fpine. The fpaces between the ribs or nerves are beautifully and copioufly reticulated. *Capfule* more obtufe than in C. *dactyloides,* but otherwife much like it. Found by Mr. Menzies at King George's Sound, but not yet brought alive to Europe. *Flowers* not feen. 10. C. *oleifolium.* "Leaves elliptic-lanceolate, with a fmall point, fingle-nerved. Capfules ovate, gibbous, fomewhat rugged." Sm. MSS. Brought by Mr. Menzies from the fame country as the laft. Full-grown *leaves,* fcarcely an inch and half long, fmooth, even and entire, with only one rib, tipped with a little fpine. Veins few and obfcure. *Flowers* fpiked, fmooth, as well as their partial ftalks, though the common ones are hairy. *Capfule* ovate, gibbous on one fide, very rugged all over. 11. C. *ceratophyllum.* "Leaves three-lobed, pinnatifid. Capfules ovate, compreffed." Sm. MSS. *Leaves* very fine, large and divaricated, from two to four inches long, fmooth, except when very young, hard and rigid, obfcurely ribbed, lobes and teeth fpinous. *Flowers* filky. *Capfule* narrow, ovate, compreffed, fmooth, apparently fucculent in its outer coat, which feems to be the cafe with the three preceding fpecies. Gathered at King George's Sound, by Mr. Menzies. It is one of the handfomeft of its genus. 12. C. *falignum.* Donn. Cant. 21. (Embothrium falignum. Andr. Repof. t 215.) "Leaves linear-lanceolate, acute, without fpines, fingle-nerved. Capfules ovate, gibbous, recurved." Sm. MSS. A tall elegant fhrub, with the habit of a willow. *Leaves* five or fix inches long, fmooth and pliable, of a narrow lanceolate form, entire, acute, but not fpinous, with one nerve and a few lateral veins. *Flowers* copious, white, fmooth, in fmooth umbels, which, as in all the reft of the genus, are axillary. *Capfule* fmallifh, ovate, recurved, very gibbous, and fomewhat rugged, at each fide, tapering at the bafe, externally hard and not fucculent, each of its valves tipped with a lateral fpine. A native of New South Wales, frequent in gardens.

Propagation and Culture. All the fpecies are fhrubby and perennial, eafily raifed from feeds brought in the capfules from their native country, and requiring with us only the ufual fhelter of a green-houfe or confervatory. Thofe from King George's Sound are as yet ftrangers to our gardens. The others thrive in fandy peat earth, but require regular and rather copious fupplies of water. They may be increafed by cuttings. C. *falignum* ripens feeds in abundance when planted in the ground under glafs, and rifes to the height of 12 or 15 feet. S.

CONCHOID, or Conchilis, in *Geometry,* a curve line which always approaches nearer a ftraight line to which it is inclined, but never meets it. It was invented by Nicomedes, and much ufed by the ancients, as we learn from Pappus, in the conftruction of folid problems.

It is defcribed thus: draw a right line B D (*Plate, Analyfis, fig.* 2.) and another A C, perpendicular to it in E; draw any number of right lines, as C M, C M, cutting B D in Q; make $QM = QN = AE = EF$; the curve wherein the points, M, M, are found, is the *conchilis,* or *conchois prima,* fo called by Nicomedes. The other, wherein the points, N, N, are found, is the *conchois fecunda;* the right line B D the *rule,* or *directrix,* the point C the *pole,* or centre of the conchoid. In reality, they are both parts of the fame curve, having the fame pole C, and four infinite legs, to which the line B D is a common afymptote. The inventor alfo contrived an inftrument, whereby the firft conchoid may be defcribed mechanically: thus, in the rule A D (*fig.* 3.) is a channel or groove cut, fo that a fmooth nail, firmly fixed in the moveable rule C B, in the point F, may flide freely within it: into the rule E G is fixed another nail in K, for the moveable rule C B to flide upon. If then the rule B C be fo moved, as that the nail F paffes along the canal A D; the ftyle, or point in C, will defcribe the firft conchoid.

Now let $AP = x$ (*fig.* 2.); $AE = a$; $PE = MR = a - x$; wherefore, as x increafes, $a - x$, or M R will decreafe; and therefore the curve continually approaches nearer to the rule B D.

In the fame manner it appears, that the right line N O muft continually decreafe; and therefore that the fecond conchoid, alfo, muft continually approach nearer the rule.

But inafmuch as between each conchoid and the right line B D, there will be the right line Q M or Q N, equal to A E; neither of the conchoids can concur with the right line B D: confequently B D is an afymptote of each conchoid. See Asymptote.

If from any point, A, of the curve (*fig.* 4.), A H and F T P be drawn perpendicular to the rule, or directrix, H T, and A L parallel to it; and if the quadrant, F G K, be defcribed interfecting A L in G; we fhall have $PL \times LG = TL \times LA$. For the triangles, A H B, T L G, are fimilar and equal, as the angles at H and L are right; and $AB = TF = TG$, and $AH = TL$; therefore $BH = GL$. Alfo the triangles, A H B, A L P, are fimilar. Whence $AH : HB :: PL : AL$; that is, $TL : GL :: PL : AL$; therefore, $PL \times GL = TL \times AL$. Hence, the fame things being fuppofed, we fhall have $AG = BT$, and $GL = HB$. For $AL = HT$, and $GL = HB$

= H B; therefore, by ſubtraction, we ſhall have $AG = BT$. This propoſition is equally true in the inferior conchoid (*fig.* 5.). In the inferior conchoid $gl = bh$. Moreover, in the ſuperior conchoid (*fig.* 4), if P T F and A H be perpendicular to the directrix H T, and A L parallel to it, $TL^2 : TF^2 - AH^2 :: PL^2 : AL^2$. For, by the preceding propoſition, $TL : GL :: PL : AL$, and $TL^2 : GL^2 :: PL^2 : AL^2$; but $GL^2 = GT^2 - TL^2 = TF^2 - AH^2$; therefore $TL^2 : TF^2 - AH^2 :: PL^2 : AL^2$.

Hence, putting $FT = a$, $PT = b$, axis $TH = x$, ordinate $HA = y$; the equation of the ſuperior conchoid will be $\frac{\overline{b+y}\sqrt{aa-yy}}{y} = x = AL$, or, by reducing it, we ſhall have $\overline{b+y}\sqrt{a^2-y^2} = yx$, i. e. $\sqrt{\overline{b^2+2by+y^2} \times \overline{a^2-y^2}} = yx$, or $\sqrt{a^2b^2+2a^2by+a^2y^2-b^2y^2-2by^3-y^4} = yx$, and $a^2b^2+2a^2by+a^2y^2-b^2y^2-2by^3-y^4 = y^2x^2$; whence, by tranſpoſition, we ſhall have $y^4+2by^3+b^2y^2-a^2y^2+x^2y^2-2a^2by = a^2b^2$, i. e. $y^4+2by^3+\overline{b^2-a^2+x^2} \times y^2-2a^2by = a^2b^2$. Thus alſo, in the inferior conchoid (*fig.* 5.), if pft and ah be perpendicular to the directrix ht, and al parallel to it; we ſhall have $tl^2 : tf^2 - ah^2 :: Pl^2 : al^2$. For $tl : gl :: Pl : al$; and $tl^2 : gl^2 :: Pl^2 : al^2$: but $gl^2 = bh^2 = ba^2 - ah^2 = tf^2 - ah^2$; therefore $tl^2 : tf^2 - ah^2 :: Pl^2 : al^2$.

Hence putting $tf = a$, $tP = b$, axis $th = x$, ordinate $ha = y$, the equation of the inferior couchoid will be $\frac{\overline{b-y}\sqrt{a^2-y^2}}{y} = x = al$. And, when reduced, $y^4 - 2by^3 + \overline{bb-a^2+x^2} \times y^2 + 2a^2by = a^2b^2$. Or, it may be had from the equation of the other curve by merely changing the ſign of y, which in this caſe is negative.

Of the whole conchoid, expreſſed by theſe two equations, or rather by one equation only, with different ſigns, there are three caſes or ſpecies; as firſt, when E F is leſs than E C, as in *fig.* 2; when E F is equal to E C, as in *fig.* 6; and when E F is greater than E C, as in *fig.* 7, in which latter caſe the conchoid is called *nodated.* The ſame equation holds for this nodated conchoid, the whole difference being merely that a is here greater than b.

Sir Iſaac Newton approves of the uſe of the conchoid for triſecting angles, or finding two mean proportionals, or for conſtructing other ſolid problems. To this purpoſe, he ſays, in the linear conſtruction of equations towards the cloſe of his "Univerſal Arithmetic:" "The ancients at firſt endeavoured in vain at the triſection of an angle, and the finding of two mean proportionals by a right line and a circle. Afterwards they began to conſider ſeveral other lines, as the conchoid, the ciſſoid, and the conic ſections, and by ſome of theſe to ſolve theſe problems." Again, "Either, therefore, the trochoid is not to be admitted at all into geometry, or elſe, in the conſtruction of problems, it is to be preferred to all lines of a more difficult deſcription; and there is the ſame reaſon for other curves; for which reaſon we approve of the triſecting of an angle by a conchoid, which Archimedes in his Lemmas, and Pappus in his Collections, have preferred to the inventions of all others in this caſe; becauſe we ought either to exclude all lines, beſides the circle and right line, out of geometry, or admit them according to the ſimplicity of their deſcriptions, in which caſe the conchoid yields to none, except the circle." Laſtly, "that is *arithmetically* more ſimple which is determined by the more ſimple equations; but that is *geometrically* more ſimple which is determined by the more ſimple drawing of lines; and in geometry, that ought to be reckoned beſt, which is geometrically moſt ſimple; wherefore I ought not to be blamed, if, with that prince of mathematicians, Archimedes, and other ancients, I make uſe of the conchoid for the conſtruction of problems."

There will be other kinds of conchoids produced, if $CE : CQ :: QM : AE$; or indefinitely, if $CE^m : CQ^m :: QM^m : AE^m$: wherefore, if $CE = b$, $EA = a$, $CQ = x$, $QM = y$; then $ab = xy$; and for infinite conchoids, $a^m b^m = x^m y^m$.

CONCHOLOGY. "The ſtudy of ſhells, or teſtaceous animals," it has been well obſerved by a plain, but ingenious writer, "is a branch of natural hiſtory, though not greatly uſeful in human economy, yet perhaps by the infinite beauties of the ſubjects it treats of, is adapted to recreate the ſenſes, and inſenſibly lead the amazed admirer into the contemplation of the glory of the Divinity, in their creation." Or, in the more harmonious periods of the poet, we would ſay,

> "Each ſhell, each crawling inſect holds a rank
> Important, in the plan of him who framed
> This ſcale of beings;"———STILLINGFLEET.

Shells appear to form a part of the creation not immediately ſubſervient to the purpoſes of human life. This is granted; but they are a link in the great chain of nature; they conſtitute a department of rational inquiry worthy the reſearches of the man of ſcience; and when we conſider the amazing diverſity of ſingular and beautiful objects they embrace, are ſuch, we are perſuaded, as cannot fail to arreſt in a particular degree the regard of every common obſerver.

A late writer, whoſe talents we reſpect, aſſerts, in undiſguiſed terms, that the purſuits of the conchologiſt are frivolous, and tend to no uſeful purpoſe. For the credit of the philoſophical inquirer in this pleaſing department of natural knowledge, we could wiſh to ſee this opinion controverted. We ſhall not indeed endeavour to ſupport the pretenſions of conchology to a diſtinguiſhed rank among the more beneficial purſuits of ſcience, but we do not fear to prove it in a pre-eminent degree entitled to the attention of every contemplative mind. In the preſent enlightened period, it is not, we ſhould conceive, incumbent to offer any argument in its behalf, becauſe we are unable to prove its utility in the common acceptance of the term. We are not, for this reaſon alone, to eſteem it frivolous; or, in a word, to declare that our ideas are entirely abſorbed in the contemplation of intereſted views and the love of wealth, or that we are ſtudious only to gratify our immediate wants. Our untutored anceſtors cultivated the oak, we are told, that they might eat acorns, regardleſs of the importance of the parent timber; but we are not to imitate their example, and deem it trifling to cultivate any branch of natural ſcience, that is unlikely to afford us ſome direct benefit; nor are we to be content with aſcertaining what may be merely uſeful as food for ourſelves, or fodder for our cattle. How unworthy would this be of the refined conceptions and dignity of intellectual men? But we reſt convinced that a more enlarged and liberal idea of this ſubject will be conceived on the ſlighteſt reflection by every intelligent mind; that the ſcience of conchology will be hereafter more ſucceſsfully purſued in this country than it has hitherto been, and that the obſervations we have to offer as we proceed, though leſs abſtruſe than the ſcience may ſeem to demand, will to a certain extent facilitate this deſirable object.

One clear and moſt important fact, the truth of which we would wiſh to impreſs on the mind of the reader, ſhould be premiſed, that whatever opinion we may form on this ſubject,

ject, or however lightly we may be difpofed to appreciate its merits, the fcience of conchology, or in more humble terms the ftudy of fhells, has in a greater or lefs degree attracted the attention of curious and contemplative minds throughout all ages; though, as may be naturally conceived, it has been cultivated with more fuccefs in fome periods than in others. The beauties of this part of the creation did not efcape the obfervation of philofophers in the firft ages of learning, as appears obvious from the writings of Ariftotle, of Pliny, and of Ælian, and we may alfo add of Athenæus and Cicero. The cultivation of this, like all other liberal ftudies, was neglected in the darker æra that fucceeded, or at leaft no evidence to the contrary has furvived to this period; but in after ages, as the mifts of Gothic ignorance which had fo long overhung the weftern world difperfed, and the light of fcience, like the morning twilight, dawned upon the horizon of the human mind, conchology revived, was countenanced, encouraged, and flourifhed. And if, in later times, it refigned a precedence to other fciences, in conformity to the example of the great Linnæus, who was perhaps lefs favourably inclined towards the ftudy of fhells than any other department of nature, it is pleafing to add, that fince his time this fubject has been moft affiduoufly cultivated, and that by writers no lefs eminently qualified to exalt its character than to give ftability to the fcience itfelf.

The term conchology comprehends the ftudy of all animals which have a teftaceous covering, whether inhabitants of the marine element, frefh water, or the land. Teftaceology is a term fynonymous with conchology, but is of later origin and application.

A precife diftinction fhould be drawn between teftaceous and cruftaceous animals; they are effentially different; though both are protected by a hard exterior fhell or cruft, in which they are partially or entirely enveloped; and have been indifcriminately confounded together, for that reafon, under the vague denomination of "fhell-fifh." Some of the old writers, and alfo Da Cofta, diftinguifh the teftacea as a kind of ftone-like calcareous covering or habitation, in which the animal, otherwife naked, refides, and from which it can protrude its mollufcous arms, or other naked parts of its body, at pleafure. The cruftaceous animals of thofe authors, on the contrary, are not naked, but have every particular limb or part feparately covered with the cruft, which is thus divided into many joints, infomuch that the whole animal affumes a loricated appearance, as if inclofed in a coat of mail. Among the cruftaceous order, the *cancri*, or crabs and lobfters, were included, a tribe we have endeavoured to fhew in another article, to be of a nature altogether diftinct from teftaceous animals. (See Cancer.) Klein, in his "Nat. Difp. Echinodermatum," fect. 1. treats on this fubject, and labours to prove that the echini, which are evidently cruftaceous bodies, are of the fame nature and quality as the teftacea; but recent, and we think conclufive obfervations, teftify the fallacy of his opinion. A better definition may be obtained by attending to the chemical properties of the two fubftances teftaceous and cruftaceous. Poli, in his work on the fhells of the two Sicilies, demonftrates that teftaceous bodies confift of calcareous earth united to a fmall portion of animal matter or gluten; and Mr. Hatchett, whofe experiments on the chemical characters of thofe bodies are inferted in the Tranfactions of the Royal Society, draws a ftriking diftinction from analyfis between the teftaceous and cruftaceous bodies, afcertaining the firft to confift only of carbonate of lime mixed with gelatinous matter, while in the other the prefence of phofphate of lime was detected. The cruftaceous body analyfed by Mr. Hatchett was the echinus.

All teftaceous animals are compofed of two parts; one of which, the animal itfelf, is foft and mollufcous; the other is the fhell, or habitation, which is hard, of a ftony or calcareous nature, and either partially or entirely covers the animal. The animal is attached to the fhell by means of ligaments or mufcles.

It was long confidered as a matter of difpute among naturalifts, whether the arrangement of fhells fhould be conftituted from the animals or their habitation. No one can deny, that if we proceed on principles ftrictly fcientific, we muft regard them as a department of zoology, and fhould, on that account, difpofe them according to the nature and ftructure of the animals. But the claffification formed from the characters of the fhells is univerfally followed, and we muft confefs too, is for many reafons preferable to any other. Neither is it, in the hands of the fkilful conchologift, attended with fo much indecifion, as might be generally imagined.

In the firft place among the vaft variety of fhells hitherto difcovered, how fmall comparatively is the number of thofe, whofe animal inhabitant is defcribed or known. It is not of fpecies only that we fpeak, but of whole natural families or genera, not a fingle fpecies of which has been yet difcovered with the animal appertaining, fo little are we acquainted with the mollufcous orders, or animals inhabiting the fhells. Of the fhells we daily fee in collections few are fifhed up alive, the far greater number are found on fhores, dead or empty. Neither, if it were otherwife, are accurate defcriptions of animals whofe parts are not eafily feen, or anatomical inveftigations, which are in many cafes neceffary, within the capacity of every one. Many of their parts, and their refpective functions, are not to be afcertained, except by comparative analogy, and which in itfelf prefents an infurmountable difficulty, or a field of critical inquiry fo extenfive and complicated that few, even with the ability to purfue it with fuccefs, could be prevailed upon to devote that attention to the fubject which it requires.

Hence it becomes impoffible to arrange the far greater number of teftaceous productions by the animals; the attempt muft ever prove unfuccefsful. Our arrangements would be partial, and three-fourths of the fhells known muft be either excluded from the fyftem, or be placed at hazard; and of courfe without order or connection with thofe whofe animals we are acquainted with. The latter are chiefly fuch as are confined to the coafts of the European feas, and fome of the terreftrial and frefh water kinds, which, from their abundance and locality, have obtruded themfelves upon the inveftigations of the naturalift. Even our knowledge of thofe is exceedingly imperfect. For thofe of the extra European fpecies, we are indebted chiefly to Adanfon, Rumphius, Argenville, and Favanne, and for the anatomical difcuffions on various European kinds to Valentini, De Heide, Lifter, and Müller. The inveftigations of Poli on the fhells of the two Sicilies are valuable, in this refpect, as alfo are the obfervations of Lamarck, and Cuvier, and we may alfo add Olivier; but what is the amount of all thefe difcoveries, we would afk, in enabling us to form a fyftem of conchology.

The beft characters upon which to found all fyftems of natural hiftory, muft be thofe moft obvious and acceffible. All ranks of animals, as nearly as can be with convenience, fhould be arranged by apparent and external characters. While we ftudy fhells, without regarding the animal, we are aware they are but confidered partially. The animals that inhabit them fhould guide us in our refearches; they alone are the fabricators of the fhell, and the fhell is only their habitation, to which they give the form, the bulk,

hardnefs,

hardnefs, colours, and all the peculiarities of elegance we admire. If we were to examine thefe new and almoft unknown beings, we fhould difcover a number of parts as remarkable for their ftructure as their functions, and an infinite variety of curious and interefting particulars relative to their general habits and manners of life. It is a fubject worthy of the ferious contemplation and attention of the naturalift, and fhould never be neglected when an opportunity offers. But a fyftem of conchology, founded entirely on the ftructure of the animals, muft, we cannot hefitate in afferting, ever remain one of the defiderata of natural fcience.

In the fuperficial arrangement taken from fhells alone we are not exempt from difficulty. Shells vary exceedingly in form and colour in the different ftages of their growth, and in this cafe we fhould fometimes derive material affiftance from our knowledge of the animal. Young fhells have been defcribed as fpecifically diftinct from the parent or older fhells by many writers. It indeed requires a greater degree of caution in determining the fpecies, nay even genera, of fhells in the different periods of growth than may be imagined; of this we could adduce many very remarkable inftances, a few it may be neceffary to mention to guard the common obferver from forming hafty, and erroneous conclufions.

Many of the cypræa, or cowries, when young, have the appearance of a volute, the thick denticulated fold of the exterior lip being wholly wanting, and the column being only partially plaited as in the true voluta. The young of the alated fhells, in general, are deftitute of that broad expanfive, or furcated lip, called the wing. The fpires in many of the turrited kinds of fhells, when young, are blunt; obtufe, or terminated in a large globular head, exceeding the fize of the whorl beneath, but as the fhell advances in growth, it develops itfelf, extending in a fpiral direction, and thus in the old fhells the number of fpires is greater than in the young ones. The variations in the growth of the patella tribe are often fo confiderable, as to almoft defy the critical obferver to determine them. Still however the conchologift by the dint of application, and nice difcrimination, will be at laft enabled to fix on certain characters peculiar to every fpecies, and be, by that means, enabled to decide on the fpecies of a fhell under every ftage of growth.

Linnæus confiders the ftructure of the animal as well as the fhell in all his generical diftinctions; the idea is excellent, and we fhould approve the defign, but the object itfelf is unattainable; a lamentable proof of which prefents itfelf to view, when we confider the number of thofe very animals which he defcribes that have been afcertained, by recent obfervations, to be of a very different nature and ftructure from what he conceived. This error may be eafily accounted for when we reflect that the judgment of Linnæus was guided in many inftances by analogy, and the indifferent figures extant in various writers, without himfelf poffeffing the means of determining their accuracy, or imperfection. We intend nothing to the difparagement of Linnæus in this refpect; the ftructure of the animal was of too much importance in his mind to be omitted, and he availed himfelf of the beft fources of authority within his power, fome of which, it has fince been proved, are not fo accurate as we could wifh, and others altogether erroneous.

From all that has been advanced on this topic, the refult will be obvious, that teftaceous bodies may be confiftently arranged, or, in other words, can only be arranged by the organization of the fhell; that the primary character muft be taken from the fhell becaufe this we are acquainted with, while the animal is oftentimes unknown to us. But that the ftructure of the animal fhould be regarded in the conftruction of genera, when it can be afcertained; as a fecondary confideration to guide us in the formation of new genera, or in correcting the old, as opportunities of inveftigating them occur.

Having defined the meaning of a teftaceous animal, and endeavoured to prove that the ftructure of the fhell is the moft material object to be regarded in a primary view, we fhall proceed next to an elementary elucidation of the feveral parts of which it is compofed.

In conchology, as in any other fcience, the ftudent muft neceffarily acquire, in the firft inftance, a diftinct knowledge of the terms employed. Thefe, except fuch as relate to fubordinate characters, or fpecifical diftinctions, and which require no explanation in this place, may be fimplified and reduced to a fmall number. In the felection of thefe terms we can abide by no one particular authority; we muft be general, deriving our terms from various fources, or inventing new ones. Hitherto in treating on the different articles of conchology, in the progrefs of this work, it has been our aim to adhere as nearly to the authority of Linnæus as poffible, referving to ourfelves an opportunity of expreffing our own fentiments under the prefent article, and ftating generally thofe points upon which we principally differ in opinion from that author. This will appear more fully in our review of his genera. Our attention is at this time confined to the terms employed in defcribing the feveral parts of fhells, and as it is well known that Linnæus laid down a feries of terms for this purpofe, it will be expected that we fhould not pafs over them in filence. Upon this fubject we fhall however only trefpafs lightly. We would willingly adopt thofe eftablifhed by Linnæus, in his "Fundamenta Teftaceologiæ," and other writings; but it muft be confeffed, with all our refpect for the talents of that naturalift, his terms are inadmiffible. The warmeft of his admirers, and we muft, on many occafions, profefs ourfelves of that number, will not perufe the definitions he has given of the bivalves, of his venus, and fome other bivalve genera, of his venus dione, and alfo of feveral univalves, without admitting that much of the Linnæan phrafeology on this fubject is neither applicable to the parts intended, nor if it were, fuch as modefty would allow us to retain; and that to expunge them is only a neceffary facrifice which the chaftity of fcience imperioufly demands. Delicacy will pardon the allufion, and defire no further explanation.

All fhells or teftaceous bodies hitherto difcovered, may be divided into three principal tribes, and which, after the Linnæan manner, may be denominated Multivalve, Bivalve, and Univalve.

Any external part of a fhell being of a teftaceous fubftance, and either itfelf, forming a fhield or covering for the animal, as in univalves, or in union with another, or others connected by a ligament, cartilage, hinge, teeth, or other faftening, is denominated a valve. The fhells therefore confifting of a fingle piece, are called univalves, thofe of two parts bivalves, and thofe of many parts multivalves. Between bivalve and multivalve no diftinction is drawn, fhells confifting of more than two fuch parts, being called multivalve, without any regard to the number. An amendment is propofed by fome of the French writers, in a new order under the name of trivalve.

Shells of the fimpleft form are arranged by fome naturalifts in the firft clafs, from which they proceed progreffively to thofe poffeffing the greateft number of valves, and being of the moft intricate ftructure. This is an ancient, and very

fimple

fimple mode of arrangement, and has its advocates in the prefent day. Linnæus reverfes this order by beginning with the chiton, lepas, and pholas, which are fhells of the multivalve and moft complex ftructure, and ending with thofe of the fimpleft form. We cannot avoid thinking the former preferable, and fhall adopt it in the prefent inftance.

Explanation of the Parts of Shells with Reference to the Elementary Plates of Conchology.

Univalve.

In the examination of a fhell of this order, the contour, or outline, is the firft particular to be regarded. By this the conchologift is guided in his definition of fimple, fpiral, or turbinated fhells, (or as the Linnæan fchool divides fhells, univalves with a regular fpire, and univalves without a regular fpire); difcoid, flattened, or turrited fhells; thofe with fmooth or uneven *anfractus*; the ventricofe, alated, labiated, roftrated, and many other diftinctions, all which ftrike the eye at the firft view. It is indeed, by attending to the contour, that the principal diftinctions in fhells of this kind are at once perceived, taking into confideration the back and front profile at the fame time. Some few fhells, as the nautilus pompilius, and others of the fame family, have the fpire revolving internally, in which the outline offers lefs affiftance in the primary definitions, but the number of fuch fhells is very fmall. Next to the profile of the fhell, the ftructure of the mouth, the pillar, and expanfion of the inner lip, the gutter or canaliculation, and the umbilical opening, and operculum if any, are to be confidered, and laftly the work on the outer furface, as well as the colours with which it is embellifhed.

The bafe or bottom of the fhell we confider that part upon which it refts when fupported in an erect pofition, with the fummit or tip of the fpire ftanding vertically. In fuch fhells the tip is called the apex. The courfe of the fpires or wreaths is from the left to right in moft fpiral fhells, fome few only being of the reverfed or heteroftrophous kind, the whorls of which are in a contrary direction. When fpeaking of the right and left fides of a fhell, it fhould be underftood as having the aperture downwards, and it will be then feen that in moft fhells the aperture or opening is on the left fide, *i. e.* facing the right hand of the fpectator.

Bafe, the tip of the falient end of the fhell, at the extremity oppofite the apex of the fpire; in the roftrated kind of univalves it implies the tip of the beak. Some fay the fhell refts on its bafe when laid upon a flat furface, with the mouth downwards; this is not correct, except in the patella tribe, and fome other univalves which have no regular fpire, as the dentalium, &c. The bafe in feveral fhells is denoted in the Plate, *Conchology*, *fig.* 1.

Apex, the fummit of the fhell. *Fig.* 2.

Front, the face of the fhell with the aperture placed directly in front of the obferver. *Fig.* 3.

Back, that part of the fhell which is immediately oppofed to the preceding. *Fig.* 4.

Sides, thofe parts feen longitudinally in profile, to the right and left when the fhell is viewed either in a front or back pofition. *Fig.* 5.

Body, of the fhell, (corpus) the firft whorl of the fpire at the bafe. *Fig.* 6.

Belly, is to be diftinguifhed from the body as it implies only the convex or fwollen part of the firft whorl, formed by the convexity of the aperture near the lip. *Fig.* 7.

Whorl denotes one of the wreaths, turns, or volutions of the fhell. *Fig.* 8.

Spire, comprehends, in a general fenfe, all the whorls of the fhell, the firft or body wreath excepted. *Fig.* 9.

The form of the fpire is of great confideration in the definition of fhells as it affords a prominent and diftinguifhed character; it is in general flattifh, fomewhat depreffed or elevated; fometimes convex and flightly pointed; or with the point obtufe; or much elevated and ending in a point; plano-concave, pyramidal, fubulate, or truncated. Mr. Adanfon obferves that the difpofition of the fpires varies according to the plane they turn on, which is either horizontal, cylindrical, conic, or ovoid. Thefe, he conceives to be the four principal difpofitions of the fpires, but admits there are many intermediate formations. The number and form of the fpires vary in the fame fpecies, in their different growths. Young fhells have commonly a lefs number than the old ones, neither have fhells of the fame age always the like number of fpires, a circumftance attributable to the effects of ficknefs, or the difference of fex. Thus in fome turbinated fhells we perceive that the males have the fpires lefs numerous, fmaller, and of a more lengthened form than in the females.

Suture of the fpire or whorls, is the fpiral line which feparates the whorls, and which is fometimes fulcated, crenulated, or fomewhat projecting. *Fig.* 10.

Pillar or Columella, is the inner part of the left lip, or column, which runs through the fhell, from the lower extremity to the tip of the fpire, and from which all the fpires take their origin; the columella being fituated as nearly as poffible in the axis of the fhell, and ferving as its bafis and fupport throughout. It is generally either flat, grooved, folded, or truncated in that part which is vifible at the opening. *Fig.* 11.

Aperture, called in familiar language, the mouth of the fhell, is the entrance to the chamber in which the animal refides, and is applicable to the openings of univalve and multivalve fhells. The aperture is either entirely open, or clofed by the operculum attached to the body of the animal, when the animal retires into its dwelling. This aperture varies in form in different fhells, being angular, rounded, femilunar, linear, or otherwife, and fometimes appears double, the inner margin being furrounded by an exterior one. *Fig.* 12.

Lip, the expanfion of the exterior part of the aperture conftitutes the lip in the labiated fhells, and the wing in the alated kinds. *Fig.* 13.

Beak, or roftrum, is that part at the bafe which extends in a ftraight or flightly oblique direction from the bottom of the aperture, and is larger or fmaller in different families. In murex hauftellum this projection is very confpicuous. *Fig.* 14.

Canal, or gutter, an elongation of the aperture of the fhell defcending in a groove or gutter-like procefs. Some kinds of roftrated fhells have the canal remarkably confpicuous, forming a finus from the aperture throughout the whole length of the beak. *Fig.* 15.

Umbilicus is the opening, or perforation in the lower part of the body, or firft whorl of many fpiral univalves, and is very confpicuous in a number of the trochus and nerita genus in particular. This umbilical perforation runs in a ftraight line from the bafe to the fummit of the fhell, forming throughout a fpiral groove or gutter, which is wide at the entrance, and tapers gradually towards the apex. In the Linnæan nerita canrena, the ftructure of the umbilicus is well difplayed, but is ftill more obvious in the ftaircafe fhell, trochus perfpectivus. This opening occurs in many fhells at the bafe of the pillar. *Fig.* 17.

The

The umbilicus is either fmooth, carinated, crenulated, or befet with tubercles, and fometimes denticulated. It is either entirely, or only partially difclofed, being fometimes half clofed up by a gibbofity, or other projection at the aperture, in which cafe it is termed by conchologifts femi-umbilicated, or fub-umbilicated. Sometimes the pillar fpreads fo far over as nearly to clofe up the entrance.

A fhell without an umbilicus is termed imperforate; fometimes the term imperforate implies that it has neither umbilicus, nor caniculation at the bafe.

Operculum is a teftaceous or cartilaginous appendage peculiar in a confiderable degree to the univalve tribe of fhells, and thofe only of the fpiral or turbinated kinds. This appendage is not connected with the fhell, but the animal, and ferves like a lid or little door, to protect or clofe up the aperture of the chamber when the creature retires within its habitation. Shells of this kind are diftinguifhed by the name of *cochleæ operculatæ*, by fome of the elder conchologifts. The opercula are often fmall in comparifon to the fize of the fhell to which they belong; their form varions in different fpecies; and their fubftance in fome of a horny texture, and, in others, teftaceous or approaching the nature of ftone. Their figure in common is either perfectly round, elliptical, oval, or elongated, and fometimes wrought with fpiral work, or concentric lines.

The operculum is commonly adherent either to the upper part of the pofterior end of the foot, or, as denominated by fome writers, the pedeftal of the animal, or at its extremity, fo that when the animal moves along, the operculum appears at a diftance from the fhell. In the neritæ, fome of the turbines, and certain other kinds, which have the aperture of a round, femicircular, or oval form, the operculum is ufually of a fize adapted to the extreme circumference of the opening, or nearly fo, and fits clofe at the entrance; or is very little drawn into the opening when the animal retreats into its chamber. On the contrary, in the volutæ and fome other fhells which have the mouth of a lengthened or linear form, the aperture is comparatively very fmall, and the operculum might be drawn far into the fhell, when the animal retreats into its fpiral recefs before the channel becomes fufficiently contracted to be completely clofed up by this appendage.

The teftaceous opercula eafily diffolve in acids; it therefore happens that when put into vinegar they move brifkly to and fro for fome time, by the ebullition, hence they have obtained the name of creeping ftones among the common people. The cartilaginous opercula are not affected by this procefs. The blatta byzantia, of medical writers, are of this latter kind; being the true opercula of two or three different kinds of fhells, very abundant in Paleftine, and other parts of the eaftern world.

Some of the fpiral, or turbinated land fhells, are likewife of the operculated kinds, but differ from the foregoing, as they form a new lid, or operculum, every year, or oftener, efpecially at the approach of winter, when the animal is prompted to make this provifion, in order to guard itfelf from the inclemencies of the weather. It is formed by a vifcous moifture emitted from the body of the animal, and which condenfes into a kind of tough coriaceous fubftance of pretty confiderable thicknefs; this covering is never attached to the body of the animal; it merely covers the entrance, nor is it ever wrought like the true opercula of marine fhells with fpiral or concentric lines.

Operculated fhells are chiefly the turbinated kinds of univalves; the opercula of the balani among the multivalve fhells confift of four pieces, and partake rather of the nature of valves, both in fubftance and appearance, than of the opercula above defcribed.

Involuted fpire, revolved fhells (univalvia turbinata claviculæ intus reconditæ, &c. Da Cofta). Thefe fhells turn or revolve infide, or have the whorls concealed within the body of the fhell as the nautilus and cypræa. An involuted fpire is fhewn at *fig.* 18.

Chambers are the fpaces or divifions formed in the interior part of fhells by intervening partitions, a kind of articulated ftructure elucidated completely in the nautilus.—By a chambered fhell we fometimes underftand only that it has fome laminiform, fubfpiral, or other procefs within, as in patella Chinenfis. *Fig.* 19.

Siphunculus, the fmall canal which penetrates in a fpiral direction through the chambers of the nautili. An organ of this nature is obfervable alfo in the ammonitæ. *Fig.* 20.

Epidermis is a kind of fkin or coating, with which the exterior furfaces of many fhells, both of the univalve and bivalve tribe, are covered. It is confidered as a fort of periofteum or membrane, defigned by nature to defend the fhell from accidents and aid their growth, and to prevent other teftaceous or marine animals from fixing their habitations on thefe fhells, as they do upon moft bodies in the fea, where there is no power of refiftance. The epidermis is a genuine covering formed by the animal itfelf, peculiar to fome kinds, and as conftantly never obferved on others. There is no doubt but the animal to which this fort of covering is peculiar, poffeffes a proper apparatus for its conftruction. The ftructure of this epidermis, it fhould be added, is very diftinct in different fhells, confifting in fome of a very thin pellucid film, and in others laminated, pilous, velvetty, fibrous, or rugged. Few fhells, having a rugofe furface, are deftitute of this external covering or epidermis.

The fpines, protuberances, longitudinal ridges, carinations, furrows, ftriations, punctations, granulations, and other peculiarities of what is termed the "outfide work" of the fhells, are to be regarded only as fpecifical diftinctions of fhells; and the variegations of colours, fpots, and other fimilar particulars, are to be confidered in the fame point of view. Thofe peculiarities are not obfervable in many fhells in their natural ftate, being concealed beneath the thick epidermis which invefts them; in others which have the epidermis thin and membranaceous, they are perceptible, but the beauty of the fhell is difclofed only upon removing this exterior covering. See *fig.* 21.

Bivalves,

Or fhells of two valves united by means of a cartilage, hinge, connection of the teeth, or other procefs. In order to conftitute a bivalve fhell, it is only requifite that it be furnifhed with two connected valves, without regard to their refemblance in form or dimenfions. Some of the bivalves have both valves formed alike; in others they differ only in a flight degree, and again in others they are altogether diffimilar. The firft of thefe is well exemplified by the folen genus; in that of the Linnæan tellinæ, we find examples both of the equivalve fhells, and thofe with the valves flightly different: of the laft-mentioned kinds we have many, as the oftrea, fpondylus, and anomia. Bivalve fhells are often much compreffed, fome are gibbous, and when viewed at the fide, or facing the ligament, have a cordated appearance, as in venus, and the Linnæan chama cor. Shells, having both valves alike, as before obferved, are called equivalve. Equilateral valves imply thofe which have both fides of the fame valve alike, as for inftance, when a longitudinal

tudinal line is drawn from the beak to the oppofite margin, the fpace on each fide the line is diftinguifhed by the appellation of the right and left fide; and when the form of both thofe fpaces correfpond, the fhell is equilateral, as in the fcallops (oftrea, Linn.): the inequilateral valves are the reverfe of this, a line drawn as above defcribed, from the beak to the oppofite margin, prefenting two fides of a very different fhape, as we fee in moft of the mactra, the donax, and tellina genera, and in the mya truncata efpecially. Subequilateral fhells, or thofe having the valves nearly equal at both fides, are fufficiently elucidated by fhells of the cardium, or cockle genus, which are ftrictly "bivalvis fubæquilatera."

All bivalve fhells do not completely clofe their fhells, though moft of thofe before mentioned do fo, fuch as the fcallop, the donax, tellina, and cardium: in feveral other tribes of bivalves, when the fhells are fhut as clofely as their form will allow, they ftill exhibit a kind of hiatus or gaping, either at the anterior or pofterior end, or at both; and in fome, when the valves are fhut, both the anterior and pofterior parts are clofed, but an opening appears on one fide of the beak; this laft-mentioned character is very obvious in chama gigas.

One of the firft circumftances to be confidered, is which part of a bivalve fhell ought to be deemed the bafe, becaufe when this is determined, every other part will fall progreffively in their relative order under our obfervation. We name that part of the margin or limb which is fituated in a direct line oppofite the beak, the bafe of the fhell. Linnæus, in order to eftablifh the characters, and afford fome apparent reafon at leaft for the application of the terms he beftows on the different parts of bivalves, reverfes this pofition of the fhell, and defcribes the beaks as the bafe of the fhell. But the fact is, the natural pofition of the fhell is in immediate contradiction to his axiom, for the beaks are always uppermoft, being either immediately vertical, or with a flight inclination obliquely, when the animal moves along with its teftaceous covering on the back. A folitary example will perhaps occur occafionally, in which the beaks may be confiderably inclined when the animal crawls, but none, we believe, are known which open the valves upwards, and proceed with the beaks under the body. The beaks, if only for this reafon, are to be confidered as the fummit, and the margin oppofite as the bafe. Many of the bivalves are deftitute of the locomotive power, or at leaft do not poffefs it in any material degree.

Bafe of bivalve fhells, exemplified in venus verrucofa. *Fig.* 22.

Summit, a word applied in a general manner to the top or moft elevated part of the two protuberances obfervable in the greater number of bivalves. Da Cofta calls that part of the fhell, in which the teeth or hinge is placed, the fummit or apex; we regard it as the moft elevated part of the beaks. *Fig.* 23.

Beak, the pointed termination, apex, or tip of the protuberances laft-mentioned, and which, in many fhells, turn fpirally downwards, or obliquely, fo that the beak itfelf is feldom the moft elevated part of the fhell; though it is fo fometimes, as for inftance in the mytilus edulis, or common mufcle. *Fig.* 24.

Sides, the lateral parts of the valves diftinguifhed by the epithet of right and left fide; in common language, the two valves of a fhell are called the fides, but it is not underftood as a term in conchology in this view. *Fig.* 25.

Margin, or *limb,* the whole circumference or outline of the fhell, when laid flat down on one valve. *Fig.* 26.

Difk, the convex centre of each valve, or exterior furface *Fig.* 27.

Anterior flope, that part of the fhell in which the ligament is fituated; in the front view of the anterior flope, the beaks fall back, or behind. *Fig.* 28.

Pofterior flope, that immediately oppofed to the former, and in which the beaks of the fhell turn forward. *Fig.* 29.

Lunule, the lunulated depreffion below the beaks, either on the anterior or pofterior flope, and fometimes on both; they may be diftinguifhed under the appellation of anterior or pofterior lunules, according to the flope in which they are fituated. *Fig.* 30, *a, b.*

Cartilage of the hinge, called alfo the ligament of the hinge, the fubftance of a flexible, fibrous, and fomewhat horny nature, by means of which, the two valves are united near the beak. *Fig.* 31.

Ears, the lateral proceffes near the beaks, as in the fcallop tribe: thofe occur either on one fide, or on both. *Fig.* 32.

Ligament perforation, the opening, or aperture, through which the ligature of the animal paffes in the anomia genus, by the affiftance of which it faftens itfelf to the rocks, or other bodies; in fome it is fituated in the flat valve, in others at the beak of the gibbous valve. *Fig.* 33.

Length and breadth of the fhell. The length is meafured from the cartilage or beak to the margin below, the breadth is of courfe taken in the oppofite direction. The breadth of many bivalve fhells exceeds their length: fome remarkable inftances of which occur in the folen tribe. *Fig.* 34.

Infide of the valves exhibits the concave furface (*concavitas concharum*), *fig.* 35.

Hinge, the point of union between the two valves, formed by the connection or articulation of the teeth in both valves, or by the teeth in one valve, fitting into hollows or fockets in the valve oppofite. The amazing variety of ftructure obfervable in the hinge of different tribes of fhells renders this one of the moft effential characters in the generical definitions of fhells. The teeth in fome are fmall and numerous, in others thick, folid, and few in number, or fometimes fingle, long, fpatuliform, laminiform, acicular, &c. the principal of which may be divided into *inarticulate* hinge, when only furnifhed with callofities, or having no vifible teeth; *articulate,* when it has teeth, but only a fmall number; and *multarticulate,* when the teeth are numerous. Thefe variations will be further explained under the refpective genera.

Cicatrix, the impreffion on the infide of the valves indicating the point of connexion between the mufcles of the animal, and its fhell. In fome kinds, as the common oyfter for example, there is only one fuch mufcular impreffion in each valve, in others there are two, and fome have more. The cicatrix is not of the fame figure in all fhells, being either round, femi-ovate, lunate, or elongated, in different kinds. *Fig.* 37.

Byffus, the appendage called the beard; by means of which fome bivalves faften themfelves to the rocks. *Fig.* 38.

The imbrications, furrows, fpines, tubercles, reticulations, ftriations, or other peculiaritis of the fame nature, as well as the variations of colours, obfervable on the exterior furface of bivalves as before ftated in fpeaking of univalves (and which is indeed equally applicable to the multivalves, and confequently to fhells of every defcription), though they afford us the beft fpecifical diftinctions poffible, do not claim our regard as primary characters, and are therefore paffed unnoticed in this place.

Multivalves.

Multivalves.

The ſhells of this order are few, compared with either of the preceding; and the terms propoſed for thoſe, are applicable for the moſt part to the multivalves. The following require more explicit mention.

Baſe, that part of the ſhell upon which it reſts: in the lepas tribe it implies the part immediately ſeated upon the ſtem or pedicle; in the balani, the baſe is generally larger than the ſummit, and is the bottom by means of which the ſhell is fixed upon the rocks, or other extraneous bodies. *Fig.* 39.

Ligament, the ſubſtance, whether membranaceous or tendinous, which ſerves to connect the valves together. The connexion of the valves in ſome multivalves is formed by the parts of one valve locking into another. *Fig.* 40.

Operculum. The balani have the aperture at the ſummit cloſed by means of four ſmall pieces or valves, which are commonly called the operculum; theſe opercula of the balani are, however, very different from thoſe of univalve ſhells. *Fig.* 41.

The various parts of which teſtaceous bodies conſiſt being ſufficiently conſidered and explained, our attention is next directed to the different modes of arrangement into which thoſe bodies have been diſtributed by the principal writers on conchology, and a general inquiry into a variety of other particulars connected with the hiſtory of the ſcience. In this inveſtigation we ſhall avail ourſelves in ſome meaſure of the method pointed out by the learned author of the "Claſſes Conchyliorum" (Bergen), the valuable "Bibliotheca Hiſt. Natur. Banksiana" of Mr. Dryander; "La Conchologie" of Favanne; the "Hiſtorical Account of Teſtaceological writers," by Dr. Maton and Mr. Rackett, inſerted in the "Tranſactions of the Linnæan Society," and the labours of many others, in addition to our own, as will appear in the courſe of the following obſervations.

The name of Ariſtotle ſtands high in the records of philoſophy. He is emphatically called by Dr. Pultney, in ſpeaking of teſtaceological writers, the father of natural ſcience; and by Dr. Maton the inventor of ſyſtem. Our reſpect for the Macedonian philoſopher is great, nor would we willingly appear to detract from his diſtinguiſhed merit; yet we muſt confeſs we never could conceive it poſſible, with all the ability this early writer poſſeſſed, that, riſing as it were from primæval darkneſs, he could at once ſurvey the multifarious objects of creation, and produce a ſyſtem of natural objects ſo complete as that which we are diſpoſed to acknowledge excluſively as his own. He muſt have derived conſiderable aid from ſources then extant, and which are now for ever loſt to the world. The hiſtory of mankind throughout all ages will teſtify beyond a doubt that the acquirement of human knowledge is ſlow and progreſſive; and the knowledge of Ariſtotle in natural ſcience was in particular of that kind which in a great meaſure could be attained only from the obſervations of many. Under the patronage of Philip, the Macedonian monarch, and of his ſon Alexander, the hero of the world, no advantages which Ariſtotle could derive from the ſtudy of books would be denied him, and can it be imagined from ſo many hundred thouſand volumes as were extant in his time, and at his immediate command, Ariſtotle was unable to obtain information; or that among this immenſe number there were none on the ſubject of Ariſtotle's inquiries? This writer would certainly avail himſelf of the recorded labours and diſcoveries of former ages, and eſpecially would not neglect to cultivate an acquaintance with the ſciences of the Egyptians, upon all which his own ideas might improve. Indeed, if we miſtake not, however viſionary it may appear, the latter was the genuine ſource from whence his knowledge of natural philoſophy was derived. Egypt, not Attica, was the cradle of ſcience.

To the writings of Ariſtotle the learned world is certainly indebted for the firſt account we probably ever may poſſeſs of the ſtate of natural ſcience at the early period in which he lived; it is a fortunate circumſtance for the cauſe of learning that his labours have ſurvived the havoc of deſtructive time. This ſyſtem is a production that would confer credit on any naturaliſt of the fourteenth century, much leſs of a period almoſt two thouſand years before. The claſſification, or diviſion of ſhells contained in the fourth book of "Ariſtotle's Hiſtory of Animals," has ſtood the teſt of ages, and, with improvements, rendered neceſſary by recent diſcoveries, is in general adopted by very late writers. Linnæus was in a great meaſure himſelf indebted to his ſyſtem for the outlines of his own, for many of his genera, and for the names under which thoſe genera are retained, even in the moſt improved ſtate of his "Syſtem of Teſtaceology."

The "Oſtracodermata" of Ariſtotle, for ſuch is the title of his conchological productions, preſent us with a valuable ſcheme of ſhells. He divides all ſhells into two principal claſſes, Μονόθυρα and Δίθυρα, or univalves and bivalves.

The univalves he ſeparates into two parts; namely, thoſe of the turbinated kind, as Κοχλιαι, or *limaces*, Κωκάλια, *cocalia*, the *purpuræ*, Πορφύραι, *buccina*. Κήρυκες, &c.; and ſuch as are leſs turbinated, as Λεπὰς, the ſea-ears, or haliotis, and Νηρῖται, *neritæ*. Among the latter, he includes ſeveral families of the echinus, or ſea-eggs, Εχινος, a tribe of cruſtaceous animals retained by almoſt every writer among the ſhells, till they were ſeparated by Linnæus. He alſo ſpeaks of the animals inhabiting the cocalia, purpureæ, and buccina.

The bivalves he diſtributes into ſeveral families; he has Κτενες, or *pectines*, Σωληνες, *ſolenes*, and Πιννα, *pinnæ* or ſea-hams, all of which genera have been retained by Linnæus, and later authors.

Ariſtotle commits one remarkable error, however, in placing the opercula of ſome turbinated univalves as a genuine tribe of ſhells. This error, which indeed we think excuſable conſidering the age in which that philoſopher lived, is mentioned by ſeveral authors as an objection to his accuracy of diſcrimination, and is commented on by Bergen in the following obſervation.

"Ex umbilicis Ἰοῖς κόχλοις videtur Ariſtoteles peculiare conchyliorum genus perperam conſtituiſſe, ſunt enim proprie opercula quorumdam turbinatorum, quæ certo anni tempore foribus cochlearum quaſi inſtar clauſtri agglutina inveniuntur quæque poſtea decidunt & nullius amplius uſus pro ipſo animalculo." Ariſtotle flouriſhed 322 years before Chriſt.

C. S. Pliny wrote largely upon conchology; the ninth book of his "Hiſtory of Animals" is very copious: it is more diffuſe than that of Ariſtotle, and the arrangement is unmethodical, but this is ſtill an uſeful work, and may be conſulted with advantage. Many of the terms employed by modern conchologiſts are to be found in his work. Pliny conſtitutes thirty-three families, which are diſtinguiſhed chiefly by the form and ſuperficies of the ſhell, as *plana*, *concava*, *longa*, and *lunata*, *lævis*, and *rugata*; by the ſhape of the margin, as *margine in mucronem emiſſo*; *margine fortis effuſo*; and *margine intus replicato*. The ſinuoſities, or projections of the ſhell, the connexion of the valves, and other ſimilar characters, were alſo taken as diſtinctions of the different families.

In Pliny's time the Romans are ſuppoſed to have poſſeſſed conſiderable opportunities of acquiring a knowledge of ſhells, as their navigation was extenſive, at leaſt in the Mediterranean and the Red Sea.

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The conchological writings of Ælian are held in leſs repute than either of the preceding; he dedicates ſome conciſe chapters to this ſubject in his work entitled, "Περι Ζωων ἰδιοτητος."

After the dark ages which ſucceeded, Vincentius Bellovacenſis was one of the earlieſt writers on this ſubject. His "Speculum naturale," publiſhed in folio, in the year 1494, contains a deſcription of the murex, purpura, oſtrea, and a few other remarkable ſhells, extracted chiefly from the works of Ariſtotle and Pliny, and intermingled with the abſurd and ſuperſtitious notions of the times. The works of Albertus Magnus, entitled "De Animalibus," which appeared in folio in 1495, contains deſcriptions of ſome ſhells; and ſo likewiſe does that of Adam Lonicerus, "Hiſtoriæ naturalis opus novum," publiſhed in 1551.

The firſt writers who diſtinguiſhed themſelves by any attention to the ſtudy of conchology, after the revival of letters in Europe, were Belon, Rondeletius, and Geſner. Belon is celebrated for his travels in the Eaſt, and he was perhaps one of the firſt learned men who travelled principally with a view to natural ſcience; on his return to Paris, in 1553, he publiſhed, beſides other works, an octavo volume, entitled "De Aquatilibus." The part appropriated to conchology is not extenſive, it is rather elementary and philological than deſcriptive; but contains figures of a few ſhells engraven on wood. The work of Rondeletius (profeſſor of phyſic at Montpelier) appeared two years after, A. D. 1555; this bears the title of "Univerſa Aquatilium Hiſtoria," and contains upwards of one hundred ſpecies of teſtaceous animals. His reſidence on the coaſt of the Mediterranean afforded him abundant opportunity of inveſtigating the ſhells of that ſea, and their animal inhabitants, a ſubject of inquiry to which he paid ſome attention. This author received much aſſiſtance from the labours of Ariſtotle and Pliny. The "Commentaries" of Matthiolus, embelliſhed with a few cuts of ſhells, contain nothing of material intereſt, except what has been collected from former writers; ſeveral editions of this work appeared between the years 1566 and 1683, in Spain, Italy, France, and the Venetian ſtates. In 1558, the work of Conrad Geſner, "De Piſcium et Aquatilium Animantium Hiſtoria," made its appearance, and acquired much reputation. Dr. Pultney pays a high compliment to Geſner for his unparalleled induſtry, and ardent love of natural hiſtory, and obſerves, that he not only collected all the philological, hiſtoric, and deſcriptive erudition of the ancients on this ſubject; but beſides his own copious comment on their writings availed himſelf of what Belon and Rondeletius, his contemporaries, had done, to which he added much original matter of his own, having deſcribed and figured many of the Mediterranean ſhells and ſeveral of thoſe diſcovered in the Indian and Arabian ſeas. This comment is correct, but of the ſyſtem propoſed by Geſner for the claſſification of ſhells, we muſt ſpeak more fully. This author divides all ſhells into four claſſes, *univalvia, bivalvia, turbinata,* and *anomala.* The firſt contains only two genera, lepas and auris marina; or the limpets, and ſea ears (lepas derived from the Greeks, and ſynonymous with patella, being the name applied by old conchologiſts to the limpets, ſince called patella by Linnæus). His bivalvia claſs contains many genera, as oſtrea, ſpondyli, mytili, tellinæ, chamæ, pinnæ, ſolenes, and eight others. In the third claſs turbinata he has ten genera, as ſtrombi, murices, buccinum, turbo, trochus, nerites, &c. all which names will be recognized by the Linnæan ſtudent as thoſe employed by Linnæus. His fourth claſs anomala, is exceptionable, as it contains, beſides the balani, pencilla marina, tubuli marini, and echini, the ſtellæ marinæ, or ſtar-fiſh, and caput meduſæ, neither of which have ever been conſidered by other naturaliſts as appertaining to conchology. Bergen admits this as a material objection to his ſyſtem, "Peculiarem claſſem anomalorum condidit, ad quam, ut mihi videtur, adnumerandae. Idem valet de capite meduſæ." His ſeparation of the balani from the two firſt claſſes is countenanced by all late writers.

Geoffrey Linocier, in his "Hiſtoire des Poiſſons," publiſhed at Paris in the year 1558, gives an account only of a ſmall number of ſhells; the work not being devoted to the ſubject of conchology: neither is that of Imperato, publiſhed at Naples in 1599; though it contains an account of ſome ſpecies, this production relating chiefly to foſſils; it bears the title of "Dell'Hiſtoria di Ferrante Imperato Napolitana."

The work "De Mollibus Cruſtaceis, Teſtaceis, et Zoöphytis," of Aldrovandus, appeared in folio, in 1606, and is well known. His arrangement conſiſts of three claſſes, *turbinata, bivalvia,* and *univalvia.* Among the turbinata he includes the nautilus, and alſo the buccinum, and other ſpiral ſhells, together with the echini. The bivalve claſs is the ſame with that of all other writers, as oſtrea, tellina, and pinna, but beſides theſe includes the multivalve ſhells of late authors, ſuch as the balani and pholades. The third claſs, or univalvia, contains the lepades, patellæ, auris marina, concha venerea, concha perſica, and pencillus marinus. The figures conſiſt of cuts on wood, and are rudely executed.

Fabius Columna, in 1616, publiſhed a treatiſe on ſhells, or rather a monographia on the purpura, entitled "De Purpura ab animali teſtaceo fuſa, de hoc ipſo animali, aliſque rarioribus teſtaceis quibuſdam." A new edition of this work, with annotations, appeared in 1675, by John Daniel Major.

In the year 1616, a work entitled "Faſciculus rariorum et aſpectu dignorum varii generis, quæ collegit et ſuis impenſis æri ad vivum incidi curavit," from the pen of Baſil Beſler, apothecary at Nuremberg, made its appearance; it is in Latin and German, and two of the plates are appropriated to the ſubject of ſhells.

Chiocco, the deſcriber of the "Muſæum Calceolarium," publiſhed at Verona, in 1622, gives a full account of the ſhells contained in that collection, with ſpecific characters in the Latin language, borrowed for the moſt part from other authors. This muſeum was begun by Benedict Ceruto, a phyſician, and afterwards enlarged by Calceolari. The figures of the ſhells occupy ſix plates. It appears to be the firſt work that was written profeſſedly as a deſcription of a muſeum of natural curioſities, the account of the ſame muſeum by J. P. Olivius, publiſhed in 1584, alone excepted.

A phyſician of Hamburgh, Schonvelde, was author of an account of aquatic animals, both of the marine and freſh water kinds, found in the duchies of Sleſwick and Holſtein, which contains ſeparate chapters on oyſters and muſcles. The obſervations relate chiefly to the culinary uſes of the animals. This book bears date 1628.

The work of Nierembergius, "Hiſtoria Naturæ," contains an account of a number of ſhells, but does not preſent us with any figures. It was publiſhed at Antwerp, in 1635.

In the firſt edition of the "Gazophylacium Rerum Naturalium" of M. P. Beſler, the brother of Baſil Beſler before-mentioned, are twenty-four plates, containing, among a variety of other ſubjects, natural and artificial, a few figures of ſhells, with a conciſe deſcription in Latin of each, under the reſpective figures. The ſecond edition compriſes

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fix additional plates and a preface in German. The firft was publifhed in 1642, the latter not till the year 1733.

The fynoptical catalogue of Seger, "Synopfis Methodica rariorum tum Naturalium tum Artificialium quæ in Mufæo D. Olai Wormiis affervantur," was printed at Copenhagen in 1653; and, as the title informs us, defcribes both the natural and artificial curiofities in the mufeum of Wormius. This was fucceeded in 1655 by a more ample account of the mufeum by Olaus Wormius, from which it appears to have contained many of the teftaceous tribe, one only of which is however figured; this is the Linnæan lepas anatifera, to which is attached the whole of the abfurd tale related by credulous writers of that day refpecting the bernacle goofe, which was fuppofed to be engendered, and hatched in thofe fhells! The fixth, feventh, and eighth chapters of this work are defcriptive of fhells; thefe he divides into univalvia, bivalvia, and turbinata.

In 1672, the "Mufeum Mofcardianum," or "An account of the collection of natural curiofities belonging to an Italian nobleman, Conte Lodovico Mofcardo," appeared at Padua. The fhells are comprifed in twelve plates, and the fubjects are noticed fpecifically. Another edition of this work made its appearance in 1672, at Verona, the city where that noble collector refided, which, befides the twelve plates above-mentioned (and which are engraven on copper) contains fome cuts on wood.

The work "Hiftoria Naturalis de Exanguibus Aquaticis" of Jonfton, is an extenfive production, a compilation for the moft part from others, and is embellifhed with a number of engravings, comprehending altogether twenty copper plates of mollufca and teftacea. Like Aldrovandus, he diftributes all fhells into three principal claffes, turbinata, bivalvia, and univalvia. His turbinata are fubdivided into two fections, "* in anfractum torta;" and "* * in orbem circumacta." In the firft of thefe, we find the nautilus, purpura, buccinum, murex, conchylium, and blatta byzantina; and in the other, turbines, trochi, nerites, cochlea, and echini. Except the multivalves balani, and pholades, which he includes in his clafs bivalvia, the bivalves are thofe of later authors; the clafs univalvia contains two genera, the lepas or patella, and concha venerea. This work was publifhed at Amfterdam in 1657. Eight years after which (1665) the fame author defcribed a few of the more remarkable fhells in his "Thaumatographia Naturalis."

About this time De Rochfort publifhed an account of the fhells of the Caribbee ifles, illuftrated with a plate of five fpecies, which he confidered moft remarkable for fhape and beauty. This work bears the title of "Hiftoire Naturelle et Morale des Ifles Antilles." Jean Baptifte du Tertre, alfo, publifhed on the fame fubject, "Hiftoire generale des Antilles habitées par les François." Paris 1667.

The "Mufæum Gottorpianum," or "Mufeum of the Duke of Holftein-Gottorp," was defcribed by Adam Olearius, in 1666. This is in quarto, and of thirty-fix plates which it contains, five confift of fhells, all which are referred to by Linnæus in various parts of his Syftema. Another edition came out in 1674.

In the "Pinax Rerum Naturalium Britannicarum," publifhed in London in the year 1667, by Merret, we are prefented with the earlieft catalogue of the natural productions of Great Britain, extant. This is in octavo. The conchological part, which he calls "Teftacei," occupies about half a page, and contains references to the voluminous works of Rondeletius, Gefner, Aldrovandus, and Jonfton.

Charleton, a phyfician of confiderable celebrity, publifhed, in London, in the year 1668, his "Onomafticon Zoicum," in which a new arrangement appears. This author divides all fhells after the manner of Aldrovandus and Jonfton, into turbinata, univalvia, and bivalvia, from whence it will be perceived, he inverts the order of the two laft claffes. His turbinated genera are literally tranfcribed from Jonfton. The univalves contain ten genera, five correfponding with thofe of Aldrovandus, lepades, auris marina, concha venerea, concha perfica, and penicilus marinus, to which are added tubuli teftacei, balani, conchæ anatiferæ, dentalia and entalia. His bivalve genera are lefs happily defined: in addition to thofe eftablifhed by Jonfton, he forms others in imitation of Pliny, taken folely from the fcaly afperities, fpines, or fmooth exterior furface of the fhells, after previoufly dividing the whole clafs of bivalves into two orders "conchæ afperæ, and conchæ læves."

Nothing appeared from this time of material confequence on the fubject, till the re-publication of the treatife of Fabius Columna, by Dr. Major. In the interval, Steno publifhed a work, entitled, "De folido intra folidum naturaliter contento Differtationis Prodromus," which contains fome pages devoted to an explanation of the fabric and texture of teftaceous bodies. Boyle defcribed fome experiments on the phenomena of fhell-fifh, particularly of the oyfter, under an exhaufted receiver, in the Philofophical Tranfactions of the year 1670; and Willis, in 1672, the anatomy of the oyfter, in his "Exercitationes de Anima Brutorum;" but thefe are only phyfiological differtations. The work of Dr. Major includes a new fyftem annexed to the hiftory of the purpura previoufly publifhed by Fabius Columna, and likewife a "Dictionarium Oftracologicum;" and is befides illuftrated with a number of wood-cuts. All fhells are divided by this fyftematift into two claffes, univalvia and plurivalvia, the firft of which are fubdivided into feveral ordines, the characters of which are taken from the form and ftructure of the opening of the fhell, its turbinations, ventricofity, protuberances, or general figure. The genera conftituted of thofe fhells are few, as penicilli marini, pyramidaliter dentata, lepades vel patellæ, auris marina, conchæ natatiles, concha venerea, nautilus, murices, turbo, turbines terreftres, and buccina. His clafs plurivalvia is feparated into two orders, bivalvia and plurivalvia, the firft of which confifts of his conchæ ftriatæ, conchæ verrucofæ, conchæ rugofæ, pectines, oftreæ, and conchæ anomiæ; the plurivalvia only two genera, conchæ anatiferæ and balani, or glandes. The two latter genera are thofe united by Linnæus, under the name of lepas, and which, before the time of Major, had been improperly arranged, either among the bivalves, or univalves, except by Gefner, who, aware of this impropriety, places the balani at the head of his clafs anomala. This production of Major's appeared in 1675.

Legati was author of the "Mufeo Cofpiano," printed at Bologna in 1677. The bafis of this collection was laid by the celebrated Aldrovandus, whofe hand-writing ftill remains affixed to many fpecimens that formed the fubjects of Legati's defcription. Ferdinando Cofpi, a Bolognefe patrician, afterwards augmented it fo confiderably, that his name became attached to it; and the univerfity of Bologna, to which it was at length prefented, confidered it one of their moft valuable acquifitions. There are not many figures of fhells in the "Mufeo Cofpiano," but the defcriptions of this tribe are numerous, and very ample.

In the twelfth volume of the Philofophical Tranfactions, is a "Relation concerning Barnacles," by fir Robert Moray. This credulous obferver gives a defcription illuftrated by a rough outline of lepas anatifera, from which he afferts, that young geefe may actually be feen to emerge.

Harderus,

Harderus, in a differtation entitled, " Examen anatomica Cochleæ terreftris domiportæ," affords an anatomical defcription of helix lucorum. This appeared at Bafil in 1679. Two years after Grew publifhed his " Mufæum Regalis Societatis," or " Catalogue and defcription of the natural and artificial rarities belonging to the Royal Society, and preferved in Grefham college, London." This was the earlieft work of its kind that appeared in the Englifh language. The fhells are defcribed in two chapters, the firft comprehending univalves, the fecond bivalves and multivalves, illuftrated with about forty figures, to which the current Englifh names are annexed.

Buonanni was contemporary with Grew, and in the fame year (1681) publifhed at Rome his " Ricreazione dell' Occhio, e della Mente nell' offervation' delle Chiocciole," a work of very fuperior merit, and efteemed the firft profeffedly written, at any confiderable length, upon the fubject of conchology. This was originally printed in Italian; but was three years afterwards re-publifhed, with additions, in Latin, under the title of " Recreatio Mentis et Oculi in Obfervatione Animalium teftaceorum." The firft work contains a feries of 450 figures, the number of which is augmented to 550 in the Latin re-publication. Thefe are valuable for reference, as being conftantly mentioned in the Linnæan Syftema Naturæ; their greateft fault (and it is certainly a material objection), is that many of the fhells are reverfed by the inaccuracy of the engraver, fo that the apertures of the fpiral or turbinated fhells turn to the left inftead of the right. The fubjects were obtained chiefly from the celebrated mufeum of Kircher; a defcription of which was afterwards given by Buonanni under the title of " Mufæum Kircherianum."

The defcriptions are not entirely approved by late writers; they are confidered too loofe and defultory, or too concife and uninftructive. His diftribution of fhells comprehends *univalvia non turbinata*, *bivalvia*, and *turbinata*. In the inferior divifions, this author, Dr. Maton obferves, " has ftrangely feparated fpecies naturally allied to each other, as, for inftance, the ferpulæ, dentalia, &c. are left out of the firft clafs, and, as well as the porcellaneæ, diftributed under the third; and, with equal want of confiftency, the haliotis and nautilus (genera manifeftly turbinated) are placed among thofe which he terms " univalvia non turbinata." The fame objection is urged by Bergen againft the fyftem of Buonanni. " Hic A. tres condidit conchyliorum claffes; univalvium, non turbinatorum, bivalvium et non turbinatorum, fed partim aliena immifcuit, partim neceffaria omifit. Sic in prima claffe merito defiderantur pencilli marini et porcellaneæ, quas perperam ad turbinatas refert. Sic malo confilio aurem marinum, et nautilium huic primæ fociavit claffi, cum manifefte ex turbinatorum gente fint." Buonanni is blamed alfo for admitting the pholades and conchæ anatiferæ into his fecond, or bivalve clafs; but it fhould be remembered, in this refpect he only imitated the example of moft fyftematic writers; Gefner places the pholades among the bivalves; Aldrovandus gives both the pholades and concha anatifera in that clafs; and Jonfton the former. Linnæus, we are to recollect, like the latter, confiders the pholades as bivalves in all the early editions of the Syftema; even fo lately as the tenth edition, they ftand under the " bivalviæ conchæ." We may ftill further advert to Charleton, who yet more abfurdly arranges the concha anatifera with the univalves, at the fame time that he refers the pholades to the bivalve tribe. Major was the only writer before the time of Buonanni who difpofed of the conchæ anatiferæ in their natural order, which he certainly did, by arranging it in his clafs plurivalvia. In the work of Buonanni will be found many philofophical obfervations upon the origin, nature, formation, properties, and other curious particulars relative to teftaceous bodies.

The " Scotia Illuftrata" of fir Robert Sibbald, publifhed at Edinburgh in 1684, offers an outline of another fyftem. The author divides fhells into two parts, the land and aquatic kinds, or " cochleæ terreftres," and " cochleæ aquatiles." The aquatiles are divided into two fections, the firft containing the frefh-water fhells, the other thofe peculiar to the marine element. The fhells of both kinds are diftributed into three families, turbinatæ, bivalves, and univalves. The fubdivifions of thofe families are rudely defined, but upon the whole there is method in the claffification; the genera are felected from the writings of former naturalifts, but too fparingly. Sibbald places the echini among the turbinated fhells; yet this is even more excufable than his introduction of both the pholades and balani among the univalves.

Marfigli's fmall work on the ova of teftaceous animals, appeared at Bologna, in 1683, under the title of " Relazione del Ritrovamenta dell' uova di Chiocciole;" a new edition of which was publifhed at Rome in 1695. Some additional obfervations on the fame fubject, by Fulberti, " Refleffioni fopra il medefimo Soggetto," ufually accompany this work.

Among the " Obfervazioni Naturali" of Paolo Boccone, publifhed at Bologna in 1684, are fome remarks not altogether uninterefting on the fubject of conchology. He was the firft writer who defcribed the pediculus ceti (lepas diadema of late authors) with accuracy.

In the fame year Detteide gave an anatomical defcription of the common mufcle in the Leipfic Commentaries, and which was afterwards re-publifhed in Valentini's " Amphitheatrum Zootomicum."

An elaborate paper on the purple-fifh (buccinum lapillus) by Mr. William Cole, pointing out the mode of obtaining, and the nature of this celebrated dye, or Tyrian purple, was inferted fhortly after in the Tranfactions of the Royal Society. This tract was re-printed in quarto in 1689.

A production of very uncommon merit about this period made its appearance before the public, the great conchological work of Dr. Lifter, entitled " Hiftoria five Synopfis methodica Conchyliorum," the publication of which commenced in 1685. The author had previoufly diftinguifhed himfelf by fome excellent differtations on the fame fubject; but our attention is principally directed to this, as his moft extenfive, if not moft valuable, undertaking. It was publifhed in folio progreffively from the year 1685 to 1692.

Lifter divides his work into four books. 1. " De turbinibus terreftribus." 2. " De Turbi. aquæ dulcis et Bivalvibus aquæ dulcis." 3. " De Bivalv. marinis, et conchis anatiferis." 4. " De Patellis Dentalibus, &c. et de Buccinis marinis."

There is no text to this work, the whole confifting of engravings, with a concife defcription of the fhells, and reference to their native country, where that could be afcertained, in the Latin tongue; and fometimes their current names in Englifh. The plates, which are of various dimenfions, are executed with great force and ftrength of colour by the hands of the author's two daughters, Sufannah and Ann Lifter. It is an extraordinary circumftance, that no two copies of this work are found alike, which renders it very complex, and ill fuited for general reference. The plates in the moft perfect copies vary in number from 1050, to 1057, or 1067, the different copies having been augmented or diminifhed, and the plates tranfpofed or corrected at various times, according to the fancy of the author, or his fubfequent difcoveries. The moft perfect of all the copies extant was that

that presented by Dr. Lister himself to the royal library at Paris. This is ascertained by the observations of Davila and M. de Bure, who have taken considerable pains in the collation of different copies of this work. Da Costa names that in the library of the College of Physicians as the most complete copy in London. This last-mentioned writer appears also to have collated many of the early copies of Lister; he treats on this topic at some length; and, considering the importance of Lister's work to the conchological student, it may not be improper to repeat the result of his observations.

"I do not think it unentertaining (says this writer) to relate some circumstances relative to this useful and costly work, which have occurred to me, on the collation of many copies of the old editions of Lister, and on a collation of numbers of his proof prints dispersed among the curious by Dr. Lister himself before the names and numbers on the plates were added to complete the work; these proof prints, which are what the print collectors style variations, will lead us to some curious particulars that would otherwise be unknown. Dr. Lister in 1678 published his "Hist. Anim. Angl." in which he treats of English shells, and gives excellent figures of them, and good descriptions; he therefore designed this work, (his "Hist. Conchyl.") only for exotic or foreign shells, as evidently appears from the proof head plates of the first book. N. 8, 25, 33, 40, 43, 63, 74, 83, 99, 108, 125, and 136, which are entitled cochleæ, buccina, &c. exotica; but the word exotica was erased when he changed his mind to have a general history of shells, which probably was at the second book, and the erasement of the word exotica is even now plainly seen in all the quoted plates. Dr. Lister, to complete his intended work, carried home all the shells singly to his daughters to engrave on single or detached copper plates, (as is seen by the work) reserving their arrangement till he had a sufficient number, some not being done to his approbation, or getting better specimens afterwards, he had them re-engraved, and therefore many shells appear twice in his work, and in some only the first engraving, while in others only the second engraving is found; this circumstance is also evident from the proof plates, or variations." Da Costa further states it to be a mistaken supposition that there was only one edition of this work; there were, he says, certainly two, and he concludes with these observations in support of his assertion. "However, there are marks by which these editions may be distinguished by an accurate critic, *viz.* 1. The second edition has seventy-five shells more than the first. 2. In the preface, plate IV. the third paragraph begins "Septuaginta autem, &c." 3. In plate VII., which specifies the places where they are found, the first edition has only one column of names, whereas the second edition has a name, *viz.* Fret Magel, in a second column. 4. The title and all the head plates, as 1, 2, 3, 100, 106, 139, 140, &c. are printed partly in black and partly in red letters; whereas in the second edition only the title, plate I., is printed in red and black letters, all the others being printed only in black letters."

The plates of this work were bequeathed to the university of Oxford, and were re-published in 1770, under the direction of the Rev. Wm. Huddesford, keeper of the Ashmolean museum, who subjoined two indices, one according to Lister's distribution of the shells, the other after that of Linnæus. This edition differs from the former principally in containing several plates on one page, the whole amount is 1085, comprehending altogether 1153 shells, exclusive of the fossils and anatomical subjects; seven of the plates, however, which appeared in the original work are omitted in this edition.

After this period, and previous to the work of Rumphius, the first edition of which appeared in 1705, the names of Fehr, Normann, Schelhammer, and others, are recorded as contributors to the elucidation of conchology, yet their productions are to be regarded only as subservient to more extensive and important investigations. Fehr wrote a dissertation on the argonauta argo, which was printed in "Eph. Acad. Nat. Cur." A. D. 1686. Normann, in the same year, gave an anatomical dissertation on the purpura, which was published at Upsal. The observations of Schelhammer, published in "Eph. Acad. Nat. Cur," relate to the subject of fresh water shells. Brachius also treats of the ova of some species of ostrea. "Le Cabinet de la Bibliotheque de Saint Genevieve," of Du Molinet contains a few figures of shells. In the Philosophical Transactions, vol. xvii. is a communication on the subject of shells, addressed to Dr. Lister, by Mr. Banister who resided many years in Virginia, and in the same volume is a description of certain shells found in the East Indies by Witzen, but these are confessedly too imperfect to merit further mention. Sir Robert Sibbald also published some curious papers on testaceology about this time, but his system, and best production, on this subject, have been already noticed. Ericus, in a dissertation entitled "Conchæ anatiferæ vindicatæ," refutes the absurd tale of the Bernacle geese hatching in those shells as related by sir Robert Moray. Leeuwenhoek published several treatises on the anatomy or intestinal structure of shells. Leigh notices a few of the British shells in his "Natural History of Lancashire;" and Wallace an inconsiderable number in his "Account of the islands of Orkney." The works of Petiver, which are dispersed in the 22d, 23d, and 24th volumes of the Philosophical Transactions, and his "Gazophylacium Naturæ et Artis," may be consulted with advantage, being referred to by Linnæus and other late conchologists. This brings us to the time of Rumphius.

The popular work ushered into the world under the immediate patronage of the liberal collector last mentioned, claims particular notice. This valuable acquisition, for so it must be considered, bears the title of "Amboinshe Rarite it Kamer," the "Rarity Chamber of Amboyna;" and contains an account of the more remarkable natural curiosities in his museum, the productions of Amboyna, where they had been collected chiefly by Rumphius himself. The descriptive matter is from the pen of M. Schein Voet, and the plates are engraven in a bold style from the designs of Madame Merian. Of sixty plates with which this work is embellished, no less than thirty-three are devoted to the subject of shells, the total number of which amounts to about four hundred subjects, and many of these were of great rarity and price in those days. The passion for collecting and forming cabinets and museums began at this period to be very prevalent in Holland, from whence it afterwards extended over the other parts of Europe. The collection of Rumphius was an object worthy of emulation, and many wealthy individuals endeavoured to excel in this pursuit. The forming a collection of rarities at that period was considered a serious undertaking. Articles of rarity of this description will always obtain a considerable price. It is related as a matter of astonishment that Rumphius himself informs us a shell described in his work cost no less than five hundred florins. The sum is great, yet there are few cabinets of any note that do not include articles of equal or much superior value.

Lyonet

Lyonet estimated the price of his famous " cedo nulli" far higher, namely, 100*l.* sterling; and many instances of great prices being paid for such objects might be adduced. There are two editions of the work of Rumphius, the first written in the Dutch, the other in the German language.

Levin Vincent was one of the most distinguished Dutch collectors. Contemporary with Rumphius, he has left us a description of his museum, dated 1706, and bearing the title of " Wondertoonel der Nature." This work was printed at Amsterdam entirely in the Dutch language; the various objects are represented as they were placed in cases, drawers, or boxes, in a confused manner in the museum; among which we recognize a pretty considerable number of shells. An abridged account of the museum, with impressions of the same plates, was published afterwards.

The papers of Reaumur, inserted in the memoirs of the French academy, between the years 1709 and 1717, deserve the attention of the conchologist; they relate, for the most part, to the formation, growth, and motive powers of testaceous animals. The natural history of the pinnæ, and the formation of pearls, are amply treated of in a memoir which appeared in the volume for 1717.

In 1710 Fridericus Ruysch published a description of his museum at Amsterdam, entitled " Thesaurus Animalium primus:" it relates only in a partial degree to shells, the figures of which are grouped with coral aud other substances as they stood in his museum.

Morton, the natural historian of Northamptonshire, describes many shells, for the figures of which he refers to Lister. This work was published in folio in 1712.

Among the plates illustrative of various curious subjects, contained in the museum of Gottwald of Dantzic, dated 1714, forty-three are appropriated to shells. Few of the original copies are complete; that possessed by sir Joseph Banks is perfect.

Three plates of shells are to be found in the botanical work of Barrelier, edited by the elder Jussieu, which appeared in 1714; and the like number in the " Rariora Musei Besleriani" of J. H. Lochner, published two years after. The " Amphitheatrum Zootomicum" of M. B. Valentini, brought forward at Frankfort in 1720, includes many extracts from foregoing authors, and some plates relative to shells, but which are not considered to possess any merit of originality, or execution. Bradley, in his philosophical account of the works of nature, touches on the subject of testaceology though in a superficial manner.

The valuable work of Car. Nic. Langius, " Methodus nova Testacea Marina in suas Classes, Genera, et Species distribuendi," was published in quarto at Lucerne, in 1722. To the writings of this able naturalist Linnæus stands highly indebted. " He is an author (says Dr. Maton) not undeserving the title of a scientific one, and whose system, so far as marine testacea are concerned, and of these alone he treats, certainly glances at the great clue to simplicity, which was afterwards so succesfsully and admirably seized by the great reformer of natural history in general."—" He is the first whose generic characters are founded on commodious distinctions; the aperture of univalves, and the hinge of bivalves, being particularly considered. These distinctions are not allowed their due importance throughout, for the contour of the shell is, in many instances, made the exclusive basis of the definition, and the adoption of this naturally led, as in other systems, to a most inconvenient and perplexed multiplication of genera. The parts, classes, and sections, also are far from being well conceived, and embarrass rather than assist the investigation of the other divisions." After perusing these general strictures the curious reader may be desirous of acquiring some knowledge of this author's system. We are inclined to think it entitled to rather higher praise.

Langius divides shells into three parts. 1. Testacea marina univalvia, non turbinata. 2. Cochleæ marinæ. 3. Concha marina.

His first part is subdivided into two classes. Class 1. Testa marina univalvia non turbinata, et in se non contorta. Class 2. Testa marina univalvia, non turbinata in se contorta, ita, ut eorum spiræ non promineant. His cochleæ marinæ, or part. 2. consists of six classes, *viz.* 1. Cochleæ marinæ longæ. 2. Cochleæ canaliculalæ. 3. Cochleæ marinæ ore et mucrone simul elongatis, prima spira notabiliter ventricosa. Buccina. 4. Cochleæ marinæ ore, et mucrone elongatis, prima spira notabiliter angustiori quam in Buccinis. Strombi. 5. Cochleæ marinæ ore admodum brevi mucrone insigniter elongato. Turbines. Trochi. 6. Cochleæ marinæ breviores ore et mucrone contractis. The third part, or conchæ marinæ, consists of three classes. 1. Conchæ æquilateræ. 2. Conchæ inæquilateræ. 3. Conchæ anomalæ s. Valvis inæqualibus. The classes are divided into sections, the distinguishing characters of which are taken from the most prominent features of the various tribes of shells, as the form of the shell itself, the structure of the aperture, the canaliculation, or lip, &c. in univalves; and the shape of the valves, their dissimilarity, the beaks, hinge, teeth, &c. in bivalves. The sections are divided into many genera, the first class containing seventeen, the second fifty, and the third forty-three. Many of the genera of old writers are divided, and oftentimes not injudiciously, into two or more genera, to which new names are assigned, that Linnæus and later writers have adopted. We cannot further digress on the merits of this work, but as a system recommend it to the attention of the curious conchologist.

In the work, entitled " Oud en Nieuw Oost-Indien," by Valentyn, are sixteen plates of East Indian, or Amboyna shells. This bears date Amsterdam 1724 and 1726, having been published in folio parts. Those plates were afterwards sold separately with descriptions; the new edition of the plates appeared in 1754.

" Sloane's History of Jamaica" is a valuable work, and relates to conchology, among a miscellaneous variety of other departments of natural history. He was the first person who visited the West India islands for the sole purpose of investigating their natural productions, and his plates and descriptions relate of course to many subjects not before known. His discoveries were submitted to the public in 1725.

In the following year, John Christ. Kundmann published his " Promptuarium rerum naturalium et artificialium," &c. in quarto. He proposes three principal classes for the arrangement of shells, Classis 1. Testacea univalvia non turbinata. Classis 2. Testacea bivalvia. Classis 3. Testa univalvia turbinata; each of which is divided into a number of genera, somewhat after the method of Buonanni.

A new arrangement of shells, by John Ernest Hebenstreit, appeared at Leipsic in 1728; " Dissertatio de Ordinibus Conchyliorum methodica Ratione instituendis." The limits of our observations will not permit us to enter minutely into this methodus testaceorum. The system of this author comprehends several principal classes: namely. Classis 1. Univalvia irregularia. Classis 2. Univalvia regularia, quæ spira carent. Classis 3. Univalvia regularia, quæ spira gaudent magis turbinata, turbine per totum excurrente. Classis 4.

De

De vertice tantum turbinata, ore per totum hiante, turbinibus obliqué flexis. Claffis 5. Univalvia, vertice tantum turbinata, ore per totum hiante, fpiris circa centrum flexis. Claffis 6. Minus turbinata fpira unica brevi. Claffis 7. Bivalvia valvis per ginglymum connexis. Clafs 8. Bivalvia per ginglymum cohærentia. The outline of his arrangement may be collected from his definition of the claffes. His families, or fubdivifions, and genera are numerous, and are characterized by the figure of the fhell, the aperture, hinge, and other remarkable particulars. Dr. Maton accufes this writer of having introduced an ufelefs, if not unphilofophical diftinction, between teftacea and conchylia. Bergen previoufly makes the fame objection. "Cl. auctor diftinguit inter teftacea et conchylia, et notionem generaliorem tribuit prioribus, quia et malacoftri, et oftracodermata; conchylia vero fola oftracodermata fub fefe comprehendunt, fed non magni momenti mihi videtur hæc diftinctio, fi viciffim confidero et perpendo fub notione teftæ et duram et mollem teftam intelligi poffe."

The "Differtatio Phyfica de Polythalamiis, nova teftaceorum claffe," of Breynius, comprehends an arrangement of recent and foffil fhells, but the chief merit of the work is allowed to confift in the more exact definition this writer affords of the *belemnitæ*, *ammonitæ*, and *orthoceratitæ*, than had before appeared. Of the orthoceras tribe, he defcribes eight diftinct fpecies, the two others are treated lefs copioufly. His claffification of recent fhells is far from perfpicuous. This was publifhed in quarto in 1732.

About this period, the attention of many ingenious writers was directed to the inveftigation of the teredo, or fhip-worm, then, as it was believed, very recently imported from warm climates into Europe; it was firft obferved in Holland. The firft alarm was given by the perfons appointed to take care of the dykes, who perceived, that the piles which were of the hardeft oak, and had been placed to defend the low countries from the incurfions of the fea, were eaten through in a few months. The damage occafioned was immenfe, and the people of Holland thrown into the utmoft conffernation, till remedies were difcovered to prevent the evil. Among the writers on the fubject, are Vallifneri, Rouffet, Putoneus, Belkmeer, Maffuet, and Sellius, the laft of whom particularly diftinguifhed himfelf by his work entitled, "Hiftoria Naturalis Teredinis feu Xylophagi Marini."

Du Hamel, in a paper inferted in the "Memoirs of the French Academy," in 1736, treats on the purpura of the ancients. The work of Swammerdam, "Biblia Naturæ," appeared in 1737, and will be found to contain much curious matter, and anatomical refearch into the nature of teftaceous animals. In 1739, the work of James Plancus, "De Conchis Ariminenfibus minus notis," appeared in Venice. This relates principally to the minute fhells found at Rimini in the Adriatic fea. Some of the microfcopic fhells defcribed by this author, very much refemble the cornu ammonis. A fecond edition was publifhed in 1748, and another at Rome in 1760.

Gualtieri's work on fhells is a ftandard book of reference, and as fuch is well known. This is entitled "Index Teftarum Conchyliorum quæ adfervantur in Mufeo Nicolai Gualtieri," &c. It was publifhed in Latin at Florence, in 1742, and contains 110 plates of fhells; the figures of the univalves in which are fingularly placed on their fummit; they are notwithftanding tolerably correct: the defcriptive matter is lefs interefting. This author exhibits a fyftem of fhells compofed by Tournefort, the celebrated botanift, long before this time, from manufcripts on the fubject that had been prefented to him by profeffor Targioni. This arrangement is valuable, and highly worthy the perufal of the inquifitive conchologift. The Linnæan ftudent, in particular, will perceive that to Tournefort, as to Langius, he is indebted for fome of the lateft amendments of the Linnæan fyftem, and for many of the fubdivifions and terms in prefent ufe.

"La Conchyliologie" of D'Argenville is a voluminous work, and contains a vaft number of excellent defcriptions, and many figures. The firft edition of this work appeared anonymoufly, under the title of "L'Hiftoire Naturelle éclaircie dans deux de fes parties principales, la Lithologie, et la Conchyliologie," &c. in 1742; and a fecond edition, confiderably augmented, in 1754. The laft edition was publifhed in the year 1780, with many additions, corrections, improvements, and a feries of plates containing about 2000 figures, by M. Favanne de Moncervelle and his fon.

The name of Bartram occurs to a paper in the Philofophical Tranfactions, vol. xliii. A.D. 1744, entitled "Obfervations concerning the Salt-marfh Mufcle, the Oyfter-banks, and Frefh-water Mufcle of Penrfylvania," illuftrated with figures. A copious account was alfo given about this time by Needham, of the lepas anatifera. The "Teftaceo-Theologia" of Leffer, is embellifhed with 137 figures of fhells, and abounds with phyfiological and anatomical obfervations on the ftructure of thefe teftaceous animals.

Some mention is made of fhells in Dr. Charles Smith's "Hiftory of the Counties of Waterford, Cork, and Kerry," A.D. 1745—1756. Two papers, one relating to mytilus lithophagus, and the other to pholas pufilla, are inferted in vol. xlv. and vol. lv. of the Philofophical Tranfactions. In fir John Hill's "Hiftory of Animals," are an arrangement of fhells, and fome figures; it appeared in folio in 1752.

The firft work of Klein's that claims mention in this place is his "Defcriptiones Tubulorum Marinorum," containing nine plates, which chiefly reprefent different fpecies of belemnitæ, with various kinds of recent fhells, as folenes, dentalia, &c., and are introduced in order to complete his arrangement of the tubular coverings of animals. But the principal production of this writer is his "Tentamen Methodi Oftracologicæ, five Difpofitio Naturalis Cochlidum & Concharum, in fuas claffes, genera, & fpecies," &c., printed at Leyden in 1753. It has been objected againft this work that the general divifions forming parts, fections, claffes, and genera, are too numerous; and what is worfe, that fpecies are conftituted, in fome inftances, without being referable to any genus, and that, in one of the parts, there is a folitary genus without any clafs. (Dr. Maton)—"Claffes, genera, & fpecies nimium, ut mihi videtur, multiplicavit: quæ fæpe funt variationes fpecierum, fpecies vocavit; quæ funt fpecies, generum nomine infignivit; & ex generibus quibufdam claffes condidit," &c. Bergen.

The outline of an arrangement formed by a naturalift fo eminent as Klein fhould not be paffed over unnoticed. All fhells are divided by this writer into four principal parts, in the following manner:

Pars 1. *Cochlides*, canales teftacei, circa principium tenues & claufi, in gyros gradatim vaftiores conftanti ratione circumacti.

Pars 2. *Conchæ*. Teftæ vafculorum inftar explanatæ & concavæ, variorum animalium exfanguium habitacula, teftarum numero a fe invicem differentes.

Pars 3. *Polyconchæ*, quæ pluribus valvulis quam duabus gaudent.

Pars 4. *Niduli testacei*, testacea animalium domicilia in-forma niduli fessilis catervatim plerumque corporibus marinis superstructa.

The *cochlides* comprehend two sections, "cochlis simplex, and cochlis composita:" these are again subdivided into families, and lastly into genera. Among the shells included in the first of these, we find the nautilus, cornu ammonis, neritæ, auris marina, trochus, strombi, turbines, and the buccinum; and in the section cochlis composita, the bulla, porcellana, and murex. The second part, *conchæ*, of this author is comprised in three sections "monoconchæ, disconchæ æquales, and disconchæ inæquales." Among the first of these, we observe the patella, in the second, the ostrea and spondylus, and in the third, the terebratula. Part 3, or *polyconchæ*, consists of "concha anatifera." Part 4, comprehends the balani under the title of "monolopus and polylopus;" and as an appendix to part 4, and as a fifth part, the "echinus marinus, and tubulus marinus."

Although the distribution of shells after the manner of Klein does not meet our ideas of a correct methodical arrangement, it is but candid to say, that many of the genera he proposes have been rejected by later writers without sufficient consideration, and others derived from his labours without acknowledgment. Let us pause and candidly examine this arrangement, and we shall perceive that not only Linnæus himself derived very considerable assistance from his work, in the latter editions of the "Systema," but that many of the supposed new genera of the French writers, in the present day, are drawn from this very source. This work contains twelve plates, and besides the system above noticed, comprehends a dissertation on the form, growth, and colour of shells "De Formatione, Cremento et Coloribus Testarum."

The "Conspectus Sciographicus Testaceorum" of J. H. Cohausen, was printed at Frankfort about the year 1750.

In 1755, a work of considerable importance, the production of Nicholas George Geve, an eminent painter, appeared in quarto at Hamburgh, under the title of "Monatliche belustigungen im reiche der Natur, an Conchylien und Seegewächsen," or "The monthly amusement of Shells and Sea Productions." This publication came out in parts, and was favourably received, but being pirated was discontinued. The total number of plates published appears to be 33, the figures in which amount to 434.

The memoirs of the French Academy for 1756, contain a curious paper on the characters of shells, in which fourteen genera are described, founded on the nature of the animal inhabitants; this bears the title of "Observations qui peuvent servir à former quelques charactères des coquillages," and is from the pen of Guettard; another paper also on the subject of conchology, "Sur le Rapport qu'il y a entre les Coraux et les Tuyaux marins, et entre ceux-ci et les Coquilles," from the same writer appears, in the Memoirs of that Academy for 1760, to which five plates of serpulæ, dentaliæ, &c. are annexed. Guettard was besides these the author of two or three ingenious tracts on the same subject, the titles of which do not immediately occur to us. The "Dissertatiuncula de Cornu Ammonis nativo Littoris Bergensis in Norvegia," produced in 1757, and "De Tubulis vermicularibus cornu ammonis referentibus," bearing date 1761, are both the performances of J. F. Hoffman, and appeared originally in the Transactions of the Electoral Academy of Mentz. These, as their titles imply, relate to a supposed discovery of some recent shells of the cornu ammonis tribe, but which, in reality, are only of the nautilus kind, though bearing a remote resemblance to the fossils known by the title of ammonitæ. Shells similar to those had been before observed by Plancus. Another paper in the same volume as that last mentioned is from this writer, and bears the title of "De Concha Sphærica fluviatili. alata ex badio et nigro colore variegata."

"The Civil and Natural History of Jamaica," published in London in 1756, by Dr. Patrick Browne, contains a scheme of shells, which, considering the state of the science of conchology at that period, is less satisfactory than might be expected. Shells are divided by this author into three classes, *univalvia*, *bivalvia*, and *plurivalvia*. The characters of his ordines are taken, in the univalves from the hollow of the shell being non-spiral, or spiral, and the situation, and form of the aperture, and the lip; in the bivalves from the ligament of the hinge, and the teeth; and in the plurivalves from the connecting ligament of the valves.

The "Opere Postume" of count Joseph Ginanni of Ravenna, contains a description of the maritime, marsh, and terrestrial shells of the territory of Ravenna, after a system somewhat similar to that of Buonanni. The first of these tribes is illustrated by thirty-one plates, the second by four, and the third by three. The descriptive matter is in the Italian language. It was published in folio, in 1757.

Adanson's "Histoire Naturelle du Senegal," was published at Paris in 1757. This useful work contains a new arrangement of conchology, and a series of about four hundred figures of shells, with the animals appertaining to the principal families. This production of Adanson's is in much esteem with the continental naturalists.

The books of Baster, "Opuscula subseciva, observationes miscellaneas de animalculis," &c. dated Harlemi, 1759, 1760, 1761, 1762, and two 1756, afford the curious reader much information relative to the anatomical, and physiological nature of testaceous as well as crustaceous animals. In these we find the propagation, and ovaria of shell fish in general, treated of in an ample manner. A translation of the author's dissertation on the teredo navalis appears in the Philosophical Transactions.

A monographia on helix decollata, entitled "Observations sur une espece de Limaçon terrestre dont le sommet de la Coquille se trouve cassé sans que l' Animal en souffre," by M. Brisson, is inserted in the memoirs of the French Academy for 1759.

The testaceological labours of the celebrated Linnæus should be particularly adverted to in this place. One of the earliest of his productions on this subject is the "Fauna Suecica," the first edition of which was published in 1746, and contains an account of sixty different species of Swedish shells. His travels in Gothland, "Wästgöta resa, föiättad ar 1746," appeared at Stockholm the year after, and though testaceology had only partially interested the remarks of Linnæus, we are here presented with a description of several shells observed in his journey, and likewise a plate including a number of figures, rude indeed in the execution, and still more defective in representing all the univalves as heterostrophous shells, but valuable as a plate of reference to conchologists even at this day, (vide Donov. Brit. Shells, murex despectus). The "Musæum Tessinianum," published in 1753, and "Musæum Adolphi Frid. Sueciæ Regis," in the year following, scarcely demand mention as they contain only three species of the shell tribe. In the description of another museum, that of the queen of Sweden, "Musæum Ludovicæ Alricæ Reginæ;" Linnæus possessed a more favourable opportunity of treating on testaceology, as her majesty's collection was particularly rich in shells; this work describes 434 species of shells, and some do not scruple to affirm that it is the best of the Linnæan

Linnæan productions on the subject of testacea; it appeared in 1764. In the interval between the times in which the two last mentioned works were published, Linnæus brought out a second edition of the "Fauna Suecica," in which the number of shells described was augmented from sixty to eighty-nine species.

The "Mantissa Altera" contains thirty-five species not described in the other works already mentioned. The "Fundamenta Testaceologiæ" is one of his latest tracts, and is to be found among the "Dissertationes Academicæ."

These are valuable books in a limited view, but the classification of shells in the "Systema Naturæ" from the nature of the undertaking is to be considered the most general of all the Linnæan writings on the testacea. Between the year 1735, in which that work first appeared, and 1767, the Systema passed through no less than twelve editions, in all which a progressive improvement, and nearer approach to perfection are manifested, and in no one department is this more unequivocally shewn than in the methodical distribution of the shells.

An opinion is pretty generally prevalent that less attention was devoted by Linnæus to the history and arrangement of the testacea, than any other order of nature; and that he even thought them unworthy of becoming objects of scientific arrangement. These points have been contested. The truth however still appears to be, that Linnæus had not really bestowed much critical attention on this subject. We can easily imagine that the mind of Linnæus might fluctuate between the propriety of establishing his conchological system upon the characters of the animals, and the difficulty, if not impossibility, of accomplishing it, and that in this state of indecision the shells themselves were, in a great measure, disregarded by him. When therefore the completion of the Systema required that some attention should be paid to testaceology, he was unprepared, and resorting to the authorities of others, comprised this department in the smallest compass possible, more with the view of filling up a chasm, which the omission of a tribe so generally admired would occasion, than from any idea of elucidating the subject.—A similar reason is well known to have operated on the mind of Linnæus, with respect to his system of mineralogy, which was added principally, in order that this work should comprehend the three kingdoms of nature.

Whether this conclusion be correct or otherwise, one fact inferred is very obvious, that the early attempts at the classification of shells, which the Systema presents, do not afford that happy result to be expected from the industry, and superior genius, of Linnæus.—It is time we should lay aside the trammels of servile adherence, and speak decidedly:—those early attempts of this celebrated writer we do not scruple to say, if examined with candour, will be found only a slight and ill conceived compendium of what has been handed down to us by antecedent writers; and which, if he had more closely imitated in the outset, as he afterwards found it incumbent upon him to do, would have rescued his reputation as a conchologist from considerable blame. Can we for a moment, dazzled with the splendor of a name, however dignified, deny that merit which is so conspicuously prominent in the classifications of preceding writers, and attribute all the credit of reducing shells into method and order to the genius of Linnæus? or can we, after duly estimating the testaceological labours, even of Gesner, Aldrovandus, and Major, we would almost say of Aristotle, be disposed to commend this naturalist for overwhelming their arrangements in one common ruin; abolishing at the least forty excellent genera established by the different writers, and in lieu of those presenting us with eight genera for the reception of the whole testaceous tribe! Yet such is the fact, the only genera of shells, included in the first editions of the Systema, are *cochlea*, *nautilus*, *cypræa*, *haliotes*, *dentalium*, *concha*, and *lepas*.

Linnæus was himself embarrassed in the distribution of shells into such a small number of genera; he even found it impracticable, and hence we perceive, in the later editions of that work, their number progressively augmenting till, in the last publication of the Systema, they were multiplied to thirty-five. Thus from time to time, as his acquaintance with shells became more general, we see him deriving new strength and support, in the aid of his own system, from these very sources which, in the first instance, he too incautiously attempted to subvert; the genera afterwards admitted into the Systema, even to those last adopted, being with scarcely an exception to the contrary, drawn from the labours of naturalists who wrote in the century preceding, or much before.

It is an opinion likewise founded in error, that we are indebted for the outline of this testaceological system (considered in its most improved state) to the native genius of Linnæus. No one will hazard the assertion, we should conceive, who is in the slightest degree acquainted with the writings before-mentioned. His primary divisions were ready formed to his hands. Let us examine further: in the outline of his system, he divides all testaceous bodies into three principal orders, *multivalve*, *bivalve*, and *univalve*. If we take the univalves of Aristotle (retained by later writers under the title of turbinata), the bivalves of all writers, from the time of Aristotle inclusively, and the plurivalves of Major, invert their order, and we at once possess the complete outline of the system attributed to Linnæus. Or we may refer with equal certainty to the principles of Major's system alone, published sixty years before the first edition of the Systema made its appearance, in which this inverted arrangement occurs precisely, univalvia, bivalvia, and plurivalvia. Linnæus, therefore, it may be fairly inferred, was not the inventor of the systematic outline ascribed to him, for it was long in use before his time.

If we next descend from the primary divisions, or orders of the Linnæan system to his genera, these still are to be found in the same, or other early writers, perhaps a solitary transposition (as in conus and strombus) excepted, and furthermore even under the very names he assigns to them. His obligations to the labours of Langius are too obvious to be concealed. But although, in this particular, Linnæus has only the more moderate merit of adopting, instead of inventing the outlines of his system, he is to be applauded for having condescended to select what it appears he thought, on mature deliberation, superior to his own. And this, in our idea, was so far commendable, that we regret he had not been influenced by the same opinion in his first views of a testaceological classification. Linnæus had assuredly much diffuse and ambiguous matter to wade through in his investigations of former systems in general, and his selections were at length both clear and judicious, though still susceptible of much improvement. We are also to give the celebrated naturalist his full share of credit for having ultimately improved, and more accurately defined, the characters of the respective genera which he has adopted, than any of his predecessors; the characters of his species also, generally speaking, are not to be excelled for expressive simplicity and conciseness. He may be truly said to have reformed the language of natural science, before much too vague, by the introduction of that peculiar brevity of style, so extreme-

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ly ufeful in the nice difcrimination of natural objects, and which he feldom fails to apply with the happieft poffible effect.

The merits of Linnæus, as a great naturalift, will fhine with undiminfhed fplendour, divefted of its meteorous luftre; the world feels grateful to his genius. But nothing lefs than an acquiefcence unworthy of his character, and of ourfelves, can lead us to conclude he was equally fuccefsful in all his endeavours to develope the myfteries of nature. For our own part, attached to no particular fyftem, we would rather "ftem the torrent alone, than glide down the ftream with many," in contradiction to the evidence of our own mind; we are the friends of Linnæus,—and of truth. We are perfuaded, furthermore, that what the refult of calm inveftigation approves, muft redound more to the credit of Linnæus than that implicit obedience which bows down our reafon, and rejects inquiry. The celebrity fo defervedly acquired by his writings in general, has ftamped his fyftem of teftaceology with repute. Its reputation induces us to examine it with more than ordinary attention. It is in England, what that of Lamarck's is in France, and fome others in different parts of Europe; the fyftem beft known, and the moft admired. We fhall for this reafon take a comprehenfive view of the whole, regarding every genus feparately in the fame order as Linnæus places them; and offering, as we proceed, a few curfory remarks on each, with a view to enable the common reader to form his own opinion, and judge for himfelf of the comparative excellence or fuperiority of the Linnæan fyftem of teftaceology.

The primary divifions of this fyftem, in the lateft edition of the "Syftema Naturæ," as before obferved, confift of three orders, *multivalve, bivalve*, and *univalve*, each of which is fubdivided into genera. The *multivalves* contain the chiton, lepas, and pholas; the *bivalves*, mya, folen, tellina, cardium, mactra, donax, venus, fpondylus, chama, arca, oftrea, anomia, mytilus, and pinna; and the *univalves*, argonauta, nautilus, conus, cypræa, bulla, voluta, buccinum, ftrombus, murex, trochus, turbo, helix, nerita, haliotis, patella, dentalium, ferpula, teredo, and fabella.

Genera.

Chiton. Animal a doris. Shell confifting of feveral tranfverfe incumbent valves, difpofed in a longitudinal feries down the back.

Our knowledge of this genus was very confined till within the laft few years; fo lately as the period in which the tenth edition of the Linnæan "Syftema Naturæ" appeared, only four of its fpecies were known, at leaft no greater number is defcribed by that writer. To the valuable work of Chemnitz, we are indebted for the addition of thirteen other fpecies; to Schröetter, for three or four; and to Pennant for nearly an equal number; all of which are included in the laft edition of the "Syftema Naturæ à Gmelin," with a few others, amounting altogether to twenty-eight fpecies. Though we are pleafed to fee fuch a number of this curious genus, concentrated in one point of view, we cannot avoid expreffing a wifh that fome few of the fpecies at leaft were better explained, thofe efpecially which are confined to the continental mufeums; one, if not more of the fpecies defcribed by Pennant, is confeffedly erroneous.

Lepas. Animal a triton. Shell affixed at the bafe, and confifting of many unequal valves. Linn.

The propriety of feparating the balani, or acorn fhells, from the anatiferæ, or as vulgarly denominated the "goofe bearing fhell," has never yet been queftioned by any well-informed naturalift, although from motives of caution we, have, with others, fubmitted to the genus eftablifhed by Linnæus, till our reafons for diffenting from his authority (and which the Linnæan ftudent might deem an innovation) could be explained in its proper place.

We were always at a lofs to fee the true reafon that could induce Linnæus to place thefe two very oppofite natural families together; the only juftification feems to be, that the animals of the two genera (for fo we fhall denominate them) are of the triton kind, and that no other multivalve fhells are inhabited by this kind of animal, that of chiton being a doris, and of pholas an afcidia. At the fame time, it will be remembered, that animals of the fame kind inhabit fhells of very different genera, and that it is therefore no argument, becaufe all of the Linnæan genus lepas are inhabited by the triton, that they muft be of the fame genus. We cannot furely infer this from any fimilitude in the ftructure of the two kinds of fhells. What, for inftance, can be more diffimilar than the firft very effential particular in which thefe fhells difagree, namely, the manner in which they are affixed; the balani cemented immoveably by its bafe to the rocks, loofe ftones, or any other extraneous fubftances, while the anatiferæ are connected to, and fupported at their bafe by a tendinous tube, which being of a flexible nature, allows the animal an opportunity of writhing or turning in any direction in queft of food. Again, the very ftriking circumftance, which Linnæus had always himfelf regarded as of the firft confequence in an arrangement of fhells, the prefence and abfence of the operculum: in the anatiferæ, there is no operculum whatever; while, in the balani, that part conftitutes one of the principal features of the fhell; it is even the ftructure, rugofity, or other peculiar circumftances obfervable in this part, that afforded Linnæus the beft of his characters, in defining the fpecies of this family. This operculum or lid of the balani confifts of four or fix valves. The above characters are fo obvioufly diftinct, that it may be almoft confidered needlefs to advert to the form of the two fhells, though in this alfo they differ moft effentially; the anatiferæ are wedge-formed, and confift of five or more unequal valves; the balani of fix valves, and the general form of the fhell is fubconic.

Pholas. Animal an afcidia. Shell bivalve, divaricated, with feveral leffer, differently fhaped, acceffory ones at the hinge; hinges recurved, and united by a cartilage; an incurvated tooth in the infide beneath the hinge.

Thefe fhells were formerly called piddocks by the Englifh; they are found below high-water mark burrowed in hard clay, lime-ftone, or fometimes free-ftone, and alfo wood; which they perforate in their younger ftate, and as they increafe in fize enlarge their habitations. The animal is fomewhat cylindrical in form, and is furnifhed with two orifices or openings, capable of elongation in the manner of a probofcis; from one of which, fuppofed to be the mouth, it has the faculty of fquirting water. The phofphorefcent properties of the pholade are very remarkable; it contains a liquor which fhines with uncommon fplendour in the dark, and illuminates whatever it touches, or happens to fall upon. This is noticed by Pliny, lib. ix. c. 61, and M. Reaumur has alfo written copioufly on this fubject, in the Memoirs of the French Academy, for the year 1712.

Only twelve fpecies of this genus are defcribed in the Gmelinian Syft. Nat. The pholades were placed by Linnæus among the bivalves.

Mya. Animal an afcidia. Shell bivalve generally gaping at one end; hinge, with a folid, thick, patulous tooth, or feldom two, and not inferted in the oppofite valve.

Many

Many of the ſhells in this genus were arranged with the muſcles till Linnæus ſeparated them; Gmelin in the laſt edition of the Syſtema Naturæ deſcribes twenty-one ſpecies of the mya tribe.

The Linnæan myæ conſtitute three diſtinct genera, in the lateſt arrangements of the continental writers, as mya, glycimeris, and vulſella. The mya is diſtinguiſhed by a tranſverſe ſhell gaping at the two ends, and having the ligament within; and one valve furniſhed with a ſingle, compreſſed, roundiſh tooth in the beak, perpendicular to the valve, and having the ligament attached to it. The Linnæan mya truncata is of this kind. In the genus glycimeris the ſhell is alſo tranſverſe, and gaping at both extremities, but the hinge is callous and toothleſs, and the ligament ſituated on the outſide. Vulſella has the ſhell long and ſomewhat equivalve; hinge callous, depreſſed, without teeth, and forming a ſtraight line in both valves; the ligament attached to a roundiſh conic hollow; beaks bent and very ſhort. This laſt genus is cloſely allied in many reſpects to the oyſter.

Solen. Animal an aſcidia. Shell bivalve, oblong, open at both ends; hinge with a ſubulate reflected tooth, often double, and not inſerted into the oppoſite valve.

Gmelin deſcribes twenty-three ſpecies of this genus, ſeveral of which are natives of Europe, where they frequent ſandy ſhores. The Greeks were acquainted with ſome ſhells of this genus, as were alſo the Romans, both of whom valued the fleſh of the inhabiting animal as a dainty. In England they are occaſionally eaten either boiled or fried with eggs, but are not found in ſufficient plenty to be conſidered as an article of food. They are called ſheaths or razor-ſhells in this country.

The Linnæan ſolens are divided by late writers on the continent into three different genera, two of which comprehend the recent kinds, the third is eſtabliſhed chiefly for the reception of ſome foſſil ſhells, ſuppoſed to be of this Linnæan family. Thoſe genera are ſolen, ſanguinolaria, and corbula.

The ſolens, according to thoſe writers, have the ſhells tranſverſe, with the upper and lower margins almoſt ſtraight, with beaks not projecting and gaping at both extremities; and the two valves together furniſh either two or three teeth in the hinge: the ligament of the hinge in this family is placed on the outſide. Sanguinolaria differs in having the upper margin curved, the extremities a little gaping, and two approximate teeth in each valve, which lock into each other when the ſhell is cloſed. Corbula has the valves unequal, ſub-tranſverſe, and regular; with a conic curved tooth in each valve; the ligament of the hinge within, and the inſide of the ſhell marked with two muſcular impreſſions.

Tellina. Animal a tethys. Shell bivalve, generally ſloping on one ſide; in the fore part of one valve a convex, of the other a concave fold; hinge with uſually three teeth, the lateral ones ſmooth in one ſhell.

In the Linnæan ſyſtem the tellinæ are divided into three families, namely, * ovate and thickiſh, ** ovate and compreſſed, *** ſub-orbicular.

A late writer (Dr. Pultney) obſerves, in his "Catalogue of Shells found on the Coaſt of Dorſetſhire," that the tellinæ genus is one of thoſe of which the ſpecies are yet very imperfectly defined, ariſing from the great ſimilitude among them; and from the inſufficient deſcriptions of authors before Linnæus wrote, who, by deducing their characters of the genus, if indeed ſuch they might be called, almoſt wholly from figures, were neceſſarily led to throw together ſhells entirely different, when examined by the characters Linnæus affixed. Thoſe of this great maſter, adds this writer, are yet very imperfect, and ſince the great additions that have been made to conchological ſcience, by later diſcoveries, the whole ſyſtem again wants a total reformation: and the conſtruction of many new genera. The obſervation of this naturaliſt is very juſt; the writers before the time of Linnæus have, with too little caution, derived their characters from figures rather than from the ſhells, a fault we could have wiſhed Linnæus himſelf had more frequently avoided; the tellina of Linnæus is a good genus, but requires to be recaſt; ſome of the ſhells included by this genus have certainly no natural affinity whatever with the others, and the character of the genus itſelf is not laid down with ſufficient preciſion.

Liſter is one of the firſt conchologiſts who deſcribes the tellens with any degree of accuracy: he defines them to be "ſhells ſhaped like wedges," and places them after the pinna, (lib. iii. hd. 2. ſect. 8.) Woodward ſays they have a few teeth on the hinge, and are oblong ſhells, or with the ſides lengthened. Davila comprehends the tellens as a very large family, and includes the ſolens as a genus of them. Da Coſta, in his "Elements of Conchology," attempts to eſtabliſh a family of tellens under the character of the ſhells being more broad than long, rather flat, and the hinge having two teeth ſet cloſe together. This conſtitutes his ninth family of bivalve ſhells; and which he again divides into two genera, the firſt of which he ſtill calls tellina, and the ſecond cunei; his tellinæ are thus defined, "ſhells with ſimilar ſides, whoſe beak and hinge are central;" his cunei "ſhells with diſſimilar or unequal ſides, whoſe beak and hinge are placed near to, or quite at one end."

There is much method, but very little accuracy, or attention to genera, founded on natural affinities and characters, in the arrangements propoſed. It was reſerved for later writers, by a more ſtrict inquiry into the nature and habits of the animals, as well as the nice diſcrimination of characters in the ſhells themſelves, to fix upon deciſive general diſtinctions. It has been diſcovered by Poli, and others of the continental writers, that the animals inhabiting ſome of the tellen tribe are of a different ſtructure from the others; and another objection to the tellinæ, as they now ſtand in that genus, is the diſſimilitude obſervable in the hinge, teeth, and other parts of the ſhell, which Linnæus has himſelf thought eſſential to be regarded in conſtituting genera. The principal of the new genera eſtabliſhed by the lateſt of the French writers are *Cyclas* (cyclade) of Lamarck, and *Pandora* (pandore) of Latreille, the animal of which was previouſly diſcovered by Poli: the ſhell is alſo deſcribed by Linnæus under the name of *Tellina inequivalvis*.

The tellina genus, as now defined, conſiſts of thoſe bivalve ſhells which are orbicular, or tranſverſe, having a regular fold or rumple at the anterior end of the ſhell, with one or two teeth pointed to the beaks; and remote lateral teeth. This will comprehend the true tellinæ. The cyclas is of the Linnæan tellinæ, and is exemplified in the *Tellina cornea* of Linnæus and Pennant. This genus is of a ſub-orbicular form, without a regular fold or rumple at the anterior end; the ligament of the hinge is inflated, and projects out; it has either two or three teeth pointing to the beak, and lengthened lamelliform, or plate-like lateral teeth, which are received into ſockets in the oppoſite valve. The genus pandora, as above intimated, is formed principally of that ſingular ſhell the tellina inæquivalvis. This genus is unequivalve and unequilateral, one valve being convex, the other flat, with flattened ſummit; two unequal diverging teeth at the hinge, pointing to the beak in the upper valve, and two hollows in the lower; ligament within, and the inſide of the ſhell marked with two muſcular impreſſions.

Cardium.

Cardium. Animal a tethys. Shell bivalve, nearly equilateral, equivalve, generally convex, longitudinally ribbed, ftriated, or fulcated, with the margin dentated. Hinge with two alternate teeth in the middle near the beak, in moft incurved; lateral teeth remote, and inferted or locking into the oppofite.

Forty-nine fpecies of this genus are defcribed in the laft edition of the Syftema Naturæ.

Da Cofta, in his "Elements of Conchology," propofes to eftablifh a new family of cockles, under the title of pectunculus, whofe character is a curved or femilunar hinge fet with either two or four teeth. Thefe he divides into three genera. Genus 1. *Pectunculi*, or cockles, with a convex or flattifh fhell, of a roundifh fhape, with fimilar or diffimilar fides, whofe beaks are not very prominent, and curve much upwards towards the hinge; they are the *Chamæ* of Argenville and Gualtieri; and do not belong to any particular genus in the Linnæan fyftem, but are difperfed throughout his bivalves, and are only mentioned here to introduce the two next genera. Genus 2. *Cordiformes*, or heart-fhaped cockles, whofe beaks are not very prominent, and curve up greatly towards the hinge, thereby forming a figure perfectly like a heart as vulgarly painted. Thefe are ranked by Linnæus in the cardium genus, and are thofe, ftrictly fpeaking, of which his genus is chiefly compofed. Genus 3. *Truncati*, or flat-fided cockles. Thefe laft are fuch cockles as are flattened, or have a truncated appearance on one fide, as we fee exemplified in cardium medium.

The cardium genus, as laid down by Linnæus, is far from exceptionable. It is adopted by the beft continental writers, under the title of *Cardium bucarde, Cœurs, Conchæ cordiformes*, and other fignificant appellations, alluding to the heart-fhaped appearance which the fhells exhibit, in a greater or lefs degree, when viewed fideways. Thefe fhells are of a fomewhat cordiform fhape, with the valves denticulated or folded at the margin; beaks contiguous; hinge with two oblique teeth in each valve near the beak, locking into each other; lateral teeth remote, and fitting alfo into each other.

Mactra. Animal a tethys. Shell bivalve, unequilateral; valves equal; middle tooth of the hinge complicated, with a fmall hollow on each fide, and lateral remote teeth inferted into each other.

Twenty-feven fpecies of this genus are defcribed by Linnæus and Gmelin. Lamarck propofes to divide the Linnæan mactra into two genera, *mactra* and *lutraria*; both fhells are unequilateral, and gaping at the ends, but the conftruction and fituation of the teeth are very different, as we fee elucidated moft completely by comparing the mactra ftultorum of Linnæus with the mactra lutraria of the fame author.

Donax. Animal a tethys. Shell bivalve, with the margin in general crenulated, the anterior end very obtufe; hinge with two teeth, a folitary one fomewhat remote (the latter rarely double, triple, or none). Linn.

This genus, in the Linnæan fyftem, contains nineteen fpecies. The donax of the modern continental naturalifts is rather differently defined; they defcribe it as a tranfverfe fhell, with the fides unequal, a little gaping at both ends, and having two mufcular impreffions on the infide of the fhell; two teeth pointed towards the beaks in one valve, and a fingle bifid tooth difpofed in a fimilar manner in the other; and the ligament of the hinge on the outfide. This character agrees with the *Donax rugofa* of Gmelin. Another genus is eftablifhed under the name of petricola, the character of which is exemplified in the Linnæan *Donax irus*, and *Venus lapicida* of Chemnitz. The fhells of this new genus are unequilateral, a little gaping at both fides, and having two mufcular impreffions in the infide of the fhell: two teeth pointing towards the beaks in one valve, and a fingle bifid tooth in the other; with the ligament of the hinge on the outfide.

Venus. Animal a tethys. Shell bivalve, anterior margin with incumbent lips; hinge with three teeth, all which are approximate, the lateral ones divergent at the tip; "vulva et anus diftincta." Linn.

Thefe are divided by Linnæus into two fections; * pubentes, and ** impuberes, the laft of which is fubdivided into three families, † fubcordatæ, †† orbiculatæ, and ††† ovales, fupra rimam fubangulatæ. The total number of fpecies defcribed in the "Gmelinian Syftema," amounts to one hundred and forty-five. It is chiefly in the defcriptions of the fhells of this genus that Linnæus has adopted terms which we do not feel at liberty to render into common language for the perufal of the general reader.

Many of the fhells of this genus were arranged by writers previous to the time of Linnæus under the title of chama. The animal is defcribed as a tethys differing from that of the cardium, chiefly, in having the foot of the animal when protruded lamina-formed, inftead of hooked, and as a mollufcous animal, taking a variety of forms when the creature moves. It fhould however be obferved that we are yet very imperfectly acquainted with the animals inhabiting this extenfive tribe of fhells.

Spondylus. Animal a tethys. Shell with unequal valves, hard, and rigid; hinge with two recurved teeth, and a fmall hollow between.

The Linnæan fpondyli are few in number, the laft edition of the "Syftema Naturæ," comprehending no more than four fpecies. The fpondyli have been by fome called thorny oyfters. Rumpfius, Argenville, Seba, and Davila, rank them as oyfters; while Lifter, Woodward, Gualtieri, Linnæus, Meufchen and Da Cofta confider them as a diftinct genus, under the name of fpondylus. The fpondyli are either earlefs or furnifhed with ears; the valves uneven, thick, and rude or uncouth, and forming in their general exterior an intermediate natural family between the oyfter and fcallop. Lamarck, and other late French writers, divide the Linnæan fpondyli into two genera, *fpondylus* and *plicatula*. One effential diftinction between thefe fhells confifts in the fpondylus having ears, and the plicatula being without; but this is not the only difference, a ftriking character is drawn from the ftructure and appearance of the beak of the lower valve, which projects beyond the beak of the upper one, and in fpondylus exhibits a plain triangular flat fpace, divided by a furrow: while in the genus plicatula the beak has no fuch characteriftic fpace or flat furface, and the edges are rumpled or folded. Thefe new genera are well exemplified in the two Linnæan fhells, fpondylus gaedaropus, and fpondylus plicatulus.

Chama. Animal a tethys. Shell bivalve, rather coarfe; hinge with a callous gibbofity, obliquely inferted into an oblique hollow; anterior flope clofed (valva claufa abfque nymphis, Linn.)

In Da Cofta's "Scheme of Shells," the Linnæan chamæ are divided into two genera, tridacnæ or bafon conques, and chamæ or gapers. The tridacnæ are fhells of equal valves, and diffimilar fides, in hinge and appearance like the heart cockles, but on the longeft fide from the beak to near the extreme margin the two valves are open, leaving a large oval or heart-fhaped gap, the lips of which are very broad, and turn upon the edges. The chama gigas of Linnæus is of this family, and is the largeft and heavieft fhell at prefent known, weighing from fix to feven hundred pounds. The chamæ,

chamæ, or gapers, alfo called purrs, have a broad, thick, and large tooth at their hinge, and are abruptly cut off on one fide. which fide is always open or gaping.

The genus tridacna is retained by the lateft French writers, with fome amendment in the definition of the character. They defcribe it as an equilateral and fubtranfverfe fhell, with two compreffed teeth in the hinge, and the lunule at the pofterior flope gaping. The chamæ of thefe authors are adherent to other bodies, and have the valves unequal, and the infide of each marked with two mufcular impreffions; and the hinge confifting of a fingle thick oblique tooth. Hippopus, cardita, and ifocardia, are alfo new genera formed of the Linnæan chamæ; the laft is an excellent genus, founded on the peculiar ftructure of the chama cor of Linnæus: this fhell is heart fhaped, with the valve unequal at the fides; the beaks diverging fomewhat fpirally and remote; in one valve under the beak a flat tooth, locking horizontally between two in the valve oppofite, and a fingle diftant tooth in the anterior part, below the ligament.

Arca. Animal a tethys. Shell bivalve, equivalve; hinge with numerous fharp teeth alternately inferted between each other.

This genus is divided into two principal families, thofe having the margin entire, and thofe with the margin crenated; and both families are again fubdivided into two fections, the firft diftinguifhed by having the beaks recurved, the other inflected; the fpecies defcribed altogether amount to forty-two.

This genus derives its name of arca, ark, or Noah's ark-fhell, from the fimilitude which moft of the fpecies bear when the valves are clofed to a boat, or hull of a fhip, "concha rhomboidalis naviculam exprimens." Lifter places fome of thefe fhells among the multarticulate cockles, and the reft with the mufcles, under the title of many-toothed mufcles. Woodward ranks them among his "polyginglymi formâ oblongâ;" Argenville as a family of heart-cockles, and Davila and Gualtieri as a diftinct genus: the firft under the title of arca, the latter as "concha rhomboidalis." Thefe writers were fucceeded by Linnæus, who confidered thefe fhells as a diftinct genus, and called them arca.

The principal alteration in the Linnæan claffification of the genus arca propofed by late writers, is to retain only fuch fhells under the title of arca as are unequilateral, with the beaks remote; and have the line of the hinge fimple and ftraight throughout, with numerous teeth placed parallel to each other, and fitting or locking between thofe on the oppofite valve. Admitting this as the character of the arcæ, and it exactly correfponds with the arcæ noæ, and moft others, the little filvery ark; arca nucleus of Linnæus, with its analogous fpecies, is excluded. To comprehend the latter, a new genus is recently eftablifhed by the French writers under the name of nucule, or nucula, the character of which is remarkably decifive: it is defcribed as a triangular or oblong fhell, with the fides unequal; the hinge confifting of an angulated, or broken line befet with numerous teeth, which are tranfverfe and parallel, and a fingle oblique tooth placed under the beak, and out of the range of parallel teeth before mentioned. The beaks alfo, inftead of being remote, as in arca noæ, are placed clofe together, and turn backwards.

Ostrea. Animal a tethys. Shell bivalve, generally with unequal valves, and flightly eared; hinge without teeth, furnifhed with an ovate hollow, and moftly lateral, tranfverfe furrows. "Vulva anufque nullus," Linn.

Thefe are divided into three families, * valves radiated and eared, as in the fcallops, ** rugged, or rough, as in the oyfter, *** hinge with a perpendicular furrowed line, as in the fpecies perna and ifognomum. The fcallops are again fubdivided into three fections, namely, thofe with the valves equilateral, and the ears equal; thofe with the ears unequal, and having one of them generally ciliated with fpines within; and thofe with the valves gibbous on one fide. The two other families are not fubdivided.

The difference between the oyfter and the pecten tribe is fo obvioufly impreffed by the hand of nature on the refpective fhells which compofe them, that few writers on this fubject have paffed filently over the impropriety of placing them together. If, however, we examine a number of the other fhells included by Linnæus in the extenfive genus oftrea, many will be found, which though lefs diffimilar at the firft view, equally deferving of being confidered generically diftinct, as well as the two tribes before-mentioned. The form of the fhell is fufficient to guide us in an arrangement profeffedly of fhells; but when the peculiar ftructure of the animal confirms the propriety of conftituting new genera, no doubt can remain that fuch amendment was requifite. With refpect to the oftrea, the animals of feveral of its natural families are unknown; fome of the oyfter and pecten tribe are, on the contrary, well afcertained, and thefe are proved to be very diftinct.

As Linnæus confiders thefe animals the fame, and defcribes them as a tethys, it may not be improper to fpeak more fully on this fubject. The fcallop differs from the oyfter in being endowed with a higher locomotive power: the animal is different in having the branchiæ cirrhated, or fringed; in being furnifhed with a kind of foot, which it protrudes from the fhell near the auricle of the hinge; and in throwing out a byffus like the pinna and the mufcle, by which it affixes itfelf to other bodies. Ariftotle, and other ancient writers, attribute to the fcallop the power of fpringing from place to place, a fact pretty correctly afcertained by the obfervations of the moderns. Argenville defcribes the procefs of its movements both in the water and out; he relates, that when left dry, by a fudden and violent clofing of its valves, affifted by the foot, it has the power of fpringing four or five inches at a jerk, repeating this motion in order to regain its element. In the water, it is afferted by this writer, the fcallop has the power of rifing and fuftaining itfelf near the furface, turning about in various directions, and on any alarm fuddenly clofing the valves and finking to the bottom. The oyfter has the branchiæ fimple, and not fringed, and is unfurnifhed either with a foot, or with byffus; and its powers of motion confift in turning either the flat or convex fide upwards or downwards, and even to effect this, the animal takes advantage of the force of the ebbing or flowing of the water to affift it. Vide Dr. Pultney's Cat.—Lifter on Scallop, in Phil. Tranf. &c.

Before the time of Linnæus, moft writers confidered the fcallops and oyfters as diftinct. Gualtieri defcribes the fcallops as a particular family, and divides them into two genera, or thofe with equal, and thofe with unequal valves; the firft of which he calls *pecten*, the latter *concha pectinata*; and the fcallops with unequal or fingle ears, he calls *pectunculi*. The oftrea is ranked as a diftinct family by moft authors. Da Cofta obferves that the "head or effential character of the efcallop family is a trigonal finus, and an elaftic cartilage for its hinge in the very centre of the top of the fhell." "The oyfters have unequal valves, though there are fome fpecies that have equal valves, but none are eared. The hinge of this family has not any teeth, but confifts of one large inarticulate gutter, running the length of the top of the fhell, in both fhells alike, and is covered and filled with a ftrong cartilage." We fhould add, that in the

the scheme of shells proposed by this writer, the spondylus forms an intermediate genus between the pecten and oyster.

In Lamarck's arrangement, the two genera, *huître*, ostrea, and *peigne*, pecten, are retained; but four other genera are constituted, under the names of *malleus*, *perna*, *lima*, and *pedum*. into which the Linnæan ostreæ are distributed. Latreille forms another genus under the name of *gryphus*, the ostrea gryphus of Linnæus, a shell found only in a fossil state. We are not exclusively indebted, however, to Latreille for the establishment of this genus. Vide "Donov. Tour South Wales and Monmouthshire;" in which the course of an immense stratum of these antediluvian shells is particularly described, with remarks on the genus ostrea and gryphus.

Anomia. Animal, a ciliated strap-shaped body, with bristles or fringe affixed to the upper valve; arms two, linear, longer than the body, connivent, projecting, alternate on the valve, and ciliated each side, the fringe affixed to each valve. Shell inequivalve, one of the valves flattish; the other gibbous at the base with the beak produced, and generally curved over the hinge; one of the valves often perforated near the base; hinge with a linear prominent cicatrix, and a lateral tooth placed within, but in the flat valve on the very margin. Two bony rays for the base of the animal.

Many of the Linnæan species of anomia are found in a fossil state only, and rarely afford an opportunity of inspecting their internal structure; neither is it reasonable to imagine we shall ever become acquainted with the animals by which they were inhabited. Our observations on these points must be confined to the recent kinds only, which, so far as they have been attentively examined, are found to comprehend shells extremely dissimilar in structure, and to be inhabited by animals differing in many essential particulars. It is remarked by Dr. Pultney, that the animal of the anomia is different from that of any other shell-fish, and is not reducible to any of those in a mollusceous state hitherto known. Hence, probably, the name Linnæus imposed upon it, Ανόμια, "quasi irregularis dissimilis à lege discrepans." The animal of the anomia cepa is figured by Murray, in his "Fundamenta Testaceologiæ," t. 2. f. 23; and that of another species, by Forskål, in his "Icones Animalium," t. 6.40. B. under the name of anomia tridentata. The dissimilarity of these two renders it highly probable, that in the different shells which come under the appellation of this genus, the inhabitant animal is various. Linnæus describes that of the anomia patelliformis as extending from its body a tongue-like process fringed with fine hairs, and furnished with two extensive ciliated arms, by which it is enabled to open and shut the shell. In the anomia tridentata, the animal is furnished with two flat, wedge-shaped, trilobated arms, placed opposite to each other; these it protrudes out of the shell when it moves, and they are the organs by means of which it swims in the sea. Some other kinds of anomiæ are inhabited by animals which, it is supposed from the structure of the shell, cannot open the valves to stretch forth arms, but are furnished with processes of a different nature, which they protrude through the aperture or perforations at the beak; and other kinds again, instead of arms, have only a ligament passing through the perforations of the shell, by means of which it is firmly fixed to other bodies.

Columna is the first writer who speaks of shells of this kind; he describes some few of the fossil tribe (the only species known in his time) under the title of "Conchæ rariores anomiæ." Hence the term anomia was afterwards employed by other writers, and has since become the universal name for this family of shells. Lister figures several species of the fossil kinds in his "Appendix de Conchitis" to his "Historia Conchyliorum". Woodward forms an arrangement of them under the name of anomia, ranking them with the shells of unequal valves, not eared, both valves convex, and one of them beaked, and these he divides into three families, the smooth, striated, and sulcated. Gualtieri figures some few of the recent kinds as a new genus under the title of terebratula. Argenville places some of the anomiæ among his heart cockles. Davila treats them as a genus of his oysters; Da Costa as a genus of bivalves with unequal earless valves, the beak of the largest or under valve greatly produced, and rising or curving over the beak of the smaller or upper valve, which is pierced through like a tube: the hinge is in articulation toothless, and they have always a remarkable interior structure. These are the terebratulæ of some late writers, and comprehend only part of the Linnæan anomiæ.

Those shells of the recent kinds among the anomiæ of Linnæus, which are most dissimilar in structure, are the species terebratula, placenta, and ephippium; each of which stands at the head of a natural family, and offers characters which may be adopted with facility as distinctions of so many genera. We are persuaded the genera formed by the subdivision of the Linnæan anomiæ might be extended with much propriety to a greater number still, but we are unwilling to increase them without the most absolute necessity. With respect to the fossil kinds of Linnæan anomiæ, some may be referred to the genera above mentioned, others are in no manner applicable to them, and for the arrangement of such it is requisite to form new genera. Lamarck proposes one, calceola, derived from the characters of the anomia sandalium of Linnæus, and his genus crania formed of the Linnæan anomia craniolaris may be considered as in a great measure appertaining to the fossil shells only. These genera are laid down with perspicuity, but Lamarck we are persuaded might have proceeded further. We consider Linnæus oftentimes blameable for intermixing the recent and fossil shells promiscuously together, and may be therefore ourselves excused sometimes at least for abstaining from his example. Lamarck thinks differently; he approves this method, and having ventured from the boundaries of the present into the labyrinths of the antediluvian creation, much was expected; a greater number of new genera might have been established, those at present formed being altogether inadequate to the reception of those numerous remains of the testacea which are admitted among the anomiæ by the Linnæan conchologist.

But to return to the recent anomiæ.—What, we would inquire, could possibly induce Linnæus to place that singular bivalve, called from its transparency by the English collector "the Chinese glass window" among the anomiæ?—Or what again can be more remote than the essential character of his anomia ephippium and terebratula?—In the first, which is to be found in his Systema under the name of anomia placenta, both valves are of an equal size and form; in ephippium the valves are unequal, one being flat, and the other convex, as in the oyster; in ephippium the flat valve is perforated with a round hole in the disk near the hinge through which a ligament passes, and by this means affixed it to stones and other bodies; the A. placenta has no such perforation. In A. terebratula there is a perforation; but instead of being situated in the flatter valve it appears at the tip of the long beak into which the head of the convex valve is elongated. Near the hinge in one valve of A. placenta are two longitudinal lamelli-

lamelliform proceſſes, which approach near the beaks, and thence diverge obliquely ſo as to reſemble the letter V, and upon the valve oppoſite two correſponding proceſſes longitudinally cleft, in which, when the ſhell is cloſed, two lamelliform teeth repoſe. An internal ſtructure of longitudinal proceſſes occurs in the ſpecies terebratula, but very different from the preceding, and no ſuch internal ſtructure occurs in the anomia ephippium. Theſe characters denote ſufficiently that they are not only eſſentially different in the conformation of their ſhell, but that they are inhabited by animals diſtinct from each other.

Mytilus. Animal an aſcidia? Shell bivalve, rough, uſually affixed by a beard or byſſus of ſilky filaments: hinge in general without teeth, and except in a few ſpecies with a ſubulate excavated, longitudinal line. Linn.

The Linnæan mytili are by no means inconſiderable in number, and as they comprehend many ſhells very diſtinct in appearance, and ſome eſſential particulars, are neceſſarily diſtributed into ſeveral ſections, or families, ſuch as * paraſitici, thoſe affixed by claws, exemplified in mytilus criſta galli; ** plani, &c, flat, or compreſſed into a flattened form, and ſlightly eared, as in mytilus margaritiferus; or *** ventricoſculi, ventricoſe, as in mytilus edulis. The older writers appear to be perfectly agreed as to the mytilus genus, but the moderns think it neceſſary to divide them into two or more genera. Lamarck ſeparates them into mytilus (moule), modiolus (modiole), and anodonta (anodonte). In defining the mytili he notices in particular the unguiculated, or claw-like termination of the ſhell at the narroweſt end as a peculiar character. We do not perceive the abſolute utility of his ſecond genus, modiole, though we think it admiſſible. but we perfectly agree in the adoption of the latter anodonta. This laſt mentioned genus conſiſts of what are vulgarly called the river, or freſh water muſcles, ſhells which we have always conceived it improper to refer to the ſame genus as the marine mytili. In the colour of the valves, and form and ſituation of the beaks, the moſt obvious diſſimilitude prevails, and a diſtinction ſtill more evident reſulting from the different conformation of the animal occurs in the inſide of the ſhell, which exhibits three impreſſions of muſcles or ligaments by means of which the animal is attached to the ſhells, while the ſhells of the common muſcle, and its congeneres, have only one ſuch impreſſion.

Pinna. Animal limax. Shell ſub-bivalve, fragile, erect, gaping, and furniſhed with a byſſus, or beard; hinge without teeth, the valves uniting into one. Linn.

This genus is well defined; the ſhells of which it conſiſts are wedge-ſhaped, or of a ſomewhat triangular form, widening from a pointed or narrow top to a very broad end. The hinge is inarticulate, the two valves being united in that by part, and thus forming, what Linnæus truly terms it, a ſub-bivalve, for it is not ſtrictly of two valves, being thus connected. The pinnæ are known by different writers under the various appellations of ſea-hams, ſea-wings, and pinnæ marinæ, or by others ſilk-worms of the ſea, which laſt they obtain from the quantity of fine ſtrong brown byſſus, which the animals produce, and by means of which they affix themſelves to the rocks; the byſſus conſiſts of fine ſilky fibres of a brown colour, and which is eaſily woven into ſtuff or ſmall articles of dreſs. Among the ancient Romans this kind of ſilk was held in conſiderable eſteem: it is even ſaid that there are ſtill manufactories of it at Naples, Meſſina, and Palermo.

Eighteen ſpecies of this genus are deſcribed in the laſt edition of the Syſtema Naturæ.

Argonauta. Animal ſepia, or clio. Shell univalve, ſpiral, involute, membranaceous, and unilocular, or conſiſting of a ſingle cell. Linn.

The principal ſpecies in this genus of ſhells is the Linnæan argonauta argo, the celebrated nautilus of Pliny, lib. ix. 29, the animal ſuppoſed to have taught men the uſe of ſails, and art of navigation in the early ages of ſociety. The ancients knew this ſpecies by the name of nautilus, as appears ſufficiently obvious from many paſſages to be found in their writings. Linnæus, however, in conformity with Rumpfius, applies the name of nautilus to a chambered ſhell of a very different kind, (ſee Nautilus), and retains the nautili of the ancients, under the title of argonauta, with the eſſential character above-mentioned.

In the Gmelinian edition of the Syſtema Naturæ, the number of ſpecies deſcribed under the genus argonauta amount to five, argo, vitreus, cymbium, cornu, and arctica. But the minute obſerver of nature diſpoſed to deſcend to the inveſtigation of the microſcopic kinds of ſhells will be able to add conſiderably to this number; a work publiſhed in Germany in 1798, the united labours of our friend L. A. Fichtell, and C. A. Moll, and entitled "Teſtacea Microſpica aliaque minuta ex generibus Argonauta et Nautilus ad naturam picta et deſcripta," contains in particular, a number of new ſpecies in this curious genus, and a few others are known to us which we have reaſon to apprehend have not been noticed by any other writers. By the acceſſion of theſe latter ſpecies the genus becomes materially enlarged; but we have, at the ſame time, to obſerve that the whole of the Gmelinian ſhells, deſcribed under this generic title, are not ſtrictly admiſſible among the argonautæ, and that the removal of theſe will occaſion a ſlight reduction of the ſpecies already mentioned.

That very rare ſhell known among collectors by the name of glaſſy nautilus, the argonauta vitreus of Gmelin, is ſeparated by Lamarck from argonautæ, and conſtituted a new genus under the name of carinaria. In the Linnæan ſyſtem it would be difficult to refer it with certainty to any genus. Linnæus was himſelf in doubt where to place it, and at length referred it to the limpet tribe, under the name of patella criſtata, but it cannot ſurely belong to this genus. In the laſt edition of the Syſtema Naturæ, we ſee it tranſpoſed from thence to the argonautæ with more propriety, but we are ſtill perſuaded it cannot claim a place in this genus, though it is more cloſely allied to it than any other of the Linnæan genera; it is certainly of a new genus as Lamarck deſcribes it. The principal diſtinction between thoſe two genera, the argonauta and carinaria, is very ſtriking; in the true argonauta, (or nautilus of the ancients) the ſpiral involution turns into the opening of the ſhell, whereas in carinaria, the ſpire is ſituated at the ſummit of the ſhell and the mouth is entire. This character we think alone ſufficiently deciſive in defining the eſſential characters of the two genera. The carinaria is further diſtinguiſhed by the ſhell being conic, and flattened at the ſides, the ſpiral whorl very ſmall, the back furniſhed with a ſingle denticulated keel, and the mouth, or aperture of the ſhell, of an oval-oblong form, narrower neareſt the angle of the keel. The argonauta ſhell, inſtead of being conic, is ſomewhat boat-ſhaped, and has from this very circumſtance been named cymbium, both by Gualtieri and Teſſin; and the dorſal carination which is ſingle and denticulated in carinaria, is uniformly double and tuberculated in argonauta.

In concluſion of our remarks on this genus, it will be proper to obſerve that the glaſſy nautilus, or carinaria vitrea, is one of the moſt choice and uncommon of the teſtaceous tribe; it

it is not, however, unique, for we know of three fpecimens, one of which is in the cabinet of Mr. Jennings in England, and the two others in the Mufeum of Natural Hiftory in Paris, one of which was obtained from Lyonet's cabinet. A large foffil fhell of the argonauta genus, a fingular fpecies, and the only one we are acquainted with, occurs in the London Mufeum.

Nautilus. Shell univalve, divided into feveral departments, communicating with each other by an aperture or fiphunculus.

The Linnæan nautili confift of two principal families, thofe which are fpiral and rounded, and fuch as are elongated and ftraight. Of the fpiral kinds there are two diftinct fections, the firft of which have the whorls contiguous, the other the whorls feparated; the nautili of a ftraight form are comprehended in one fection only.

Under the general title of nautilus, Linnæus includes the three genera of modern naturalifts, nautilus, fpirula, and orthocera, with fome others which may hereafter, on accurate inveftigation, be found generically diftinct likewife. The nautilus is a fpiral rounded fhell, having the laft whorl very large, and enveloping the others, which are numerous, and divided internally into many chambers by tranfverfe partitions, the difk of which is perforated by a fiphunculus or tube. This character is drawn from the nautilus pompilius of Linnæus, a fhell admitted by the lateft authorities as an amplification of the nautilus genus; of the modern fchool only we would obferve, for it has been previoufly fhewn, under the genus argonauta, that it is not the nautilus of the ancients. The character of the new genus fpirula, is derived from the nautilus fpirula of Linnæus, (erroneoufly rendered fpicula in Gmel. Syft.) or what we call the ram's horn. This fhell is truly of the lituus or crozier family, being of a fpiral ftructure with the whorls feparated, and the laft chamber at the aperture elongated into a ftraight cylindrical ftem. Linnæus defcribes only the fpiral termination of the fhell, which being of a concamerated or chambered ftructure, and perforated with a fiphunculus; induced that naturalift to place it with the nautili, notwithftanding the ftriking diffimilarity of the difpofition of the fpiral involutions. This fhell, when perfect, affords an effential character which at once removes it from the genus nautilus, in which Linnæus places it; namely the laft or cylindrical chamber, which is alone fufficient to diftinguifh it. We may eafily prefume that no blame attaches to Linnæus in this particular refpect, for it is pretty certain that naturalift never faw the perfect fhell. In collections we have at various times feen fome thoufands of the fpiral terminations, (for it is a very common Weft Indian fhell,) fcarcely one of which has retained the flighteft veftige of this chamber, though all appear rudely broken, and different from a natural termination or aperture. This chamber of the fhell is extremely thin and brittle, infomuch that the flighteft agitation of the waves will deftroy it, and as thofe fhells inhabit the deep waters, and are collected by the curious only from the *rejectamenta* of the fea caft upon the beach in ftorms, it is natural to conclude that it is rarely feen complete. It was not till of late years that the true form of the perfect fhell appears to have been afcertained The orthocera is the orthoceros of Gualtieri and Breynius revived. This fhell is ftraight or arched, and a little conic, with diftinct chambers formed by tranfverfe fimple divifions perforated by a tube, which is fometimes placed centrally and fometimes laterally. We are of opinion this amendment would be improved by forming two genera of the orthocera, one containing the ftraight and the other the arcuated kinds; and indeed we conceive ftill further that thofe, with the fiphunculus placed on one fide, fhould form a diftinct genus from thofe having the fiphunculus in the centre. The Linnæan character of the nautilus confounds all thefe diftinctions; they are all nautili of that writer.

Among the teftaceological remains of the antediluvian world, are many fingular fpiral fhells, allied to, or of the fame genera with the foregoing, and others which, though fpiral and concamerated, cannot poffibly be reduced to thefe tribes; fuch as the ammonites, the orbulites of Lamarck, hélicite of Guettard, baculites of Faujas, and the belemnites, or "thunder-bolts," of moft authors. See article Fossils.

Conus. Animal a limax. Shell univalve, convoluted, and turbinated; aperture or opening effufe, longitudinal, linear, toothlefs, with the bafe entire; pillar fmooth.

This genus is divided into five diftinct families. * Truncati, having the fpire nearly truncated. ** Pyriformes, with the bafe rotundate and fub-cylindrical; the cylinder half as long again as the fpire. *** Elongati, with the bafe rotundate, cylinder twice the length of the fpire. **** Ventricofe in the middle, and narrow at each end. ***** Ventricofe; emits a tinkling found, when thrown on its back upon a board or table. The total number of fpecies included in this genus, in the laft edition of the Syftema Naturæ, amounts to feventy-one. Many of the conus, or cone tribe, are beautiful fhells, and bear a high price on account of their rarity; the cedo nulli of Lyonet, valued at one hundred guineas, is of this genus. We have no fpecies of this genus upon the Englifh coafts. Some very curious kinds have been difcovered in a foffil ftate in England, chiefly in the chalk cliffs of Hampfhire.

Cypræa. Animal a limax. Shell univalve, involuted, fubovate, obtufe, and fmooth; aperture effufe at each end, linear, dentated at both fides and longitudinal.

Linnæus forms feveral diftinct families of the cypræa genus, one of which is diftinguifhed by being obtufe, and without any manifeft fpire; fuch, for example, as the fpecies caput ferpentinus and tigris, the laft of which is well known by the name of tiger cowry; another kind is perforated, or furnifhed with an umbilicus, as in cypræa ziczac; and a third fort is margined like the common Weft India cowry, vulgarly called "blackmoor's teeth," cypræa moneta of Linnæus. In the young ftate, the cyprææ have much the appearance of a volute, and are entirely deftitute of the thick denticulated lip or margin, fo obvious in the adult fhells. Writers have been even fo far mifled by this fpecious appearance, as to defcribe the young of feveral kinds for fhells of the volute genus. The voluta jonenfis of Pennant's Britifh Zoology, is clearly nothing more than the young of the common Englifh cowry, cypræa pediculus, which that writer miftakes for a perfect fhell.

Bulla. Animal a limax. Shell univalve, convoluted, and unarmed with teeth; aperture fomewhat ftraightened, oblong, longitudinal, and very entire at the bafe; pillar lip oblique and fmooth.

The arrangement of the bulla family is very confufed in the works of the old writers. Lifter makes them a genus of the cowry, and calls it concha veneris bafi umbilicatâ. Grew and Bonanni place it with the fnails; Argenville and Davila with the cochleæ globofæ; and Gualtieri as a genus between the paper nautili (argonauta) and the cowries. The term bulla implying the bubble-like form, or fwollen appearance of the fhell, was applied by Rumpfius to the bulla ampulla, from whom it was adopted by Klein, and afterwards by Linnæus as a generic appellation. The fhells

included

included by this laſt-mentioned writer under the name of bulla, are more than commonly anomalous in habit and form; few inſtances can be adduced of greater diſſimilarity than is obſervable between the bulla ovum, ficus, terebellum, and virginea. The ſpecies ovum has the habit of a cowry, the ficus that of a murex, the terebellum that of a cone, or a buccinum, and the virginea of a turbinated helix. The bulla achatina and the bulla cylindrica likewiſe offer characteriſtic differences, which may, without any impropriety, conſtitute generical diſtinctions.

According to Linnæus, the animal of the bulla is a limax; but if it be ſuch, as Dr. Pultney obſerves, in any particular ſpecies examined by that author, it does not hold throughout the whole genus; nor even in thoſe which were primarily and eminently diſtinguiſhed by the name of bulla. In ſome ſpecies the animal appears more to reſemble an aſcidia. The animal of bulla aperta forms a new genus in Lamarck's arrangement, under the title of bullæa. The animal of bulla lignaria is furniſhed with maſticatory organs, conſiſting of three teſtaceous bodies placed within the ſtomach or gizzard, by the help of which it is enabled to break ſmall ſhells and hard ſubſtances. This inſtrument was firſt diſcovered by Plancus in the bulla aperta, in which we have ourſelves obſerved it. An account of that in the gizzard of the bulla lignaria, by Mr. G. Humphreys, is inſerted in the Linnæan Tranſactions. Theſe latter mentioned teſtaceous bodies were firſt introduced among conchologiſts as a new genus of ſhells by M. Gioeni, a Sicilian naturaliſt, after whom it was named gioenia, by Bruguiere. Retzius alſo deſcribes it, but under the name of tricia. An account of the diſcovery of this important error, was publiſhed by Draparnaud, in the Bulletin des Sciences, n. 39.

Voluta. Animal a limax. Shell ſingle-celled and ſpiral; aperture without a beak, ſomewhat effuſe; pillar folded or plaited, and generally without lips or perforations.

This extenſive genus is diſperſed by Linnæus into the following principal families. * Aperture or opening entire. ** Somewhat cylindrical and emarginate. *** Obovate, effuſe, and emarginate. **** Fuſiform. ***** Ventricoſe; ſpire papillary at the tip. The whole includes one hundred and forty-two ſpecies.

Linnæus has deſervedly incurred ſome blame for having too often tranſpoſed long eſtabliſhed names from objects to which they were before aſſigned, and impoſed them on others without any apparent or ſufficient reaſon, which were never underſtood among his predeceſſors by thoſe terms. An inſtance of this kind of innovation occurs to us at preſent. The term voluta, derived "a volvendo forte revolutione ſpirali," was always applied to the cone tribe, and is very expreſſive of the peculiar rolled, or involuted ſtructure of thoſe ſhells; Linnæus deprived them of that name, called them conus, and gave the title of voluta to the ſhells of which we are about to treat. The voluta genus, furthermore, as now laid down, is highly objectionable. Linnæus, in the eſtabliſhment of this new genus, has been leſs attentive to the natural families of ſhells than could have been wiſhed, and has, by that means, brought promiſcuouſly together ſhells which ſcarcely agree in any one individual reſpect, except in having plaits or folds upon the pillar.

This error does not reſt, however, entirely with Linnæus, for he was not the original projector of the genus; he only adopted it, and gave it the name it now bears, when he might with more propriety have expunged it, or diſperſed the ſhells contained into other genera. In Liſter's work, ſection 11. lib. 4, we find a claſs of ſhells entitled, "buccina columella dentata," in which that author arranges the buccina and other ſhells which have the pillar plaited. Linnæus, by the adoption of this genus, under the title of voluta, comprehends a number of ſhells poſſeſſing very diſtinct generic characters, and which had been diſtinguiſhed by his predeceſſors under the various names of oliva, rhombus, cylindricus, turricula, mitra, muſica, and others applicable either to their figure, or to the eſſential characteriſtics of their reſpective natural families. It is a ſingular corroboration of the accuracy of the ideas entertained by thoſe writers, that the animals inhabiting the ſhells above-mentioned, have been recently aſcertained to be as diſſimilar in ſtructure as the ſhells. Linnæus conſidered the animal of all the volutes as a limax or ſlug; but from the inveſtigation of Adanſon and Argenville, and ſince the time of Müller, Poli, Lamarck, and many others, it appears that no opinion was ever more unfounded; the animal of each family being differently formed, and adapted to the peculiar ſhape or ſtructure of the ſhell.

Da Coſta, in his "Elements of Conchology," aboliſhes the Linnæan voluta genus altogether, but the ſhells are not reſtored according to his method to their proper or natural families; his definitions want preciſion, and his ſcheme is confuſed and uncouth. But notwithſtanding, the ſcheme of claſſification laid down by Da Coſta was never acceded to by conchologiſts, and certainly never will now; from the circumſtance of its being the only elementary work in the Engliſh language (Barbut's Gen. Verm. excepted) it has anſwered one uſeful purpoſe, that of directing the general collector to diſpoſe their ſhells into particular families, in a more comprehenſive manner than could have been accompliſhed by attending to the Linnæan arrangement. Thus, in the Linnæan volutæ, the families are diſtinguiſhed by the title of papal crowns, Perſian crowns, melons, olives, midas's ears, mitres, muſics, and other trivial appellations, by which they are known even to this day among Engliſh collectors. As Da Coſta derived his principal diſtinctions of theſe families from writers who flouriſhed before Linnæus, ſo alſo it has happened with the French conchologiſts: they diſapprove of the Linnæan arrangement, but retain moſt of the original families deſcribed by thoſe earlier writers, and thus we ſee at the preſent time the genera olive, turbinelle, mitre, harpe, &c. recaſt and adopted with ſome improvements, by the beſt informed conchologiſts of that country.

Buccinum. Animal a limax. Shell univalve, ſpiral, gibbous; aperture ovate, terminating in a ſhort canal, leaning to the right, with a retuſe beak, or tip; inner lip expanded.

The buccina are ſeparated into ſections, in the following order: * ampullacea, &c. inflated, rounded, thin, and ſubdiaphanous, and brittle. ** Caſſidea, caudata, &c.; tail ſhort, exſerted, and reflected; lip unarmed outwardly. *** Caſſidea, unguiculata, &c. lip aculeated on the outſide of the poſterior part, otherwiſe reſembling the laſt diviſion. **** Calloſa, &c. pillar lip dilated and thickened. ***** Detrita, &c. pillar lip appearing as if worn flat. ****** Laevigata, &c. ſmooth, not enumerated in the former diviſions.

Linnæus has occaſioned ſtrange confuſion in his claſſification of the ſhells which he denominated buccinum: in the indefinite latitude which his character of this genus admits, he embraces ſhells very little, if at all, allied to each other, in any other reſpect than according with his character. Thus the cochleæ globoſæ of Rumphius and Argenville, the cochleæ pyriformes of Gualtieri, and other diſtinct natural families of writers, prior, as well as ſubſequent, are confounded altogether in this moſt copious genus. It is not ſufficient that theſe be kept apart by being referred to different families, they ſhould certainly conſtitute diſtinct genera,

nera. The French have long diftinguifhed thefe different fhells, by the appellations on tonne, cafque, harpe, pourpre, &c.; the Englifh collector will better conceive, perhaps, what is meant by the trivial diftinctions of tuns, partridges, harps, and whelks. In Lamarck's arrangement, they affume a more claffic form, and are defined generically, under the title of dolium, harpa, caffis, terebra, purpura, buccinum, and naffa, as will be more accurately explained hereafter.

Strombus. Animal a limax. Shell univalve and fpiral; lip of the aperture often much dilated, and produced into a groove leaning to the left.

Previous to the time of Linnæus, the term ftrombi was applied to fhells of a different defcription from thofe at prefent underftood by that name. Under the title of ftrombi, the Greeks originally defignated all kinds of turbinated fhells. Among the older writers, the term ftrombi was indifcriminately employed as fynonymous with turbo, trochus, and fometimes with murex. Strombi was then a term indefinite, but rather applicable to the flender kinds, murices, or rhombi.

Linnæus was the firft who limited the application of the word ftrombus to thofe univalve fhells, which have the canule or gutter directed to the left, and the lip expanded. He was not, however, the firft to eftablifh the genus. Lifter defcribes the fhells of this family which have the lip entire, under the title of purpuræ feu buccina bilinguia, and claffes them in the twelfth fection of his fourth book. Rumphius, and after him Meufchen, make a diftinct genus of them, under the title of alatæ, and by this name alatus, they are pretty generally known to this day, it being well known that Solander intended to have eftablifhed fuch a genus under this name. Davila ranks thefe winged alatæ among his murices, but independently, and as a diftinct genus, confifting of fimple or entire winged fhells; placing immediately after them another genus, comprehending thofe which have the expanded lip digitated, or elongated into pronglike proceffes. Linnæus rejects this arrangement of Davila, including in his genus ftrombus, the whole of thofe winged or alated fhells; not in a promifcuous manner, but in fections or families, as * Digitati, labio in lacinias lineares excunte. ** Lobati. *** Ampliati. The French writers to this time, on the contrary, follow the example of Davila, and form two diftinct genera of thefe fhells under the title of ftrombus, and pterocera, and to thefe another has been lately added after our countryman Lifter, under the name of roftellaria.

On this arrangement, the genus ftrombus is defcribed as being a ventricofe fhell, terminated at the bafe by a fhort canal, floping off or truncated: the right margin or lip dilating or expanding with age into a fimple or entire wing-like lobe, and having a finus beneath, diftinct from the flope of the bafe, or in the Linnæan language, the beak. This genus is fufficiently explained by the fhell called among Englifh collectors the "pugilift's fift," ftrombus pugilis of Linnæus. The genus pterocera, has the fhell ventricofe, terminated below by a long canal; the right margin, or lip expanding with age into a digitated wing, and having a finus near the bafe. The Linnæan ftrombus lambis is of this genus. The generic character of roftellaria is drawn from the ftrombus fufus of Linnæus, defcribed by Lifter, t. 854. f. 11.; and Martini, t. 159, f. 1500. The fhell is fufiform, terminated beneath in a canal, ending in a fubulated or pointed beak; right margin entire or dentated more or lefs dilated into a wing-like procefs with age, and having a finus contiguous to the canal or gutter.

We may laftly add, that the young fhells of the ftrombus genus do not poffefs the ftriking peculiarity of the ample dilated lip before-mentioned, and that in confequence, fuch fhells have been fometimes referred to very different genera, an error committed by fome of the beft among the early writers.

Murex. Animal a limax. Shell inequivalve, fpiral, rough, with membranaceous futures; aperture ending in an entire canal; either ftraight, or fomewhat afcending.

The Linnæan genus murex is very extenfive; in the laft edition of the Syftema Naturæ a hundred and fixty three fpecies are defcribed under the following fections. * Spinofi, fpinous, with the tail (or beak) produced. ** Frondofi, futures expanding into crifped foliations; tail (or beak) abbreviated (vulgarly called purpura). *** Varicofi, futures rounded, protuberant, and thick. **** Ecaudati, without tail (or beak) and fomewhat fpinous. ***** Caudigeri, tail (or beak) fubulate, clofed, ftraight and elongated; unarmed with fpines. ****** Turriti, tapering, fubulate, with the tail very fhort.

The murices of the elder writers confifted for the moft part of fuch fhells of the whelk or buccina kind as exhibited any confiderable degree of afperity or ruggednefs on the exterior furface, the Latins having employed the word murex to exprefs the roughnefs of rude ftones or walls. Many of the Linnæan murices are of that kind defcribed by his predeceffors under the name of purpuræ, the animals of which are fpoken of by the ancients as being furnifhed with a tongue-like procefs, by means of which they are enabled to perforate other fhells, and derive fubfiftence from the inclofed animal. The Englifh call the murices rocks, and the French in imitation, *rocher*.

Three genera of fhells formed of the Linnæan murices by the continental writers, claim particular attention; thefe are fafciolaria, pleurotoma, and a genus, retained under the title of murex. The firft of thefe confifts of fuch fhells as like the murex tulipa of Linnæus are of a fomewhat fufiform, or fpindle fhape; fmooth or without rugofities, and having upon the pillar two or three very oblique folds or plaits. Pleurotoma is alfo of a fpindle form, with the aperture terminating below in a long gutter or canal, and has the lip cleft or cut off in a flope near the fummit. The third or murex genus is of an oval or oblong form, canaliculated at the bafe, and having the outfide of the fhell conftantly befet with prominent longitudinal ridges, and for the moft part with tuberculations, fpines, or fringes. We cannot refrain obferving that this, and perhaps fome further amendments in the Linnæan murices, were requifite to reduce them to lucid order; it will not we think admit of any doubt that the two firft genera before mentioned, ought not to be arranged in the fame genus with the murices, admitting the Linnæan character of that genus as it ftands in the Syftema Naturæ. Linnæus, it is true, included fhells of both thefe families among the murices, but furely without fufficient attention to the generic character he had himfelf propofed for the murex tribe.

Trochus. Animal a limax. Shell univalve, fpiral, and fubconic; aperture fomewhat angular, or rounded; upper fide tranfverfe and contracted; pillar placed obliquely.

The trochi Linnæus divides into three families; * umbilicati, &c.; umbilical, erect, and with the pillar perforated; as in the fpecies niloticus and perfpectivus. ** Imperforati, &c.; erect, with the umbilicus clofed; as in labio. *** Turriti, &c. turrited, with the pillar exferted; fhell falling on one fide when placed on the bafe.

This is a long eftablifhed genus of fhells, having been adopted by the principal conchological writers a confiderable

time

time before the Syſtema Naturæ of Linnæus appeared. Notwithſtanding this, we perceive no ſmall degree of difficulty ariſing in a general arrangement of ſhells from too ſtrict an adherence to this genus as the character is propoſed by Linnæus. We do not object to the trochus genus altogether; it is an excellent genus in itſelf, ſo far as relates to the greater number of the conic ſpecies, which may be readily diſtinguiſhed by their outline, but we cannot, it muſt be acknowledged, ſo eaſily reconcile our ideas to the propriety of including with theſe the turrited or tapering trochi of this writer; ſuch as, for example, in the ſpecies teleſcopium, and others in that family. Furthermore, it may be added that ſome amendment in the diſtribution of theſe ſhells is rendered the more neceſſary for the ſake of perſpicuity in the arrangement of a number of new ſpecies not ſtrictly according even with the former, and which have been diſcovered ſince the time of Linnæus.

Lamarck, and after him Latreille, conſtitute a new genus of the turrited kinds of the Linnæan trochi, under the title of pyramidella, and which they define generically, as being a turrited ſhell, with the opening entire, and ſemioval; pillar projecting, raiſed, with three tranſverſe folds, and perforated at the baſe. This genus is fully illuſtrated by the Linnæan trochus dolabratus.

The new genus pyramidella was certainly neceſſary; but beſides this, the continental naturaliſts above mentioned, have inſtituted ſome other genera from the Linnæan trochi, as ſolarium, and monodonta. The Linnæan trochus perſpectivus elucidates the character of the firſt of theſe three genera, which conſiſts in being of a depreſſed conic form, with an umbilical opening in the baſe, crenulated along the inner margin of the ſpiral volutions, and the opening or aperture almoſt quadrangular. This is the ſhell known among Engliſh collectors by the name of ſtaircaſe trochi, from a fancied reſemblance of the internal view of the umbilical opening to a well, or ſpiral ſtaircaſe. Theſe ſhells are comprehended by Linnæus in his firſt family of trochi; but we ſhould rather incline to admit them as a genus diſtinct from that tribe; the depreſſed contour of the ſhell, and ſingular ſtructure of the umbilical opening, forming an excellent generical diſtinction. The Linnæan trochus labio, and its analogous ſpecies, being of an oval or conoid ſhape, with the opening roundiſh and entire, but furniſhed with a projecting tooth, are the deſcription of ſhells of which the genus monodonta conſiſts.

Turbo. Animal a limax. Shell univalve, ſpiral, and ſolid; aperture contracted, orbicular, and entire.

The ſhells of this genus are divided into five families; * neritoidei, &c. having the pillar-margin of the aperture flat, or dilated and imperforate; ** ſolidi, ſolid and imperforate; *** ſolidi, &c. ſolid and umbilicated, or perforated; **** cancellati, cancellated; ***** turriti proprie dicti, turrited, or tapering.

The turbo genus, as it ſtands in the Linnæan Syſtema, is much too diffuſe, and comprehends ſhells ſo very remote from each other in various eſſential circumſtances, that the Linnæan ſtudent will find ſome difficulty in retaining it under its preſent form. So nearly indeed do the Linnæan turbines, and buccina approach, that the ableſt Linnæan is ſometimes unable to decide exactly to which of the two genera particular ſpecies ought to be referred. The diſſimilarity, in general appearance, is alſo very remarkable in the turbo genus. The conoid, and the tapering turbines of this writer, are altogether diſtinct, and ſhould certainly be aſſigned to different genera; and a diſſimilitude equally ſtriking prevails between thoſe which have a ſinus at the margin, and ſuch as have that part entire. In addition to theſe, we would mention the Linnæan turbines which have equidiſtant longitudinal ridges diſpoſed on the outſide of the ſhell, as in turbo ſcalaris and clathratus, as affording ſuch a very prominent diſtinction, that we cannot heſitate to conſider them as a genus of themſelves.

Helix. Animal a limax. Shell univalve, ſpiral, ſubdiaphanous, and brittle; aperture contracted, ſemilunar, or roundiſh.

This genus is divided into ſeveral families; as * ancipites, &c. angulated on both ſides, ** carinatæ, margin of the whorls acute, *** rotundatæ, whorls rounded, and umbilicated, **** rounded and imperforate, ***** turritæ, tapering, ****** ovatæ, &c. ovate and imperforate. The whole genus comprehends, according to the laſt edition of the Syſt. Nat. two hundred and fifty-two deſcribed ſpecies.

The animal of the helices ſeems to be endowed with a more perfect and lively power of motion than moſt others of the teſtacea tribe; this we have abundant opportunity of obſerving in the common land and garden ſnail which is of this genus. Before the time of Linnæus the helices were known under the more indefinite title of cochleæ, to which family the neritæ and ſeveral other natural families were alſo referred.

Late writers divide the Linnæan helices into a number of new genera, as janthina, bulimus, lymnæa, melania, planorbis, and helix. See Latreille, Olivier, &c.

Nerita. Animal a limax. Shell univalve, ſpiral, gibbous, flattiſh at bottom; aperture ſemi-orbicular, or ſemilunar; pillar lip tranſverſely truncated and flattiſh.

The Linnæan neritæ are divided into three families, * umbilicate, ** imperforate, with the lips toothleſs, *** imperforate, with the lips. No leſs than ſeventy-two ſpecies are deſcribed in the Syſtema Naturæ under theſe three families.

The nerita genus of Lamarck, Latreille, and other late writers, conſiſts of thoſe Linnæan ſpecies, which are ſemigloboſe, flattened at the baſe, and not umbilicated; with the opening entire and ſemi-circular; and the pillar ſomewhat tranſverſe, truncated, and often denticulated. Nerita exuvia of Linnæus is of this kind. The genus natica (natice) of thoſe writers, comprehend the umbilicated neritæ, ſuch as the ſpecies canrena, and its analogous kinds. The naticæ are ſubgloboſe, umbilicated, with the left margin callous near the umbilicus: mouth or opening of the ſhell entire; pillar oblique, and not denticulate.

Haliotis. Animal limax. Shell ear-ſhaped, dilated, ſpire lateral, and nearly concealed, and a longitudinal row of orifices along the diſk or ſurface.

Few ſpecies of this genus were known to Linnæus, and in the reference of theſe, he was peculiarly attentive to the characteriſtic longitudinal ſeries of orifices ſo conſpicuous in this genus. It was for this reaſon he referred the helix haliotoidea to the helices, rather than the haliotis tribe; the ſhell being deſtitute of this ſtriking character, though, in every other reſpect, it appertains more ſtrictly to this haliotis than the helix genus. After this we cannot think Gmelin adviſeable for having admitted the imperforate ſhells, his haliotis imperforata and perverſa, into this genus. It would have been perhaps better, even in that ſyſtem, to have conſtituted a new family for their reception; he conceived the introduction of a new genus an innovation. Chemnitz indeed calls the firſt of theſe an haliotis, but its impropriety is not leſſened by that circumſtance.

One of the imperforate kinds, the haliotis imperforata of Gmelin, was previouſly deſcribed by Heblins, under the new generic title of ſtomatia, a genus adopted ſince by Lamarck,

marck, Latreille, and various other writers, and which we cannot hesitate to admit as highly neceffary. The diftinctions between thefe two genera are fufficiently charaċteriftic. Stomatia has the fhell of an oval form, and ear-fhaped, with the fpire prominent; the aperture ample, entire, and longer than its breadth; difk imperforate, or without orifices. Haliotis fhell flat, ear-fhaped, with the fpire very low, and almoft lateral; aperture very ample, and longer than its breadth, and entire; and the difk pierced with orifices difpofed in a line parallel with the left margin.

Lifter, in his "Hiftoria Conchyliorum," places the haliotis, or fea-ear tribe, among the turbinated fhells, between the nerita and trochus; the fame mode of arrangement is obferved in his work "De Animalibus Angliæ," where he fays it is fpiral at the claricle, in the fame manner as other turbinated fhells, and is therefore placed erroneoufly by fome among the fimple fhells. Gualtieri ranks them among fnails with depreffed or flattened fpires; Adanfon, in the firft family of fpiral fhells; Da Cofta immediately after the patellæ, his firft genus of fimple fhells, and Lamarck between the teftacelle, which follows the helices and neritæ, and the vermiculaire or ferpula.

Some writers admit it as a collateral character of the haliotis, that the infide is always of the fineft pearl, and pearls are oftentimes produced in thefe fhells. The perforations vary in number in different fpecies. It has been obferved, that the animal always clofes one of thofe holes towards the fpire, whenever he opens another towards the head as he grows bigger, and by that means that the number of openings are invariably the fame in different individuals of the fame fpecies. Shells of this genus are very rarely difcovered foffil; we much queftion if any of thofe defcribed by writers are truly of this genus.

Patella. Animal a limax. Shell univalve, fub-conic, and without fpire. Linn.

Thefe are the limpets, and are fo named from their refemblance to a little plate, or patella, and are more or lefs conic without, and concave within. Some have the apex or top entire; others perforated: the chambered limpets are diftinguifhed by a peculiar kind of projecting procefs, or lip within; moft have the margins entire, but fome have an indent or fiffure in that part; and again others are fo completely fpiral or wreathed in their exterior appearance that they refemble rather the trochi, or top fhells, than the limpet. Linnæus, in order to comprife fhells fo very diffimilar in appearance under one genus, found it neceffary to conftitute no lefs than five diftinct fections or families for their reception. Thefe he arranges in the following order.

* Labiatæ, &c. furnifhed with an internal lip; fhell entire.

** Dentatæ, &c. with the margin angulated, and toothed.

*** Mucronatæ, &c. with the pointed tip recurved.

**** Integerrimæ, &c. very entire, and not pointed at the tip.

***** Perforatæ, &c. with the crown perforated.

Lamarck, as being one of the lateft writers on this fubject, deferves particular attention; he divides the Linnæan patella into fix diftinct genera, which he calls patella, fiffurella, emarginula, concholepas, crepidula, and calyptræa.

The fhells retained under the old name of patella (patelle) are defined generically as being univalve, without fpire, oval, or fuborbicular, fhield-form, or bonnet-fhaped, concave and fimple beneath, with the fummit entire, and margin without fiffure, as exemplified in patella teftudinaria, in the fourth Linnæan family. Fiffurella (fiffurelle) has the fhell fhield-form, without any kind of fpire, concave beneath, and at the fummit an oval or oblong aperture. The fiffurellæ correfpond with the fifth of the Linnæan families perforatæ, and with the genus formed by Da Cofta under the name of pierced limpets or mafks, in his "Elements of Conchology." The little flit limpet, patella fiffura of Linnæus, very clearly illuftrates the genus emarginula (emarginule), of Lamarck; the genus is diftinguifhed by the fhell being of a conic form, concave beneath, and having the pofterior margin cleft. The concholepas has the fhell univalve, oval, convex above with the fummit obliquely inclined upon the left margin; the cavity within fimple; and two teeth and a finuofity at the bafe of the right margin. This genus is exemplified in the concholepas peruviana of Favanne, and buccinum lepas of Bruguiere. Some other writers admit it as a family of the limpets which they diftinguifh fimply by having the beak produced and fomewhat twirled or crooked. The crepidula (crépidule) of Lamarck is of an oval, or oblong form; with the fummit inclined upon the margin, and a partial fimple diaphragm or divifion in the cavity. The Linnæan patella porcellana is of this genus. The calyptræa (calyptrée), is of the chambered kind, appertaining to the firft of the Linnæan families, and is fufficiently explained by the Linnæan patella equeftris. The fhells of this kind are of a conoid form with the fummit vertical, entire, and pointed, and the cavity furnifhed with a thin plate, or tongue-like procefs in the centre, which is either detached or connected to one fide of the fhell, and runs in a fpiral direction.

Dentalium. Animal a terebella. Shell univalve, tubular, ftraight, or flightly curved, with the cavity open at both ends, and undivided. Linn.

The fimplicity and precifion of the generic character of dentalium merits commendation, and, although fome late writers on the continent feem too faftidious to admit it, we deem it unexceptionable. The fhells of this kind are known in England by the name of tooth-fhell. (Donov. Brit. Shells.) We have few fpecies, and thofe are principally of the minuter kinds, in this country. Gmelin enumerates altogether twenty-one fpecies of this genus, fome of which are found only in a foffil ftate.

Serpula. Animal a terebella. Shell univalve, tubular, and adhering. Often feparated internally by divifions at uncertain diftances.

By the introduction of a few particular fhells the Linnæan ferpulæ are rendered altogether incongruous. The genus, as now retained, is extremely vague; and which, indeed, is neceffary in order to comprife the whole of the fpecies defcribed by Linnæus under this general head. Nothing abfolutely certain is eftablifhed for its character, except its being an univalve fhell, a circumftance common to the greater part of the fhell tribe, and its being tubular without a regular fpire, which is no lefs applicable to the dentalia, the teredines, and if, like Linnæus, we admit the genus to be really of the teftaceous tribe, the fabellæ alfo. What then remains to fix the character of a ferpula? that it adheres to other bodies, but even this is not always the cafe; and beyond this we are again left in doubt, its character being confeffedly indecifive and local, "fæpe ifthmis integris paffim intercepta," Linn. There are fometimes internal divifions at uncertain diftances in thefe fhells, but what can we infer from thefe in conftituting a generic character: thefe divifions are in the firft place concealed within the fhells when entire, and are only to be difcovered by deftroying them! and can this be confidered as a character well calculated to afford a generical criterion? Nor is this all, thefe internal divifions are by no means conftant; they are not as in the nautili and other regularly formed

formed chambered ſhells placed at equal intervals, neither are they pierced by a ſiphunculus, or pipe-like receptacle communicating from chamber to chamber for the reception of the linear body of the animal inhabitant; the creature muſt remain in the ſingle chamber or encloſure, having no means of extending itſelf into the reſt of the ſhell. And beſides this, the concamerations above-mentioned do not ſeem conſtant to any particular ſpecies, but depend on the age of the ſhell, and appear to be formed progreſſively at various intervals as the animal from various cauſes or its increaſe of growth finds it neceſſary to form a larger dwelling. In this caſe the deſerted chamber laſt occupied being no longer uſeful is cloſed up, to render its new habitation more compact. We now advert only to particular ſhells; there are many ſpecies which do not exhibit ſuch a concamerated ſtructure.

One of the firſt writers upon this ſubject, after the time of Linnæus, was Da Coſta, who in his "Elements of Conchology" takes occaſion to notice the manifeſt impropriety of uniting in the ſame genus the ſhell known by the Linnæan ſtudent under the name of ſerpula penis, and the ſimple vermiculi.

He propoſes to obviate the difficulty by conſtituting two genera, the *vermiculi*, or tubular worm ſhells, which have no fixed or regular form, as the common vermiculi, (ſerpula vermicularis, Linn.); and *pencilli*, or thoſe worm-ſhells which, in the whole, or any eſpecial or particular part, have a determinate regular ſhape or ſtructure. Of this laſt genus, he obſerves there are few ſpecies; the watering pot (ſerpula pluis, Linn.) from the Eaſt Indies is the chief kind, and when perfect is much valued. The propriety of dividing theſe families of ſhells is well conceived, but the diſtinctions are leſs happily defined than might be expected. The ſuggeſtion, however, of this writer has been improved upon by the later French naturaliſts. The genus arroſoir or pencillus of Lamarck is the pencilli of Da Coſta; and yet, in truth, we ſhould add, that though the genus was laid down by Da Coſta, we may trace it to Argenville, who had previouſly, nay, even before the time of Linnæus, deſcribed the watering-pot ſhell under the title of pencillus marinus. The genus arroſoir, or pencillus, as defined by Lamarck, is a good one, and the ſame may be truly ſaid of the ſiliquaria of Davila, a genus exemplified in the Linnæan ſerpula anguina, which is diſtinguiſhed by having a longitudinal ſubarticulated opening or cleft, extending throughout the whole length of the ſhell. The concamerated ſerpulæ, we have ſeen, are not to be regarded as generically different from the reſt.

The vermiculi of Gualtieri include the Linnæan turbo ſcalaris, a rare ſpiral ſhell, better known in England by the name of wentletrap, and which is eſteemed of conſiderable value on account of its rarity. This writer places it with the vermiculi, becauſe, as he obſerves, the ſpires of the ſhell are not produced from or ſupported by a pillar, as is conſtantly the caſe in turbinated ſhells, but poſſeſs, on the contrary, the true character of the ſpiral worm ſhells; and there is certainly much truth in the ideas of Gualtieri, though we do not at the ſame time perceive the abſolute neceſſity of removing it to this genus, and we ſhould anxiouſly and moſt ſcrupulouſly avoid any needleſs innovation. Laſtly, we ſhall mention that the author of the "Teſtacea Britannica" propoſes as an amendment in the ſerpulæ, to divide them into two diſtinct genera; the ſerpula he retains under the old Linnæan character, "ſhell univalve, tubular, adhering, or affixed to other bodies; in ſome ſpecies divided into cells." The other he calls *vermiculum*, and defines "ſhell univalve, ſhape various; not attached, or adhering to other bodies." This we believe muſt in candour be admitted as more vague and indefinite than even the Linnæan diſtinction, and by the laxity of expreſſion may as well apply to the whole tribe of univalve ſhells, the adherent ſerpulæ excepted, as to the particular family called vermiculum. But though we diſapprove of the character aſſigned, we perfectly agree with the ingenious author as to the propriety of ſeparating the adhering kinds of ſerpula from thoſe ſpecies which conſtantly occur detached.

Teredo. Animal a terebella, furniſhed with two calcareous, hemiſpherical valves, or maxillæ, truncated before, and two others of a lanceolate form; ſhell tapering, flexuous, and penetrating wood.

The animal inhabiting this ſhell is a terebella of a particular kind; the body being of a ſoft and gelatinous nature, but having the head provided with an inſtrument of a calcareous ſubſtance, which performs the office of an augre, and enables the worm to penetrate the hardeſt oak. The moſt deſtructive of the animals of this genus is the teredo navalis, which penetrates the bottoms of ſhips. It was originally imported from India into Europe about ſeventy years ago. Sellius, in the year 1733, publiſhed a treatiſe on this ſubject under the title of "Hiſtoria Naturalis Teredinis, ſeu Xylophagi marini Tubulo-conchoidis." It was afterwards deſcribed and figured by ſeveral writers, and among others by Baſter, in the Philoſophical Tranſactions, vol. lxi. It is now too well known by the name of *ſhip-worm.* See Donov. Brit. Shells.

Three ſpecies only of this ſingular genus have been yet diſcovered, and which are named navalis, utriculus, and clava. Favanne and Guettard divide theſe ſhells into two genera, teredo (taret) and fiſtulana; the ſhell of teredo is diſtinguiſhed as being tubular, cylindrical, and open at both ends, lower orifice furniſhed with two lozenge-ſhaped valves, and the upper with two ſpatulous opercules. Fiſtulana is a genus compoſed of a ſingle ſpecies, teredo clava, Gmel.: the ſhell is tubular, clavated at one end, open at the ſlender extremity, and containing in the cavity two non-adherent valves. This laſt is called by Favanne, fiſtulana cornicula, and fiſtulana gregata by Guettard.

Sabella. Animal a nereis, with ringent mouth, and two thicker tentacula behind the head: ſhell tubular, compoſed of particles of ſand, broken ſhells, and vegetable ſubſtances, united to a membrane by a glutinous cement.

The ſabella, according to Linnæus, is inhabited by an animal of the nereis kind. Some of theſe animals were known among the old writers under the name of ſea ſcolopendræ. Since the time of Linnæus, the number of ſpecies has been greatly augmented by the diſcoveries of Pallas, Fabricius, Müller, and others, and the nature of thoſe animals become better underſtood; in conſequence of which, they have been diſcovered to be the habitations not only of the nereis, but likewiſe of the amphitrite and terebella genera. We ſpeak of the marine kinds: with reſpect to ſeveral of the ſuppoſed ſpecies of ſabella found in freſh water, it is accurately determined they are not of this race of animals, but the larvæ of ephemeræ, phryganeæ, and other inſects, which conſtruct cylindrical cells of extraneous matter, in which they reſide while they remain in that ſtate in the water. Some naturaliſts, in order to avoid confounding theſe larvæ with the true ſabella, have cautiouſly omitted the whole; and we indeed ſuſpect, that although they may continue to be retained by the Linnæan ſtudent among the ſhell tribe, they will be expunged, or many of the ſpecies at leaſt, by future ſyſtematiſts. The Gmelinian ſyſtem comprehends 25 ſpecies

fpecies of fabella, the frefh-water kinds, defcribed by Schroetter, included.

The marine fabellæ fhells are compofed chiefly of fand and the fragments of fhells; thofe of the fuppofed fabella found in frefh water, either of fmall fragments of vegetables, or the broken fhells of teftaceous vermes, thofe of the helix tribe efpecially.

Having prefented the reader with a detailed view of the Linnæan fyftem of conchology, we fhall next proceed as before to fpeak of the other principal writers on the fubject, as nearly in chronological order as circumftances will permit.

The third volume of the extenfive and coftly work of Seba "Defcriptio Thefauri Rerum Naturalium," was produced at Amfterdam in 1758. This part treats on marine fubjects generally, as cruftaceous and teftaceous animals, corals, &c.; and contains, befides plates in other departments, fixty-one elucidatory of conchology. As a book of reference to the more ftriking and well known kinds of fhells, the work of Seba poffeffes merit: it has been obferved, and with much truth, that this valuable publication might however have been rendered lefs expenfive by the omiffion of a number of figures, which confift merely of repetitions, and alfo the fpecimens of art abfurdly introduced, fuch as the fanciful decorations on the fhells of the nautili, and the examples of "fhell work," on which a profufion of engraving is unneceffarily expended.

In the "Hiftory of Cornwall," Dr. Borlafe prefents us with a plate of fhells containing about thirty fpecies; the defcriptive matter is flight, and is principally copied from fome of the oldeft writers on the fubject. This was publifhed in folio in London, A.D. 1758.

The magnificent work of Francois Michael Regenfus, "Choix de coquillages et de cruftacés," appeared at Copenhagen, under the patronage of the king of Denmark, in the fame year as the preceding. The work comprifes twelve coloured plates in imperial folio, and each plate comprehends twelve fhells. The defcriptions, which are written both in the French and Danifh language, are the joint labour of profeffor Kratzenftein and Dr. Afcanius. It has been lamented that the talents of this artift were not employed on fubjects better deferving of elucidation, as thofe which are figured by Regenfus fall daily under the notice of the moft humble collectors. A fecond volume was begun, and confiderable progrefs made in it before the year 1776; but as the artift is no more, the undertaking is in all probability relinquifhed. Twelve plates defigned for the fecond volume are poffeffed by fir Jofeph Banks, and which include fhells of greater rarity than thofe inferted in the firft volume.

We have already adverted to the "Claffes Conchyliorum" of Carolo Augufto de Bergen, publifhed at Nuremberg in 1760. This little treatife contains a compendious view of the principal fyftems of conchology which had then appeared, under the heads of "Methodi Univerfales," and "Methodi Particulares," with concife prefatory ftrictures on each. Thefe remarks of Bergen have evidently furnifhed later writers with many ufeful criticifms on the feveral works that fall within the compafs of his view, and may, upon the whole, be thought far preferable to many more elaborate obfervations that have fince appeared on the fame fubject.

The "Amufement Microfcopique" of Ledermuller relates to minute fhells, and contains many figures. The firft part was publifhed at Nuremberg in 1764, and in 1766 and 1768 two other parts of the fame work.

Davila's "Catalogue Syftematique et Raifonné des Curiofités de fon Cabinet" was printed at Paris, in 1767, in three volumes octavo, preparatory to the difperfion of his collection in the following year. The firft volume treats entirely of fhells, and contains twenty-two plates of the rarer fpecimens in his cabinet, many of which are fcarce even at this day. This work affords much interefting information, though it is to be confidered only as a fale catalogue. The fame year a fimilar production, "Catalogue Syftematique des Coquillages de Arnold Leers, de Rotterdam," appeared at Amfterdam, as an annunciation of the fale of his valuable collection. This was written by Mr. F. C. Meufchen, German envoy at the Hague, and contains a fheet fyftem of fhells.

The work of Geoffroy, "Traité des Coquilles, tant fluviatiles que Terreftres, que fe trouvent au Environs de Paris," was printed in 1767, and forms a valuable acquifition in this department of fcience. Three plates engraven by Duchefne, contain figures of forty-fix fhells defcribed by Geoffroy.

A curious and interefting paper by Heriffant, occurs in the Mem. de l'Acad. des Sciences, for 1768, entitled, "Eclairciffemens fur l'Organization jufqu' ici inconnue d'une Quantité confidérable de Productions Animales, principalement de Coquilles des Animaux," with eight illuftrative plates, three of which relate to fhells. In the fame year the "Memoire fur le Coquillage appelé Datte en Provence" of A. D. Fourgeroux de Bondaroy, was inferted in Mem. Etrang. de l'Acad. Roy. de Sc. together with a plate elucidatory of the fubject, which is the Linnæan mytilus lithophagus.

Cotte's obfervations on the phyfiology, &c. of the fnail tribe, occur in the "Journal de Sçavans" for 1770, and in the "Journal de Phyfique les Délices des Yeux, et de l'Efprit" of Knorr, completed in 1773, confift of fix parts, and altogether contain 978 figures of fhells. The author was a painter at Nuremberg, and his publication commenced in 1760; but not living to finifh the undertaking, the laft part was brought forward by his executors. Knorr had collected materials for another teftaceological work, his "Deliciæ Naturæ felectæ," which was afterwards prepared for public view under the direction of Müller and De la Blaquière.

Another conchological work, of ftill greater extent, "Neues fyftematifches Conchylien-cabinet," was in a progreffive courfe of publication at Nuremberg, about the fame period. The firft part appeared in 1769, another in 1771, and a third in 1777. Thefe conftitute the firft three volumes, which were all its author, Martini, lived to complete. Seven volumes have been fince added by F. H. Chemnitz. The body of the work is written in the German language; the embellifhments confift of 366 plates, and exhibit a number of figures on each plate. It is highly probable this work will never be extended beyond its prefent limits; Chemnitz being dead, and his collection of fhells, which was very copious, having been difperfed within the laft four years by public fale. The catalogue of fale bears date Feb. 7, 1803, it was drawn up by H. S. Holten, in a fmall duodecimo, entitled, "Enumeratio fyftematica Conchyliorum J. H. Chemnitzii," &c.

Schröter is the author of many treatifes on the fubject of fhells, and which appear to be little known. He has in particular diftinguifhed himfelf by his obfervations on the river fhells of Thuringia; the fource from whence Gmelin has obtained many of the new fpecies defcribed in his edition of the Syftema; the fabellæ of this writer are very numerous. See his "Die gefchichte der Flufsconchylien, mit vorzüglicher rückfichte auf diejenigen welche in den Thüringifchen

gifchen waffern leben," 1779. This was preceded by a fmall publication on the land fhells found chiefly in the neighbourhood of Thangelftadt, "Verfuch einer fyftematifchen abhandlung uber die Erdkonchylien um Thangelftadt." A later production of this writer's is the "Einleitung in die Conchylien kenntnifs nach Linné," publifhed in three volumes octavo, 1783—1786, and which to the German fcholar forms a valuable introduction to the ftudy of conchology.

The "Zoologiæ fundamenta" of Martinus Thrane Brunnich, was publifhed in 1772, and relates in a partial degree to fhells.

In the "Vermium terreftrium et fluviatilium Hiftoria" of Müller, we are prefented with an arrangement of land and river teftaceous animals difpofed according to the characters of the animals themfelves inftead of their fhells. The firft volume was begun in 1773, and the fecond in the year following. The teftaceological productions of Denmark are defcribed in the "Zoologia Danica" of this author.

The "Viaggia in Dalmazia," or travels in Dalmatia, by Albert Fortis publifhed at Venice in 1774, contains a few figures elucidatory of thofe fhells which he found in the Porto di Bua.

The "Elements of Conchology," by Da Cofta, was publifhed in 1776. This work prefents us with a new arrangement of fhells, and befides contains fome judicious obfervations on the claffification of Linnæus, and fome other writers; which latter, in our opinion, deferve more attention than his fyftem of fhells. The "Elements" of this writer is one of the moft inferior of this author's works. His "Britifh Conchology," publifhed in 1778, is more valuable, though it does not take a fufficiently extenfive view of the Britifh teftacea. Da Cofta had intended to publifh a fecond edition of thefe with confiderable improvements; the collection of materials, and the MS. for which are in the poffeffion of Mr. Donovan, and have been in part incorporated into his "Natural Hiftory of Britifh Shells." The great forte of Da Cofta appears to be in the antediluvian race of fhells, and other extraneous foffils, and in the more ufeful departments of mineralogy, or what he denominated native foffils. Upon thefe fubjects alone, no lefs than ten folio volumes of unpublifhed manufcripts are preferved at this time in the extenfive collectanea of original MS., &c. formed by Mr. Donovan. and which are intended to be placed in the library of his mufeum.

Among the few teftaceological works noticed by Da Cofta, in the introduction to his "Elements," he fpeaks of "a new and anonymous conchology, began to be publifhed in this metropolis, in 1770, in folio, illuftrated with copper plates." "It was intended (he obferves) to be a general natural hiftory of fhells, and to include figures of all the known fpecies, common as well as rare, beautiful or otherwife, and fome copies were defigned to be accurately coloured for the ufe of the curious. This anonymous production was, to our knowledge, written by Da Cofta, and was the joint undertaking of himfelf and Mr. George Humphrey, by the latter of whom moft of the fhells were furnifhed that are defcribed in this work. The numbers of this work that were publifhed comprehend the firft three families of his fyftem, limpet, fea-ear, and ferpula.

The publication of Ignaz Edler von Born, the celebrated mineralogift entitled "Index Rerum Naturalium Mufaei Cæfarei Vindobonenfis" prefented the public in 1778 with the defcription of the fhells preferved in the mufeum of the emprefs queen at Vienna; and was undertaken at the exprefs command of her imperial majefty. Two years after the baron publifhed his "Teftacea Mufei Caefarii Vindobonenfis," as a fplendid illuftration of his former work; this contains about two hundred coloured figures delineated in eighteen folio engravings.

The early editions of the "Britifh Zoology," as it is entitled by Mr. Pennant, though in reality it embraces only an inconfiderable portion of the zoological productions of Britain, include none of the teftaceous tribe: thefe were added, in a fourth volume publifhed in 1778. This volume contains an enumeration of 163 fpecies of fhells with concife defcriptions, and 56 plates exhibiting figures of nearly all that are defcribed. Dr. Maton obferves in his comments on this work that "moft of the plates are valuable for reference, but fome of them are executed lefs carefully than could have been wifhed. In the defcriptive part (fays the doctor) the author has tranflated pretty clofely the fpecific characters, given by Linnæus, whenever they could be had, but there are feveral fpecies of which the former is to be looked upon as the firft defcriber. It is very remarkable, however, that he fhould have wholly omitted others which had been noticed by Lifter and Petiver, and which are unqueftionably natives of our ifland." The number of Britifh fpecies of teftacea known to us at prefent amount altogether to feveral hundreds more than Mr. Pennant was acquainted with, and it is our knowledge of thefe which renders his catalogue of little moment. But we ought in candour to allow that confidering the very low ebb of natural fcience in this country at the period Mr. Pennant wrote, his work is a refpectable performance: we mean with regard to the number of fpecies contained. The defcriptive matter certainly betrays great want of information, as well as fcience: many of the fynonyms are mifapplied, and the names erroneous.

The "Obfervations fur les moules" in the "Journal de Phyfique," 1779, is from the pen of a lady, Mafoon le Golft, and relates to the reproduction of parts of mufcles. Dicquemare treats upon the locomotive faculty of oyfters in the fame volume of this journal "Sur la Faculté locomotive des huitres," p. 241. tom. 28.

In 1780 the "Fauna Groenlandica," of Otho Fabricius was printed at Leipfic. This work contains the defcription of fifty feven fpecies of fhells found in Greenland, among which are a number not previoufly obferved by writers. Fabricius pays confiderable attention to the ftructure and habits of the animal as well as the fhell.

The "Zoophylacium Gronovianum," a defcription of the rich mufeum of L. T. Gronovius fenator at Leyden was publifhed in 1781. There are in this work a fcientific defcription of 589 fpecies of fhells, and among the plates, two appropriated to the illuftration of the rarer kinds.

Molina's "Saggio fulla ftoria naturale del Chili," or natural hiftory of Chili, comprehends defcriptions of the fhells obferved by this writer in that part of South America. The work was printed in octavo, at Bologna in 1782.

A fmall octavo tract was publifhed at Naples in 1784 entitled "Defcrizione di una nuova famiglia, e di un nuovo genere di Teftacei, trovati nel littorale di Catania, con qualche offervazione fopra una fpezie di oftriche," by M. Gioeni. The fuppofed new genus of fhells which occurred to the notice of Gioeni on the fhores of Catania was no other than the hard teftaceous fubftance found in the gizzard of bulla lignaria, a fimilar organ to which we have ourfelves found in the gizzard of bulla aperta. Some years paffed before this mifconception was detected: it had been really confidered as a fhell by profeffor Retzius from whom it obtained the name of triola Gioenii; and it is arranged alfo in the fyftem of Bruguiere under the name of gioenia ficula.

ficula. M. Draparnaud claims the merit of having firft afcertained the real nature of this teftaceous fubftance, an account of which he inferted in the Nouv. Journ. de Phyfique. We fhould add that the fame article is defcribed and illuftrated with figures in the fecond volume of the Linnæan Society by Mr. G. Humphrey, affociate.

A variety of new and very curious experiments by the indefatigable Spallanzani on the reproduction of the head of the common fnail is recorded in two memoirs, the firft of which was publifhed in 1782, the other in 1784. See "Rifultati di Esperienze fopra la Reproduzione della Tefta nelle Lumache Terreftri," Mem. della Soc. Ital. t. 1. p. 581.—t. 2. p. 506.

The fplendid work on fhells by Martyn entitled the "Univerfal Conchologift," was begun in the year 1784, and continued to be publifhed at uncertain intervals till 160 plates appeared, when its progrefs was finally impeded. This work commenced with the nondefcript fhells collected in the different voyages of the Englifh circumnavigators in the South Seas; many of which are ftill efteemed valuable, while others, as may be imagined from our more habitual intercourfe at this time with the fouthern hemifphere, are become common. As a fcientific work, this performance will be found altogether defective, and it is befides too barren of general particulars, to render the fubject pleafing to the common reader. Much greater praife is due to the plates, which are the productions of Grozier, and many other artifts, and are for the moft part well executed; it may be indeed added that they are the reprefentations of objects in themfelves fo beautiful as to afford the artift every facility in the difplay of talent. A number of the original fpecimens are in the cabinets of Mr. Wood, apothecary, Mrs. Forfter, and others in London.

A fmall quarto treatife embellifhed with three plates, the joint labour of Mr. W. Boys, and Mr. G. Walker, appeared in London in 1784. The work treats only of microfcopic fhells, and the refearches of its authors were confined to the fandy fhores of Sandwich as the title indicates "Teftacea minuta rariora nuperrime detecta in arena littoris Sandvicenfis." It is dedicated to the late duchefs of Portland.

In the Philofophical Tranfactions for 1786 is "an account of fome minute fhells, either not duly obferved, or totally unnoticed by authors." This is illuftrated with three plates and is the production of the rev. Mr. Lightfoot, the learned author of the "Flora Scotica," to whom the world is fo highly indebted for his indefatigable inquiries refpecting the Britifh fuci and confervæ.

In 1786, C. L. Kämmerer defcribed the collection of the hereditary prince of Schwarzburg-Rudolftadt. This catalogue is in the German language, and is embellifhed with twelve plates; it bears the title of "Die Conchylien in Cabinette der Herrn. Erb.—Prinzen von Schwartzburg-Rudolftadt. An appendix, with four additional plates, was publifhed at Leipfic in 1791, under the title of "Nachtrag zu der Conchylien un Fürftlichen Cabinette zu Rudolftadt."

The "Journal de Phyfique" for 1787, contains a defcription accompanied with figures of chiton fquamofus by Lefebure des Hayes.

In the Tranfactions of the Ruffian Academy, for the year 1787, we find a memoir on teftaceology, entitled "Marina varia, nova, et rariora," by profeffor Pallas. The fubjects treated of are ferpula fpirillum, lepas cariofa, pholas teredula, chiton amiculatus, and helix coriacea. This author had previoufly diftinguifhed himfelf by his critical writings on conchology, both in his "Spicilegia Zoologica," which appeared in 1780, and his "Mifcellanea Zoologica," publifhed fome years before.

Retzius in the fame year printed his "Nova Teftaceorum Genera,", a fmall work in quarto, in which many alterations and improvements on the Linnæan fyftem of conchology are projected. It was previoufly the fubject of an inaugural differtation at Lund. Retzius was likewife the author of a defcription of Venus lithophoga, publifhed in the Memoirs of the French Academy for 1786.

Cordiner's work of "Remarkable Ruins and Romantic Profpects of North Britain," appeared in numbers, and befides the views comprifes fome plates of natural hiftory, among which are a few of the more remarkable fpecies found on the coaft of Scotland, grouped with a variety of other marine productions. Antiquity is however the leading feature of this work. Only part of this production appeared in 1788; fome additions have been made to it fince that time.

In the year 1789, Bruguiere, the well known traveller in the eaft, commenced the teftaceological part of the grand work, carried on in France, under the title of "Encyclopédie Méthodique," but unfortunately for the caufe of fcience, this fkilful naturalift lived only to complete the firft volume, which does not go beyond the letter C. of the article *vers* (worms). The prefatory matter to this volume contains the method of an arrangement he intended to purfue, founded principally upon that of Linnæus, with fuch additions and deviations only, as he conceived to be required by the difcoveries of other naturalifts fince the publication of the Linnæan Syftema. This is the principal, though not the only production on the fubject of conchology, Bruguiere fubmitted to the world.

A pleafing variety of beautiful and curious fpecies of teftaceous tribes, chiefly the extra-European kinds, have been introduced, at various times, to the notice of the Englifh reader, through the medium of that well known periodical undertaking the "Naturalift's Mifcellany," of Dr. Shaw. We are not a little furprifed indeed to obferve, that the greater number of univalve fhells in this work are reverfed in the plates, and are therefore likely to miflead the incautious obferver into a perfuafion, that they are in reality heteroftrophous. This work commenced in 1790, and ftill continues in a progreffive courfe of publication.

The "Zoologia Adriatica," of Abbé Olivi, printed in 1791, contains an account of the fhells found in the gulf of Venice, with a feries of engravings, to illuftrate fome of the more remarkable fpecies. In the "Ann. de Chimie," for the fame year, M. Vauquelin treats of the refpiratory procefs in the helix pomatia, and proves in the courfe of his obfervations, that the vermes require vital air for the excitement of their pulmonary fyftem as well as other animals. The fpecies above mentioned (according to this author) will refpire azotic and carbonic acid gas, as long as any oxygen remains combined with either. The "Obfervations fur la génération des Buccins d'Eau douce," by M. Ribaucourt, inferted in the "Journ. d'Hift. Nat." for the fame year, tend to prove that all the fpecies of that tribe are viviparous. The laft we have to mention in this year are the papers of M. Cuvier, the celebrated comparative anatomift. Thefe relate to the anatomy of the animal of the Linnæan patella vulgaris, and unguis; and the bulla aperta, and are to be found in the "Annales du Mufeum National."

The firft volume of "Teftaceographia ac Zoophytographia parva et microfcopica," by Am. Soldani, is dated 1789; a fecond volume appeared in 1795. The microfcopic fubjects, defcribed by this writer, are principally fhells difcovered

difcovered by himfelf at Porto-Ferrara; the ifland del Giglio; on the fhores of Caftiglioncelio, la Follonica, &c. No lefs than 148 plates embellifh this work, in which the fhells are reprefented both of their natural fize and magnified.

A number of minute, or microfcopic fhells, difcovered by the late Mr. Adams, on the coaft of Pembroke, are defcribed by that ingenious collector in the third aad fifth volume of the Tranfactions of the Linnæan Soeiety, in which will be alfo found two plates, containiug figures of the fhells defcribed.

Among the "Obfervations fur les Coquilles," inferted in the "Journ. d'Hift. Nat." for 1792, and in the "Prodrome d'une nouvelle Claffification des Coquilles." Mem. Soc. d'Hift. Nat. An. 7, the curious reader will find much interefting matter relative to the teftaceological fyftems of Linnæus, and Bruguiere, and alfo a fketch of that propofed by their author, M. Lamarck. Thefe were the prelude to his more important undertaking "Syftême des Animaux fans Vertebres," in which we meet with a new arrangement of teftaceology more comprehenfive and fatisfactory than has perhaps hitherto appeared upon this interefting fubject.

The "Teftacea Microfcopica aliaque minuta ex Generibus Argonauta et Nautilus ad Naturam picta et defcripta," publifhed at Vienna in 1798, is the joint production of L. A. Fichtell and J. P. C. Moll. It treats principally on the minute fhells of the argonauta and nautilus genera, and contains, befides the defcriptions in the Latin and German languages, accurate figures of a great number of fpecies, among which are many that efcaped the obfervations of Plancus, and every other writer.

Mr. Hutchinfon's new and enlarged edition of the "Hiftory of Dorfetfhire," ineludes a catalogue of the birds, fhells, and more rare plants of that county, by Dr. Pultney. The teftaceological part of this catalogue is that which interefts us in the prefent detail. Dr. Pultney beftowed confiderable attention on this department; his remarks on the Linnæan genera, which the limits of his views permitted him to notice, are judicious; the fpecies he defcribes are, however, lefs numerous than might be expected, nor can we refrain adding, with due refpect to the memory of that zealous and well informed naturalift, that all the fhells defcribed as fpecies, are not defined in a clear and fatisfactory manner. As a local catalogue we admit its general utility with this exception.

The above mentioned catalogue was printed in 1799, and in the Philofophical Tranfactions for the fame year, appeared Mr. Hatchet's "Experiments on Shell and Bone," in which that accurate chemift relates the particulars of his difcoveries refulting from analyfis of the component parts of teftaceous and cruftaceous fubftances, in the firft of which he detected the prefence of phofphate of lime, and he found the other to confift only of the carbonate of lime mixed with gelatinous matter. The publication of Donovan's "Natural Hiftory of Britifh Shells," commenced early in 1799. This work was defigned to include all the fpecies hitherto difcovered in Great Britain, fyftematically arranged in the Linnæan manner, with fcientific and general obfervations on each. Five volumes have fince appeared in a progreffive courfe of publication, comprifing altogether 180 plates, with many coloured figures. The writer of this article does not feel at liberty to comment further on a work which he has himfelf fubmitted with deference to public opinion. It is allowed by Dr. Maton and Mr. Rackett, in their review of teftaceological writers, inferted in the Linnæan Tranfactions, "that the author has given feveral new fpecies, and that he has rectified many errors of preceding writers."

The fifth or laft volume of Mr. Dryander's "Bibliotheca Hift. Natur. Bankfiana," was publifhed in 1803. This is an account of the books on the fubject of natural hiftory, in the valuable library of Sir Jofeph Banks bart., and although only a catalogue, will be found to contain much general information. In the "Elenchus Sectionum," we are prefented with a methodical arrangement of the principal teftaceological fubjects treated of by different writers, named in the other part of the catalogue; and which, in many refpects, may prove more acceptable as a mode of reference than a catalogue confifting merely of the titles of the books and names of the authors.

A paper defcribing the hinges of fome Britifh fhells of the bivalve tribe, by Mr. W. Wood, is inferted in the fixth volume of the Linnæan Tranfactions. The attempt is ingenious, but on a very confined fcale, and it prefuppofes, without the flighteft countenance of fact, that among the many writers who had previoufly noticed fhells, or even written profeffedly on them, no one had hitherto paid attention to their hinges. The paper is illuftrated by fix plates of outlines.

In 1803. the "Teftacea Britannica" of Mr. G. Montagu, was publifhed in two quarto volumes. The number of fhells defcribed in this work is confiderable, as it comprehends an account of the microfcopic kinds, in addition to thofe of a larger fize. It is embellifhed with fixteen coloured plates.

"The Hiftorical Account of Teftaceological Writers," to which, in the courfe of our foregoing obfervations, we have had frequent occafion to advert, appeared in the fixth volume of the Linnæan Tranfactions, publifhed in 1804, and is the joint production of Dr. W. G. Maton, and the Rev. Thomas Rackett.

The "Tableau Methodique des Mollufques," by Latreille, publifhed in the twenty-fourth volume of the "Nouveau Dictionaire d'Hiftoire Naturelle," printed at Paris in 1804, affords us an arrangement of fhells, founded on that of Lamarck, with fome additions that may render it more applicable to general ufe.

The rife, progrefs, and general traits of the hiftory of this fcience may be more readily collected, we apprehend, in the courfe of the foregoing review of the different works that have appeared on the fubject, than from any other mode that might be devifed; and, under this idea, we have adhered as nearly as poffible to the chronological order of arrangement, this being the moft likely to facilitate the purpofe intended. From the perufal of this, the reader will at once perceive which are the moft confiderable and valuable works on the fubject, as well as obtain a general knowledge of a number of treatifes, tracts, and memoirs, on particular articles connected with teftaceology, which, being difperfed through a variety of mifcellaneous and voluminous publications, might, without fuch reference, efcape attention. The leading features, or defign, of the refpective performances, are likewife detailed, and the embellifhments which accompany them pointed out; and, in fact, every other particular deemed likely to affift the ftudent in his choice of the beft books in forming a teftaceological library.

In refuming this fubject, as we propofe under the article TESTACEOLOGY, we fhall be prepared to offer fome further, and more general remarks on this topic, and in particular to fubmit our own ideas as to an enlarged and improved arrangement for the claffification of teftaceous

bodies,

bodies, founded on the leading principles of the beft authors, with fuch amendments as we conceive neceffary. D.

Mifcellaneous Additions relative to Conchology.

The following inftructions for collecting, cleaning, and preparing fhells, may not be unacceptable.

The teftaceous, like all other animals, have their particular reforts; fome inhabit only the deep parts of the fea, and are what the old writers diftinguifhed by the name of pelagian fhells; others are as conftantly found in fhallow water, in bays, or thofe parts of the fea which are contiguous to the entrance of rivers: it has alfo been obferved, that many fine and rare fhells are fometimes found in the ftraits between iflands, and in fhallows near the coaft, of four or five fathom water. Some fpecies alfo are found on rocky, and others on fandy fhores. The beft fhells are thofe taken alive out of the fea, from whence they may be obtained by means of a trawling-net, fuch as the fifhermen employ, if the depths are not too great; they are alfo brought up by the cable in weighing anchor, the log-line in founding, and various other means. Sometimes valuable marine fhells are found fticking to the bottoms of fhips, or the fides of rocks.

After a ftorm, good fhells may be picked up on the fea beach or fhore, as the violent agitation of the water in a tempeft feparates them from their native beds, and often cafts them afhore. But fuch as have lain expofed for fome time to the heat of the fun, or beaten by the waves, are of little value, as their colours will be found faded, and the fhells worn and broken; thofe only are worth felecting from the fea-fhore, which have the animal alive within, or which have been recently thrown up.

River fhells are, in general, of an obfcure colour, and remarkably thin and brittle, infomuch that fome have imagined it a peculiar character, by means of which they may be diftinguifhed from the marine or terreftrial kinds. This is not, however, an abfolute criterion, for many of the latter are as thin as the river fhells, as we obferve, for example, in the argonautæ, or paper nautili, fome pinnæ, and many other fea fhells, and in numbers of the fhells of the terreftrial kind.

Terreftrial, or land fhells, though few in comparifon with the former, are oftentimes very beautiful, and not lefs efteemed than the marine kinds. Thofe are found moft commonly crawling, like the fnail tribe, on various forts of plants, and in warm countries efpecially abound.

Many fhells poffefs fuch a fmooth, and highly polifhed furface, and are fo beautiful in colour when they are fifhed up, that art cannot improve their appearance, fuch as for inftance, the cypræa or cowry, and the voluta or volute, with many others. It is the commonly received opinion, that the animals, inhabiting all naturally polifhed fhells whatever, are capable of not only adding to the extent and growth of their fhells, but that they are able, from time to time, as occafion may require, to add a frefh polifhed covering to the whole fhell. Should this opinion be unfounded, they can at leaft extend their organs to fuch a length, as to clear away all impurities from their fhells, as we feldom find any cowries with coral, or any extraneous bodies, adhering to any part of them.

Other fhells are covered with an epidermis or membrane, intended no doubt by nature to defend them from accident, and aid their growth. The ftructure of this epidermis varies very much, being in fome laminated, in others fibrous or brufh like, or pilous, and velvetty. The epidermis prevents the lepas, and other fimilar fhells, or marine worms, from fixing their habitations on them; it is worthy of remark, that moft fhells, with a feabrous furface, are covered with an epidermis. Many others, when taken out of the fea, are flimy, and encrufted with filth, coralline, and other extraneous matter.

Immediately after gathering or collecting the fhells, and thofe efpecially taken from the fea, the firft procefs neceffary, is to deftroy and extract the animal inhabitant, without injuring the fhell, and then to prepare the fhell that it may not be damaged by the action of the marine falts, with which they are faturated. As fhells are of a calcareous nature, all acids fhould be as much avoided as poffible, both in killing the animal, and preparing the fhell; it is ufual to boil them in water for this purpofe, but as boiling may injure the fhells, it will be moft advifeable to dip them into fcalding water, which will be fufficient to kill the animal, after which, let them remain for two or three minutes to cool, and then put them into cold water, in which they may lie till they are taken out to be cleaned. The animal, by being killed in this manner, becomes condenfed, and fomewhat folid, and may be picked out by any fharp inftrument.

Shells encrufted with extraneous matter fhould be allowed to fteep for fome time in warm water, both for the fake of moiftening thefe fubftances, and to extract as much as poffible the marine falts. They may be fuffered to remain in water two or three minutes without any injury. After this brufh them well, obferving only that the brufh muft not be too hard. If that proves infufficient to clean them, rub or brufh them again with tripoli or emery, or put them into weak acid for the fpace of a minute and then dip them into cold water; which procefs may be repeated as often as will be neceffary to remove the extraneous matter. Strong foap may alfo be ufed with a rag of woollen or linen cloth to rub them, or a ley of pearl-afhes; and when cleaned finifh them with a foft brufh and fine emery.

Scientific collectors endeavour to preferve one at leaft of every fhell with the epidermis on, to exhibit its natural appearance, together with the uncoated fpecimens.

The epidermis may fometimes be fo thick that it will be neceffary to take it off before the fhell can be polifhed. For this purpofe pour a quantity of the fpirits of nitre, or nitrous acid, into water, in the proportion of about one-fixth or one-tenth part of the former; put this into a fhallow bafon or faucer, and place the fhell or fhells therein, in fuch a manner that the corrofive fluid may act only on the coat, without injuring the orifices or mouth, which in fome cafes may be coated with bees-wax: change the fituation of the fhell every two or three minutes, that all the parts may be equally uncoated; wipe off the bubbles as occafion may require with a feather, firft dipped in water: when you perceive the enamel in any part free from the coat, take it out, and wafh off the aquafortis, and after this procefs rub them with fine emery powder. If inftead of a thick epidermis it is only a pellicle, it is fufficient to fteep it in hot water, and then pick it off; or fteep the fhell in vinegar till it peels off freely, or is corroded away. The epidermis of fome fhells is fo coarfe and thick as to refift the corrofive quality of acids diluted, or even of aqua-fortis; emery with ftrong brufhes is then fubftituted, or feal-fkin, and pumice-ftone, or the exterior coat may be ground off with a grind-ftone, or files of various dimenfions. If the matter is too obftinate to be cleared off by this means, pour fome fpirit of nitre into a cup or other veffel, ftop up every part

part of the fhell that may be fufceptible of injury with foft wax, as carefully as poffible, and put it into the liquor in the veffel; remove it every minute into cold water, but obferve never to fhift it into the fame water more than once, and wafh it every time before you return it into the corrofive liquor. If the fhell is warted, irregular, or armed with points, examine it with a common magnifier, and if you perceive on the more prominent parts through the wax any appearance of the polifhed furface, cover them with wax, and let the fhell remain a few minutes longer in the fpirit, take it out and wafh it again; after which, polifh the fhell with fine emery, and pafs a camel's-hair pencil with gum arabic over them to brighten the colours; the white of egg is fometimes ufed, but it is very apt to turn yellow in time, though at firft it appears glaring; and varnifh communicates a difagreeable fmell.

Some fhells have naturally a flight politure; thofe may be rubbed by the hand with chamois leather, which will give them a bright gloffy appearance: avoid when poffible the ufe of emery powder, as it is apt to detriment the beautiful workings on the fhells; it cannot however be often left out of ufe.

It is defirable as far as can be to point out the impofitions which are often practifed on thofe who are not well acquainted with fhells, and are therefore not aware that any individual fhell may be made to affume a very different appearance by having the firft or fecond exterior coat of the fhell removed by acids, or any other means. Thus, for example, we fee that though the outer furface of the common cowry, or tide fhell, is of a pale colour, with dark fpots; when that is cleared off, it is of a fine violet colour: the fea-ears are clouded with brown, green, and white; but when that coat is rubbed away it appears of a beautiful pearl colour. Thus alfo the nautilus fhell is externally of a pale brown or ochraceous hue, variegated with ftreaks of chefnut, but on the exterior coating being taken off, the whole fhell will be found of that fubftance known by the familiar name of mother of pearl. The fame circumftance is obferved of the true mother of pearl fhell, the exterior coat of which is blackifh; many of the trochi, or top fhells, and an infinite variety of other fhells of different genera are of the fame defcription. Among thofe fhells which alter their appearance moft, we muft not omit the volute, called by us the purple or violet tip, and by the French *onyx*; it has a brown epidermis, which, being taken off, difcovers the ground colour to be a dull yellow. When this is worked down to beneath the cruft or furface, it is of a pure white, with the tip of a fine violet. We fhall laftly mention the common mufcle, the exterior coat of which is dull blueifh black, that beneath purple, and the inner one white: fometimes we have feen mufcles in the hands of dealers, and in fcientific collections, of a fine purple colour, variegated with large diftinct fpots of white or brown, fo dexteroufly managed as to have all the appearance of a fhell in a natural ftate, though in reality fuch fhells are the work of art, and no other than the common or edible mufcle. For this purpofe thofe of the largeft fize are ufually felected, which, being firft uncoated down to the brighteft purple furface, are afterwards fretted or rubbed with a file, in particular parts, till the white or inner coating is feen through the purple. The fpots may be managed however with more certainty, by covering the whole furface with a thin coat of wax, then fcraping off the wax in fuch parts as it is defigned fhould exhibit fpots, and laftly fuffering the fhell to remain in fpirit of falts diluted, or nitrous acid, till the outfide is corroded in thofe parts down to the white or inner coat of the fhell. After wafhing the fhell, and clearing off the wax, the fpots thus formed may be ftained of any colour, according to the fancy of the operator. A preparation of the oxyd of iron, or manganefe, are moft commonly employed, as thefe produce a brown colour of different tints, and form an indelible ftain. The Dutch, who are great amateurs in conchology, paint fhells with a variety of colours, and that fo ingenioufly, as to render it difficult to detect the impofition. Neither are they lefs expert in joining broken fhells, cementing and filling up holes pierced by marine worms, or fractures, and filling the mouths and tips in fuch a manner as to entirely alter their appearance.

Foffil fhells fhould be noticed here if any inftructions were neceffary for their prefervation; but thefe in general conftitute the moft durable part of a collection, being either chalky, cafts in flint or ftone, or replacements of fparry matter, with perhaps only fome flight fragments of the fhell adhering, and that very rarely. They are dug out of chalk-pits, lime-ftone, or other ftone-quarries, and coal-pits, &c. Vide "Donovan's Inftructions for collecting and preferving Subjects of Nat. Hift." from which the above particulars are chiefly extracted.

CONCHUCOS, in *Geography*, a jurifdiction of South America, in the vice-royalty of Peru, fubject to the archbifhop of Lima, which commences 40 leagues N.N.E. of Lima, and extends along the centre of the Cordilleras. Its air, therefore, is different according to the height of the fituation of its feveral parts, the mildeft of which produce all kinds of grains and fruits, and the others, where cold checks their fertility, afford pafture for all kinds of cattle. This jurifdiction abounds with looms: the principal occupation of the Indians being woollen manufactures of various kinds, which conftitute the greateft part of its commerce with other provinces.

CONCIATOR, in the *Glafs Art*, is for the cryftal glafs what the founder is at the green glafs-houfes. He is the perfon that weighs and proportions the falt on afhes and fand, and works them with a ftrong fire, till they run into lumps, and become white; and if the metal be too hard, and confequently brittle, he adds falt, or afhes; and if too foft, fand; ftill mixing them to a fit temper, which is only known by the working.

CONCILIO—*Querela corum rege et* CONCILIO. See QUERELA.

CONCINNA, DANIEL, in *Biography*, an Italian Dominican, born in the Venetian territory about the year 1686. He was highly diftinguifhed for his pulpit talents, which attached to him numerous admirers in Italy, and even in Rome itfelf. As a writer he was efteemed, on account of the fupport which he gave to the inftitutions of the Papal church. He was author of numerous publications in the Latin and Italian languages, on hiftorical, moral, and critical fubjects, among which are "Defenfio Concilii Tridentini, et Apoft. Conft. Eccle Rom. in caufa Paupertatis Monafticæ, &c." "Ufura Contractus trini Differtationis Hift. Theol. demonftrata," &c. "De Spectaculis Theatralibus Chriftiano cuiquam, tum Laico, tum Clerico, vetitis, &c." "Theologia Chriftiana, dogmatico-moralis," in 12 vols. 4to. "Theological, Moral, and Critical Differtations, relative to the Logic of Probabilities, with Supplementary Obfervations." "A Defence of Revealed Religion, &c." He died at Venice in the year 1756. Nouv. Hift. Dict.

CONCINNOUS *Intervals*, in *Mufic*, are fuch as are apt and ufeful in harmony, as the V., 4th, III., 3d, VI., 6th, IV. and 5th, in contradiftinction to fuch as are inconcinnous, as the intervals deficient or redundant by a comma. See COMMA-*Redundant*, *Fifth*, *Fourth*, &c.

CONCINO Concini, Marshal D'Ancre, in *Biography*, was a native of Tuſcany, and, with his wife, Leonora Galigai, accompanied Mary de Medicis, queen of Henry IV. into France, in 1660. He was made gentleman of the bed-chamber, governor of Normandy, and marſhal of France, in 1615. As he was raiſed by the influence which he attained over the mind of the queen, he held the reins of government during the minority of Louis XIII. and behaved in ſo haughty a manner to the young king, that he was induced to order his arreſt, and in caſe of reſiſtance, the perſon ſent on the buſineſs was commanded to kill him. The captain of the guard demanded his ſword as he was paſſing the drawbridge of the Louvre, and upon his refuſing to comply, he ſhot him dead, April 24, 1617. His body, after it had been buried, was taken up and given to the populace, who treated it with every indignity. His wife was afterwards condemned, by a decree of the parliament, to be hanged and burnt. Moreri.

CONCIOLO, an Italian painter, who flouriſhed in the commencement of the thirteenth century. Upon a picture at Subiaco, in the Eccleſiaſtical State, repreſenting the conſecration of a church, the artiſt has thus ſigned his name, Conxiolus pinxit, 1219. This is one amongſt the many proofs, with which the churches and convents of Italy abound, to ſhew that however low the ſtate of the arts in Europe, previous to Cimabue and Giotto, the intervention of Greek painters was by no means neceſſary to their eſtabliſhment. Lanzi. Storia Pittorica.

CONCIONATORES, in *Antiquity*, common-councilmen, freemen, called to the hall or aſſembly, as moſt worthy. Thus, "quodam tempore cum conveniſſent *concionatores* apud London, &c." Hiſt. Elien. apud Gale, c. 46.

CONCLAMATIO, a ſhout raiſed by thoſe preſent at burning the dead, before they ſet fire to the funeral pile. See Shout. The word was alſo applied to the ſignal given to the Roman ſoldiers to decamp, whence the expreſſion "conclamare vaſa;" and "conclamari arma" was a ſignal for battle. It was likewiſe uſed for a practice of calling to a perſon deceaſed three times by his name, and when no reply was returned, they thus expreſſed his deceaſe, "conclamatum eſt." Whence the ſame term was afterwards applied to the ceſſation of the Roman empire.

Conclamatio, among the Greeks, Romans, and ſeveral other nations, was a ſpontaneous cry or ſhout, which all the ſoldiers of an army made when they underſtood or heard the third ſignal for combat.

CONCLAVE, an aſſembly or meeting of all the cardinals that are at Rome, ſhut up for the election of a pope; whence it derives its name. See Cardinal.

The conclave had its riſe in the year 1270, and on this occaſion; Clement IV. being dead at Viterbo, in 1268, the cardinals were nearly three years, *viz.* from the 29th of November 1268, to the 1ſt of September 1271, without being able to agree on the election of a ſucceſſor; in effect, things were carried to ſuch paſs that they were upon the point of breaking up, without coming to any concluſion at all.

The magiſtrates of Viterbo, being appriſed of their deſign, by the advice of St. Bonaventure, then at Viterbo, ſhut the gates of their city,' and locked up the cardinals in the pontifical palace adjoining to the cathedral, till they were brought to a better underſtanding.

Hence aroſe the cuſtom, which has ſince prevailed, of ſhutting up the cardinals in a ſingle palace, till they have elected the pope.

Such was the origin of the conclave, as related by Onuph. Panvinius, Ciaconius, and Papebroch.

Panvinius informs us, that John of Toledo, cardinal biſhop of Porto, ſeeing the cardinals daily praying the Holy Ghoſt to inſpire them with the ſpirit of concord and union, and yet diſcord continuing to reign among them, ſaid pleaſantly, "Let us uncover the room, elſe the Holy Ghoſt will never get at us." When this ſarcaſtic remark was reported to the magiſtrates of Viterbo, they immediately ordered the roof of the room in which the cardinals were aſſembled, to be taken off, hoping that this new inconvenience would oblige them to haſten the election; but their obſtinacy prevailed againſt all inconveniences, till the magiſtrates bethought themſelves of daily leſſening their ſubſiſtence; and this had the deſired effect. For being thus reduced to the alternative of ſtarving or agreeing, they left the election by compromiſe to ſix of their number; and then Gregory X. was elected.

Conclave is alſo uſed for the place wherein the election of the pope is performed; which is now at St. Peter's in the Vatican; though Gregory X. and Clement V. appointed it ſhould always be held in the place where the laſt pope ſhould die. But if he ſhould die in a borough or village, where the electors could not conveniently meet, the election was to take place in the epiſcopal city, or in the neareſt to it, if that city were under an interdict.

While the affair is in hand, if it be in winter, the walls and windows are all mured up, excepting only a ſingle pane, to give a little light; in ſummer the windows are not cloſed; but the great door of the hall is ſecured with four locks and four bolts; an aperture being, however, left, through which to ſupply the impriſoned prelates with victuals.

If the election takes place at Rome, the door of the conclave, and all the avenues to it are to be carefully guarded by the city-guards, by the Roman nobility, by the ambaſſadors of princes, and by the biſhops and conſervators of the city. If the election is to be made out of Rome, the ſame duty is incumbent upon the temporal lords and magiſtrates of the place; and it is a duty common to them all to ſee that nothing be carried into the conclave, or out of it, that has the leaſt tendency to retard or prevent a lawful election.

In the hall, which is very ample, there are cells or ſtalls erected for as many cardinals as are to be preſent at the election; the cells being only ſeparated by deal boards, and the room having no outlet, except to the privy.

The cells are marked with letters of the alphabet, and are diſtributed to the cardinals by lot: each cardinal puts his arms on the cell that falls to his ſhare.

No one ſhall be allowed to go into the common room or conclave, nor out of it, but in caſe of ſickneſs, or on ſome other urgent occaſion.

After the aſſembly has continued three days, they are only allowed one diſh for a meal; and after fifteen days more, only bread, wine, and water, though this rule is not very ſtrictly regarded.

Each cardinal is allowed two concláviſts, or ſervants to attend him, and to be ſhut up with him.

The election is begun ten days after the pope's deceaſe, and decided by a majority of two parts in three of the cardinals preſent, who vote by ballot; and if, upon ſcrutiny, no one of the candidates has two-thirds of the votes, the balloting muſt, after a ſtated interval, be repeated. And this continues to be reiterated if they ſhould remain ſhut up for years, till one of them attains the fore-mentioned ſuperiority. Cardinals who arrive before the election is finiſhed, are incloſed with the reſt.

Theſe regulations were principally eſtabliſhed by Gregory X. in 1274. But as this conſtitution of Gregory X. was

was thought by the cardinals to be too rigorous, they prevailed upon Clement VI. in the year 1351, not long before his death, to mitigate it. Clement allowed them to have each two fervants, clerks, or laymen; to have curtains round their beds, and one difh of flefh or fifh at dinner, and another at fupper, befides bread, wine, fruit, and fweetmeats, fo long as they continued in the conclave.

Matthew Paris fays, the word conclave anciently fignified the pope's wardrobe.

It is a popular proverb in Italy, *chi entra papa, efce cardinale;* he who enters pope, comes out cardinal; q. d. he who according to common report will be elected pope, ordinarily is not.

We have various accounts, both by proteftant and popifh writers, of the intrigues that have been practifed in the conclave, during contefted elections. What is faid to have paffed upon the deceafe of Alexander VII. is no tale invented by proteftants, but related by grave Roman catholics, *viz.* that on the laft day, cardinal Sforza, going into the conclave, afked another cardinal, his intimate friend, what he thought would be the iffue? He returned this frank anfwer: "Signior cardinal, if the French make the pope, he will be cardinal Farnefe; if the Spaniards, cardinal Rofpigliofi; if he is made by the people of Rome, he will be cardinal Barberini; if the Holy Ghoft appoints him, cardinal Odefchalchi will be the man; if the devil has a hand in it, he muft be your eminence, or myfelf." Upon this, Sforza replied with a laugh, "then Rofpigliofi will be the man;" and he was accordingly chofen by the name of Clement IX. In the year 1724, upon the death of Innocent XIII, the following fatirical diftinction was made between the candidates for the papal throne:

"Il Cielo vuol Orfini
Il popolo Corfini
Le Donne Ottoboni
Il Diavolo Alberoni."

i.e. "Heaven is for Orfini,
The people for Corfini,
The ladies for Ottoboni,
The devil for Alberoni."

But Orfini was chofen by the name of Benedict XIII. Keyfler's Trav. vol. ii. p. 109.

CONCLUSION, in *Law*, is where a man by his own act upon record hath charged himfelf with a duty or other thing, or confeffed any matter whereby he fhall be concluded: as if a fheriff returns that he hath taken the body upon a capias, and hath not the body in court, at the day of the return of the writ; by the return, the fheriff is concluded from plea of efcape, &c. Terms de Ley, 153, &c. In another fenfe the word conclufion fignifies the end of any plea, replication, &c. and a plea to the writ, is to conclude to the writ; a plea in bar, to conclude to the action, &c. Conclufion of plea in bar fhall be, *et hoc paratus eft verificare:*—of other pleas *et de hoc ponit fe fuper patriam.* Kitch. 219, 220. See Plea.

Conclusion *of deeds,* mentions the execution and date of the deed, or the time of its being given or executed, either exprefsly, or by reference to fome day and year before-mentioned. Not but a deed is good, although it mention no date, or hath a falfe date; or even if it hath an impoffible date, as the 30th of February; provided the real day of its being dated or given, that is delivered, can be proved.

Conclusion, in *Logic*, the laft part of an argument; or the confequence drawn from fomething either affumed or proved before.

The conclufion of an argument contains two parts: the confequent, which is the matter of it; and the confequence, which is its form, and which, of a fimple abfolute propofition, renders the conclufion relative to the premifes whence it is drawn.

The queftion and conclufion, fay the fchoolmen, are the fame ideas, only confidered in different views, or relations: in the queftion they are confidered as doubtful; in the conclufion as void of doubt.

Conclusion, in *Oratory*, confifts of two parts; the Recapitulation, or Enumeration, and the Passions. See alfo Peroration.

Conclusions *d'une procedure militaire*, Fr. See the article Judge *Advocate.*

CONCOBAR, in *Ancient Geography*, a town of Afia, in Upper Media, towards the S.W. of Ecbatana.

CONCOCTION, in the *Animal Economy*, a term ufed by the older writers to denote the procefs which the food undergoes in the ftomach, and by which it is converted into chyme and chyle. This procefs is now more ufually termed Digestion, which fee.

Concoction, in the *Pathology* of Hippocrates and Galen, and their numerous followers, was alfo employed to fignify certain changes in the fluids in the courfe of acute difeafes, from a fuppofed analogy between the changes, and thofe which the aliments undergo in the ftomach during digeftion. The procefs of concoction may be particularly illuftrated in the cafe of a common phlegmon, or boil; the progrefs of which is marked, according to Galen, by four diftinct ftages. The firft, or *incipient* ftage, when thefe fluids are beginning to collect, is confidered as the ftage of crude and unchanged humours: in the fecond, or ftage of *increafe*, in confequence of the procefs of concoction, heat is diffufed through the part, and the pain, tenfion, and tumour are increafed: when the humours are completely concocted, and converted into *pus*, the ftage of the phlegmon is faid to be *ftationary*, or the difeafe to be in its vigour: and the fourth ftage is that, in which the tenfion and tumour become lefs, and which is termed the *decline* of the fwelling. A fimilar progrefs is obfervable in almoft all inflammatory difeafes. Thus in catarrh, affecting the mucous membrane of the nofe, the difcharge in the commencement is thin and watery, and, in the language of the humoral pathology, *crude;* by degrees a thicker and more opake matter is difcharged, which at length (becoming completely concocted), affumes a very thick and purulent appearance, which betokens the decline of the difeafe. Such alfo is the progrefs of change in the fluids expectorated in inflammations of the lungs and bronchiæ, difcharged from the eyes in ophthalmia, &c. By an analogy fomewhat remote, this doctrine was transferred to febrile complaints, where no local inflammation, or depofitary of morbid concocting matter, exifted. In an idiopathic fever, as fynochus or typhus, the alvine excrements, the urine, and the difcharge from the fkin, were referred to, as evidence of the procefs of concoction; and the varieties of the appearance of thefe difcharges are defcribed by Hippocrates, and his commentator Galen, as denoting the ftates of crudity and of concoction, and hence as affording a prognofis of the future progrefs and event of the difeafe. The alvine excrement is faid to be well concocted, when it is, as in health, foft and connected, and is difcharged with the ufual regularity. When it is not in this ftate, but liquid and watery, partly liquid, partly

partly folid, &c. it is confidered as not concocted, and therefore indicating the unhealthy condition of the bowels, through which it had paffed. And thus, with refpect to the urine, when it is extremely thin and limpid, it is faid to be crude; and when it is flightly tinged with yellow, it is confidered as having undergone a fmall degree of concoction, which is ftill more complete, if it foon depofits a moderate fediment. But the figns of concoction in the urine were faid to be different in the young and the old, and different alfo in different difeafes. Thus in bilious and fummer fevers, a light cloud fufpended in the urine was deemed the fign of concoction; in inflammatory fevers, a white fediment. See Galen, de Tot. Morbi. Tempor. et de Crifibus, lib. i.

CONCOLIN, in *Geography*, a town of France, in the department of the Ifere; 4½ leagues N.E. of Grenoble.

CONCOMITANT, in *Theology*, fomething that accompanies, or goes along with, another.

Concomitant grace, is that which God affords us during the courfe of our actions to enable us to perform them; and as the Roman fchoolmen fay, to render them meritorious.

CONCOMITANT *Neceffity*. See NECESSITY.

CONCORD, FORM OF, in *Ecclefiaftical Hiftory*, a ftandard-book among the Lutherans, compofed at Torgaw, in 1576, and thence called the Book of Torgaw, and reviewed at Berg, by fix Lutheran doctors of Germany, the principal of whom was James Andreæ. This book contains in two parts, a fyftem of doctrine, the fubfcription of which was a condition of communion, and a formal and very fevere condemnation of all who differed from the compilers of it, particularly with refpect to the majefty and omniprefence of Chrift's body, and the real manducation of his flefh and blood in the eucharift. It was firft impofed on the Saxons by Auguftus, and occafioned great oppofition and difturbance, both among the Lutherans and Reformed.

Several of the moft eminent churches of the Lutheran communion rejected it fo firmly and refolutely, that no arguments nor intreaties could engage them to admit it as a rule of faith, or even as a mean of inftruction. Accordingly, it was rejected for various reafons, by the churches of Heffia, Pomerania, Nuremberg, Holftein, Silefia, Denmark, Brunfwick, and others. Among the Reformed, or Calvinifts, the Swifs doctors, at the head of whom was Hofpinian, the Belgic divines, thofe of the Palatinate, together with the principalities of Anhalt and Bade, declared war againft it. This form of concord, however, was patronized in a fpecial manner by Julius, duke of Brunfwick, to whom, in a great meafure, it owed its exiftence; and who employed his authority and munificence in encouraging thofe by whom it was compofed, and in commanding all the ecclefiaftics, within his dominions, to receive and fubfcribe it as a rule of faith. But foon after it was publifhed, this zealous prince changed his mind, fuffered it to be publicly expofed by the divines of his univerfity of Helmftadt, and to be excluded from the number of creeds and confeffions that were received by his fubjects. Various means were ufed to obviate his objections; and particularly in the year 1583, a convocation of divines from Saxony, Brandenburg, Brunfwick, and the Palatinate, was held at Quedlinburg for this purpofe. But Julius perfifted in his oppofition, and propofed that the form of concord fhould be examined, and its authority difcuffed by a general affembly or fynod of the Lutheran church.

In the year 1614, John Sigifmund, elector of Brandenburg, following the example of the landgrave of Heffe, renounced Lutheranifm, and, under certain reftrictions, embraced the communion of the Reformed churches. This event occafioned a difpute, which was agitated with violence, and which occafioned the form of concord to be fuppreffed in the territories of Brandenburg, and the fubjects of that electorate to be prohibited, by a folemn edict, from ftudying divinity in the academy of Wittemberg. Towards the clofe of the 17th century, *viz.* in the year 1675, a new confeffion of faith was drawn up by the Helvetic divines, under the denomination of the "form of concord or of agreement," which was alfo entitled the "Confenfus;" but the introduction of it occafioned contefts and tumults in feveral places. It maintained, however, its credit and authority in the church of Geneva, until the year 1706, when, without being abrogated by any pofitive act, it fell into difufe. In feveral other parts of Swifferland, it was ftill impofed as a rule of faith, particularly in 1718, by the magiftrates of Bern, who publifhed an order, by which all profeffors and paftors, particularly thofe of the univerfity and church of Laufanne, who were fufpected of entertaining any erroneous opinions, were obliged to declare their affent to this formulary. Many paftors and candidates for holy orders refufed the affent that was demanded by the magiftrates, and fome of them were punifhed for this refufal. In confequence of thefe warm contefts and grievous complaints letters were addreffed by George I., king of England, as alfo by the king of Pruffia, in the year 1723, to the Swifs cantons, in order to procure the abrogation of this form, or confenfus, which was confidered as an obftacle to the union of the Reformed and Lutheran churches. Mofheim's Eccl. Hift. by Dr. Maclaine, vol. iv. v. vi.

CONCORD, in *Geography*, a flourifhing poft-town of America, in New Hampfhire, pleafantly fituated on the W. bank of Merrimack river, in Rockingham county, eight miles above Hookfet falls. The legiflature has, of late, held its feffions here; and on account of its central fituation in the front of a thriving country, it will probably become the permanent feat of government. Much of the trade of the upper country centers here. This town is connected with Pembroke by a handfome bridge acrofs the Merrimack. Concord was incorporated in 1765, and has 1747 inhabitants. Its Indian name was "Penacook." It was granted by Maffachufetts, and called "Rumford." The compact part of the town contains about 170 houfes, a congregational church, and an academy, which was incorporated in 1790. It is 54 miles W.N.W. of Portfmouth, 58 S.W. of Dartmouth college, and 70 northward from Bofton. N. lat. 43° 12′. W. long. 71° 29′.

CONCORD, a town of America in the ftate of Vermont and county of Effex, lying on Connecticut river, oppofite to a part of the 15 mile falls.

CONCORD, a poft-town of America, in the ftate of Maffachufetts, being one of the moft confiderable towns in Middlefex county, fituated on Concord river, in a healthy and pleafant fpot, nearly in the centre of the county, and 18 miles N.W. of Bofton, and 17 E. of Lancafter. Its Indian name was Mufquetequid; and it owes its prefent name to the peaceable manner in which it was obtained from the natives. It was incorporated in 1635; being at that time the moft diftant fettlement from the fea-fhore of New England. In 1791 this townfhip contained 225 dwelling houfes and 1590 inhabitants; and as a proof of the falubrity of its fituation, 80 of the number were above 70 years old; and for 13 years before 1791, the average number of deaths was 17, one in four of whom was 70 years old or upwards. The public buildings are a congregational church, a fpacious ftone gaol, and a very handfome county court houfe. The river is croffed by three bridges, of which one is 208 feet long and 18 feet wide, fupported by 12 piers,

piers, and built after the manner of Charles river bridge. This town, during the revolution, was the feat of the provincial congrefs in 1774, and the fpot where the firft oppofition was made to the Britifh troops, on the 19th of April 1775. The grand court has been held here, when contagious difeafes have prevailed in the capital. N. lat. 42° 25′.

Concord, a fmall river of Maffachufetts, formed of two branches, which unite near the centre of the town of Concord, whence it takes its courfe in a N.E. and N. direction through Bedford and Billerica, and empties itfelf into Merrimack river at Tewkfbury. This river is remarkable for the gentlenefs of its fcarcely perceivable current. At low water mark it is from 100 to 200 feet wide, and from 3 to 12 feet deep. During floods it is nearly a mile in breadth: and when viewed from the town of Concord, exhibits a fine appearance.

Concord, a townfhip of Delaware county in the ftate of Pennfylvania.

Concord, a fettlement in Georgia, on the E. bank of the Miffiffippi, about a mile from the fouth line of Tenneffee, 108 miles N. from the mouth of Yazoo river, and 218 below the Ohio. N. lat. 33° 55′. W. long. 91° 25′.

Concord, in *Grammar*, that part of fyntax, or conftruction, whereby the words of a fentence agree among themfelves, *i. e.* whereby nouns are put in the fame cafe, number, gender, &c. and verbs in the fame number and perfon, with nouns and pronouns.

The rules of concord are generally the fame in all languages, as being of the nature of what is in ufe almoft everywhere, for the better diftinguifhing of difcourfe.

Thus, the diftinction of the two numbers fingular and plural obliges us to make the adjective agree with the fubftantive in number; that is, to put the one either in this or that number, according as the other is: for the fubftantive being the thing confufedly, though directly, marked by the adjective; if the fubftantive word mark feveral, there are feveral fubjects of the form marked by the adjective, and of confequence this fhould be in the plural; as *homines docti*, &c.

Again, the diftinction of mafculine, and feminine, renders it neceffary to put the fubftantive and adjective in the fame degree.

And verbs fhould have concord or agreement with nouns and pronouns in number and perfon.

If any thing occur apparently contrary to thefe rules, it is by a figure; *i. e.* fomething is implied, or the ideas are confidered more than the words themfelves. See Syntax,

Concord, *Order of*, in *Heraldry*, was inftituted by Chriftian-Erneft, Margrave of Brandenburgh, on his return from Spain, in the year 1660, to diftinguifh the part he had taken in reftoring peace and union to many European princes. The badge of the order is a gold crofs of eight points enamelled white, furmounted by an electoral crown; in the centre of the crofs a medal thereon, two olive branches paffing faltierwife through two crowns: around the medal the motto *concordans*. On the reverfe the founder's cypher with the date of the inftitution. This badge is worn pendent from an orange ribbon.

Concord, in *Law*, is the agreement between parties who intend the levying a fine of lands to one another, how and in what manner it fhall pafs. This is ufually an acknowledgment from the deforciants (or thofe who keep the other out of poffeffion) that the lands in queftion are the right of the complainant. And from this acknowledgment or recognition of right, the party levying the fine is called the *cognizor*, and he to whom it is levied the *cognizee*. This acknowledgment muft be made either openly in the court of common pleas, or before the lord chief-juftice of that court; or elfe before one of the judges of that court; or two or more commiffioners in the country, empowered by a fpecial authority, called a writ of "dedimus poteftatem;" by which judges and commiffioners are bound by ftatute 18 Edw. I. ft. 4. to take care that the cognizors be of full age, found memory, and out of prifon. If there be any feme-covert among the cognizors, fhe is privately examined whether fhe does it willingly and freely, or by compulfion of her hufband.

Concord, is alfo an agreement made upon any trefpafs committed (betwixt two, or more); and is divided into *concord executory*, and *concord executed*. Thefe concords or agreements are by way of fatisfaction for the trefpafs, &c.

Plowden obferves, that the firft binds not, being imperfect; but the latter is perfect, and binds the party.

Others are of opinion, that concords executory are perfect, and bind no lefs than thofe executed.

Concord, in *Mufic*, denotes the relation of two founds which are always agreeable to the ear, whether heard in fucceffion or confonance.

If two fingle founds be in fuch a relation, or have fuch a difference of tone, as that, being founded together, they make a mixture, or compound found, which affects the ear with pleafure; that relation is called *concord*: and whatever two founds make an agreeable compound in confonance, thofe fame founds will always be pleafing in fucceffion, or will follow each other agreeably.

The reverfe of concord is what we call *difcord*; which is the general denomination of all the relations or differences of tone that have no pleafing effect.

Concord and harmony are, in effect, the fame thing; though cuftom has applied them differently. As concord expreffes the agreeable effect of two founds in confonance: fo harmony expreffes the fame fort of agreement in a great number of founds in confonance: add, that harmony always implies confonance; but concord is fometimes applied to fucceffion, though never but when the tones will make an agreeable confonance; whence it is, that Dr. Holder, and fome other writers, ufe the word confonance for what we call concord.

Unifonance, then, being the relation of equality between the tones of two founds, all the unifons are concords, and in the firft degree; but an interval being a difference of tone, or a relation of inequality between two founds, becomes a concord or difcord, according to the circumftances of the particular relation. Indeed fome reftrain concord to intervals, and make a difference of tone conftitute the effential difference of concord and difcord; but two unifons cannot form an interval.

It is not eafy to affirm the reafon or foundation of concordance: the difference of tone, we have elfewhere obferved, takes its rife from the different velocity of the vibrations of the fonorous body, *i. e.* of the velocity of thofe vibrations in their recourfes; the more frequent their recourfes are, the more acute will be the tone, and *vice verfâ*.

But the effential difference between concord and difcord lies deeper: there does not appear any natural aptitude in the two founds of a concord, to determine it to give us a pleafing fenfation, more than in the two founds of a difcord: thefe different effects are merely arbitrary, and muft be refolved into the divine pleafure.

We know by experience what proportions and relations of tone afford pleafure, and what do not; and we know alfo how to exprefs the difference of tone by the proportion of

of numbers; we know what it is pleafes us, though we do not know why: we know, *v. gr.* that the ratio of 1 : 2 conftitutes concord, and 6 : 7 difcord: but on what original grounds agreeable or difagreeable ideas are connected with thofe relations, and the proper influence of the one on the other, are above our reach.

By experience we know, that the following ratios of the lengths of ftrings are all concord; *viz.* 2 : 1, 3 : 2, 4 : 3, 5 : 4, 6 : 5, 5 : 3, 8 : 5; that is, take any ftring for a fundamental, which fhall be reprefented by the number 1, and the following divifions thereof will be all concord with the whole; *viz.* $\frac{1.2.3.4.5.3.5}{2.3.4.5.6.5.8}$.

So that the diftinguifhing character between concords and difcords muft be looked for in thefe numbers, expreffing the intervals of found; not abftractedly and in themfelves, but as expreffing the number of vibrations. Now, unifons are in the firft degree of concord, or they have the moft perfect likenefs or agreement in tone; and therefore have fomething in them acceffory to that agreement which is found, lefs or more, in every concord: the nearer two founds come to an equality of tone, the flower are the beats, and the more agreement they have; therefore, it is not in the equality or inequality of the numbers that this agreement lies.

Further, if we confider the number of vibrations made in any given time by two ftrings of equal tone; on the principle laid down, they are equal: and therefore the vibrations of the two ftrings coincide, or commence together as frequently as poffible, *i. e.* they coincide at every vibration; in the frequency of which coincidence, or united mixture of the motions of the two ftrings, and of the undulations of the air which they occafion, it is, that the difference of concord and difcord muft be fought. Now, the nearer the vibrations of two ftrings approach to a coincidence as frequent as poffible, the nearer they fhould approach that condition, and confequently the agreement of unifons; which is confirmed by experience.

For if we take the natural feries 1, 2, 3, 4, 5, 6, and compare each number to the next, as expreffing the number of vibrations in the fame time of two ftrings, whofe lengths are reciprocally as thofe numbers; the rule will be found exact, for 1 : 2 is beft, then 2 : 3; after 6 the union is unfufferable; the coincidences being too rare: though there are other ratios that are agreeable, befides thofe found in that continued order, *viz.* 3 : 5, and 5 : 8, which, with the preceding five, are all the concording intervals within, or lefs than an octave, or 1 : 2; that is, whofe acuteft term is greater than half the fundamental.

On this principle, 3 : 5 will be preferable to 4 : 5; becaufe thofe being equal in the number of vibrations of the acuter term, there is an advantage on the fide of the fundamental in the ratio 3 : 5, where the coincidence is made at every third vibration of the fundamental, and every fifth of the acute term: fo alfo the ratio 5 : 8 is lefs perfect than 5 : 6; becaufe, though the vibrations of each fundamental that go to one coincidence are equal; yet in the ratio 5 : 6, the coincidence is at every fixth of the acute term, and only at every eighth in the other cafe.

Thus, we have a rule for judging of the preference of concords, from the coincidence of their vibrations: agreeable to which rule, they are difpofed into the order of the following table; to which the names of the concords in practice, the ratio of their vibrations, the lengths of the ftrings, and the number of coincidences in the fame, are expreffed.

Ratios, or vibrations.	Grave Term.		Acute Term.	Coincid.
Unifon —	— 1	:	1	
Octave, 8ve	— 2	:	1	60
Fifth, 5th —	— 3	:	2	30
Fourth, 4th	— 4	:	3	20
Sixth, gr. —	— 5	:	3	20
Third, gr. —	— 5	:	4	15
Third, leffer	— 6	:	5	12
Sixth, leffer	— 8	:	5	12
	Grave Lengths.		Acute Lengths.	

Though this order be fettled by reafon, yet it is confirmed by the ear. On this foundation, concords muft ftill be the more perfect, as they have the greateft number of coincidences, with regard to the number of vibrations in both the ftrings; and where the coincidences are equal, the preference will fall on that interval, whofe acuteft term has feweft vibrations to each coincidence: which rule, however, is in fome cafes contrary to experience; and yet it is the only rule hitherto difcovered.

Indeed, Kircher, after father Merfenne, gives us another ftandard for fettling the comparative perfection of intervals with regard to the agreement of their extremes in tone: and it is this.

The perception of concordance, fay they, is nothing but the comparing two or more different motions which in the fame time affect the auditory nerve: now we cannot make a certain judgment of any confonance, till the air is as often ftruck in the fame time by two ftrings, as there are units in each member expreffing the ratio of that concord; *v. gr.* we cannot perceive a fifth, till two vibrations of the one ftring, and three of the other, are accomplifhed together; which ftrings are in length as 3 to 2: the rule then is, that thofe concords are the moft fimple and agreeable, which are generated in the leaft time; and thofe, on the contrary, the moft compound and harfh, which are generated in the longeft time.

For inftance, let 1, 2, 3, be the lengths of 3 ftrings, 1 : 2 is an octave; 2 : 3 a fifth; and 1 : 3 an octave and fifth compounded, or a twelfth. The vibrations of ftrings being reciprocally as their lengths, the ftring 2 will neceffarily vibrate once, while the ftring 1 vibrates twice, and then exifts an octave; but the twelfth does not yet exift, becaufe the ftring 3 has not vibrated once, nor the ftring 1 thrice, which is neceffary to form a twelfth.

Again, for generating a fifth, the ftring 2 muft vibrate thrice, and the ftring 3 twice; in which time, the ftring 1 will have vibrated 6 times; and thus the octave will be thrice produced, while the twelfth is only produced twice; the ftring 2 uniting its vibrations fooner with the ftring 1, than with the ftring 3; and they being fooner confonant than the ftring 1 or 2 with that 3. Whence, that author obferves, many of the myfteries of harmony, relating to the performance of harmonious intervals, and their fucceffion, are eafily deduced.

But this rule, upon examining it by other inftances, Mr. Malcolm has fhewn defective, as it does not anfwer in all pofitions of the intervals with refpect to each other; but a certain order, in which they are to be taken, being required: and there being no rule, with refpect to the order, that will make this ftandard anfwer to experience in every cafe: fo that at laft we are left to determine the degrees of concord by experience and the ear.

Not but that the degrees of concord depend much on the more or lefs frequent uniting the vibrations, and the ear's being

being more or lefs uniformly moved, as above; for that this mixture or union in motion is the true principle, or, at leaft, the chief ingredient in concord, is very evident: but becaufe there feems to be fomething farther in the proportion of the two motions neceffary to be known, in order to fix a catholic rule for determining all the degrees of concord, agreeable to fenfe and experience.

The refult of the whole doctrine is fummed up in this definition.—Concord is the refult of a frequent union, or coincidence of the vibrations of two fonorous bodies, and, by confequence, of the undulating motions of the air, which, being caufed by thefe vibrations, are like and proportionable to them; which coincidence, the more frequent it is, with regard to the number of vibrations of both bodies, performed in the fame time, *cæteris paribus*, the more perfect is that concord: till the rarity of the coincidence, in refpect of one or both the motions, produces difcord. See fome of the remarkable phenomena of founds accounted for from this theory, under the word UNISON; fee alfo INTERVAL, &c.

Mr. Carre, in the Memoirs of the Royal Academy of Sciences, lays down a new general propofition, to determine the proportion which cylinders are to have, in order to form the concords or confonances of mufic. And it is this—that the folid cylinders, whofe founds yield thofe concords, are in a triplicate and inverfe ratio of that of the numbers which exprefs the fame concords.

Suppofe, *e. gr.* two cylinders, the diameters of whofe bafes and lengths are as 3 to 2: it is evident their folidities will be in the ratio of 27 to 8, which is the triplicate ratio of 3 to 2: we fay then, that the founds of thofe two cylinders will produce a fifth, which is expreffed by thofe numbers; and that the biggeft and longeft will yield the grave found, and the fmalleft the acute one.—And the like of others.

Concords are divided into *fimple*, or original, and *compound.*

A *fimple*, or *original* concord, is that whofe extremes are at a diftance lefs than the fum of any two other concords.

On the contrary, a *compound* concord is equal to two or more concords.

Other mufical writers ftate the divifion thus: an octave 1 : 2, and all the inferior concords above expreffed, are all fimple and original concords: and all greater than an octave, are called compound concords; as being compofed of, and equal to the fum of one or more octaves, and fome fingle concord lefs than an octave; and are ufually, in practice, denominated from that fimple concord.

As to the compofition and relations of the original concords, by applying to them the rules of the addition and fubtraction of intervals, they will be divided into *fimple* and *compound*, according to the firft and more general notion; as in the following table.

Simple Concords	Compound Concords.				
5 : 6 a 3d leff.	4th	3dg. and	3dl.	8 ve. compofed of	5th 4th or
4 : 5 a 3d gr.	6th l.	4th.	3dl.		6th g. 3dl.
3 : 4 a 4th.	5th g.	4th.	3 g.		or 3d. g.
					3d. l. 4th.

The octave is not only the firft concord in point of perfection, the agreement of whofe extremes is greateft and the neareft to unifon; infomuch that, when founded together, it is impoffible to perceive two different founds; but it is alfo the greateft interval of the feven original concords; and, as fuch, it contains all the leffer, which derive their fweetnefs from it, as they arife more or lefs directly out of it; and which decreafe gradually, from the octave to the leffer fixth, which has but a fmall degree of concord.

A remarkable circumftance is the manner wherein thefe minor concords are found in the octave, which fhews their mutual dependences.

For, by taking both an harmonical and arithmetical mean between the extremes of the octave, and then both an harmonical and arithmetical mean betwixt each extreme, and the moft diftant of the two means laft found; viz. betwixt the leffer extreme and the firft arithmetical mean, and betwixt the greater extreme and the firft harmonical mean; we have all the leffer concords.

Thus, if betwixt 360 and 180, the extremes of octave, we take an arithmetical mean, it is 270; and an harmonical mean is 240: then, betwixt 360 the greateft extreme, and 240 the harmonical mean, take an arithmetical mean, it is 300; and an harmonical mean is 288. Again, betwixt 180 the leffer extreme of the octave, and 270 the firft arithmetical mean, it is 225, and an harmonical one 216.

Thus, we have a feries of all the concords, both afcending towards acutenefs from a common fundamental 360; and defcending towards gravity from a common acute term 180: which feries has this property, that taking the two extremes, and any other two at equal diftances, the four will be in geometrical proportion.

The octave, by immediate divifion, refolves itfelf into a fourth and fifth; the fifth, again, by immediate divifion, produces the two thirds; the two thirds are therefore found by divifion; though not by immediate divifion; and the fame is true of the two fixths. Thus do all the original concords arife out of the divifion of the octave; the fifths and fourths immediately and directly, the thirds and fixths mediately.

From the perfection of the octave arifes this remarkable property, that it may be doubled, tripled, &c. and yet ftill will preferve a concord, *i. e.* the fums of two or more octaves are concord; though the more compound will be gradually lefs agreeable: but it is not fo with any other concord lefs than octave; the doubles, &c. of which are all difcords.

Again, whatever found is concord to one extreme of the octave, is concord to the other alfo; and if we add any other fimple concord to an octave, it agrees to both its extremes; to the neareft extreme it is a fimple concord, and to the fartheft a compound one.

Another thing obfervable in this fyftem of concords is, that the greateft number of vibrations of the fundamenta cannot exceed five; or that there is no concord where the fundamental makes more than five vibrations, to one coincidence with the acute term. It may be added, that this progrefs of the concords may be carried on to greater degrees of compofition, even *in infinitum;* but ftill the more compound, the lefs agreeable.

So a fingle octave is better than a double one, and that than a triple one; and fo of fifths, and other concords.

Three or four octaves form the extremes of all the intermediate founds; what will afford all the variety of pleafure the harmony of founds is capable of affording, or at leaft that we can receive; for we can hardly raife founds beyond that compafs, either by voice or inftrument, that fhall not offend the ear.

The phenomena attending fimultaneous founds have been confidered by Euler, and treated of in fo clear and perfpicuous

cnous a manner, that we cannot do better than ufe his own words in this place.

" On hearing a fimple mufical found, our ear is ftruck with a feries of pulfations equally diftant from each other, the frequency and number of which, in a given fpace of time, conftitute the difference which fubfifts between low notes and high ; fo that, the fmaller the number of vibrations or ftrokes produced in a given time, fay a fecond, the lower we eftimate that note ; and the greater the number of fuch vibrations, the higher is the note. The perception of a fimple mufical found may, therefore, be compared to a feries of dots equidiftant from each other, as . . . . If the intervals between thefe dots be greater or fmaller, the found produced will be lower or higher. It cannot be doubted, that the perception of a fimple found is fomewhat fimilar, or analogous, to the fight of fuch a feries of dots equidiftant from each other : we are enabled thus to reprefent to the eye, what the ear perceives on hearing found. If the diftances between the dots were not equal, or thefe dots were fcattered about confufedly, they would be a reprefentation of a confufed noife, inconfiftent with harmony. This being laid down, let us confider what effect two founds, emitted at once, muft produce on the ear. Firft, it is evident, that if two founds are equal, or if each performs the fame number of vibrations in the fame time, the ear will be affected in the very fame manner as by a fingle note ; and, in mufic, thefe two notes are faid to be in unifon, which is the fimpleft union or combination of two founds : we mean by the term the blending of two or more founds heard at once. But if two founds differ in refpect of low and high, we fhall perceive a mixture of two feries of pulfations, in each of which the intervals are equal among themfelves, but greater in the one than in the other ; the greater intervals correfpondiug to the lower note, and the fmaller to the higher. This mixture, or this combination of two notes, may be reprefented to the eyes by two feries of dots, arranged on two lines, A B, and C D ;

A	1	2	3	4	5	6	7	8	9	10	11		B
	.	.	.	.	.	.	.	.	.	.	.		
	.	.	.	.	.	.	.	.	.	.	.	.	
C	1	2	3	4	5	6	7	8	9	10	11	12	D

and in order to form a juft idea of thefe two feries, we muft have a clear perception of the order which fubfifts among them, or, in other words, of the relation between the intervals of the one line and of the other. Having numbered and marked the dots of each line, and placed N° 1 under N° 1 ; thofe marked with the figure 2, will not exactly correfpond, and ftill lefs thofe marked 3 ; but we find N° 11 exactly over N° 12 ; from which we difcover that the higher note makes twelve vibrations, and the other only 11. If we had not affixed the figures, the eye would hardly have perceived this order ; it is the fame with the ear, which would with much difficulty have traced it in the two notes, which are reprefented by two rows of dots. But in the following figure,

. . . .

. . . .

you difcover at the firft glance, that the upper line contains twice as many dots as the under, or that the intervals in the under are twice as great as thofe of the upper. This is undoubtedly, next to unifon, the fimpleft of all cafes, in which you can at once difcover the order which fubfifts between thefe two feries of dots ; and the fame thing holds with refpect to the two notes reprefented by thefe two lines of dots : the number of vibrations contained in the one, will be precifely the double of the vibrations contained in the other, and the ear will eafily perceive the pleafing relation of thefe two founds ; whereas, in the preceding cafe, it was extremely difficult, if not impoffible, to difcriminate. When the ear readily difcovers the relation fubfifting between two notes, their combination is denominated confonance ; and if it be very difficult, or even impoffible, to catch this relation, the combination is termed diffonance. The fimpleft confonance, then, is that in which the high note produces precifely twice as many vibrations as the low note. This confonance, in the language of mufic, is called octave ; every one knows what it means ; and two notes which differ precifely in octave, harmonize fo perfectly, and poffefs fuch a complete refemblance, that muficians mark them by the fame letters." Euler's Letters, vol. i.

Let the feries of equal parts contained in the parallel right lines 01, 02, 03, &c., *fig. a*, *Mufic-Plate*, reprefent the feries of equal times between the fucceffive pulfes of air that beat on the ear, when the fingle founds 01, 02, 03, &c. are heard refpectively ; then, when any two of thefe founds are heard together, the combination of the two correfponding lines, will rightly reprefent the two feries of equal times, if the magnitude of the equal parts in one line be to the magnitude of thofe in the other, in the ratio of the fingle vibrations of the founds ; or, the whole lines being fuppofed equal, if the number of aliquot parts in each be feverally the fame, as the leaft numbers of the vibrations of each found, made in the fame time. And the points which divide the feparate lines, will fubdivide the combined lines into fmaller portions, as in *fig. b*, where $0\frac{2}{3}$ reprefents a third feries, or cycle of times, in which the pulfes of the founds 02 and 03 interchangeably fucceed each other in beating upon the ear ; in like manner $0\frac{3}{4}$ and $0\frac{3}{5}$ will reprefent the cycles refpectively produced, by the union of the founds 03 and 04, in the firft cafe, and 03 and 05 in the fecond cafe. See CYCLE.

According to Dr. Smith, (Harmonics, p. 15.) fuch a mixture of pulfes, fucceeding one another in a given cycle of times, terminated at both ends by coincident pulfes, and fufficiently repeated, is the phyfical caufe that excites the fenfation of a given confonance or concord : efpecially when confidered as diftinct from any other confonance, whofe fingle vibrations having a different ratio from that of the former, will conftitute a different cycle, and excite a different fenfation. And although the abfolute times may be different, yet if the ratio is the fame, the confonances are fimilar, and may be looked upon as the fame in this refpect, that their cycles have the fame form ; the times in both having the fame order, and the fame proportions. And that this form of the cycles ferves to excite the fenfation of a particular concord, is evident, from confidering, that if the agreeable fenfation of confonances, according to the received principle in harmonics, be the refult of the frequent coincidences of their pulfes, and confequently be more or lefs agreeable, according as the coincidences are more or lefs frequent ; all the confonances in tempered fyftems, whofe vibrations are incommenfurable, ought to be the greateft difcords in nature ; it being impoffible for their pulfes to coincide more than once in an infinite time. For as no two numbers, how large foever, can exprefs the ratio of fuch vibrations, fo no multiple of one vibration can ever be equal to any multiple of the other. And yet experience fhews that

that fuch confonances are much more agreeable than perfect difcords, whofe pulfes coincide very often.

We may, indeed, fays Dr. Smith (p. 99.) approach as near as we pleafe, and certainly much nearer than the fenfe can diftinguifh, towards the exact magnitude of an incommenfurable ratio, by the ratios of whole numbers; but as thefe will grow larger and larger without bounds, fo will the time between the fucceffive coincidences, or the length of the approximating cycle of the pulfes; by which is meant the time of either of the incommenfurable vibrations, multiplied by the heterologous term of the approximating ratio. Let any man tell us then where we may ftop, and which of thofe cycles it is, whofe repetition excites the determinate fenfation of the confonance.

The like difficulty occurs in approaching gradually even to a commenfurable ratio of the vibrations of any perfect confonance. For, if either of its vibrations be pretty much altered at once, and then be made to approach by degrees to its former length, the terms of the feveral approximating ratios will grow larger and larger without bounds, and in regular order, except when ratios occur whofe terms are reducible; and the cycles of their pulfes will accordingly be longer and longer, and their coincidences fewer without limit, thofe interruptions excepted; and yet the confonance will grow better and better by regular degrees, till it arrives at perfection, as is certain by experience. For inftance, the ratios 30 to 21, 300 to 201, 3000 to 2001, &c. approach nearer and nearer to 3 to 2, and the Vths, whofe vibrations are in thofe ratios, grow more and more harmonious, though the cycles of their pulfes grow longer and longer to infinity.

It feems indifputable, that coincident pulfes are not neceffary to fuch harmony as the ear judges to be perfect. For if any long period of imperfect unifons, intercepted between two beats, be lengthened greatly and indeterminately, as in tuning an inftrument, any given part of it, as long as any mufical note, will approach indefinitely near to perfect unifons; certainly nearer than the ear can diftinguifh, as being often doubtful of their perfection. And yet throughout that part (fuppofed to be fmall in comparifon to the whole period) the pulfes of one found divide the intervals of the pulfes of the other very nearly in a given ratio, of any determinate magnitude, between infinitely great and infinitely fmall, in proportion to the diftance of that part from the periodical point or point of coincidence. Neverthelefs, the ear cannot diftinguifh any difference in the harmony of fuch different parts, as is evident by often repeating the fame confonance, which can hardly begin conftantly in the fame place of the long period; and this argument applies to all other confonances befides unifons.

Dr. Robifon fupports this train of argument, by a reference to the well known fact, that if two mufical inftruments, as two organ pipes, tuned fo exactly in unifon that their pulfes may be fuppofed to begin and end at the fame inftants, making the moft perfect coincidence of pulfes, be placed at a given diftance from each other, and founded, the confonance will be perfectly the fame, in whatever part of the room or fpace round the founding pipes the ear of an auditor may be placed; while, owing to the time taken up by found in travelling through a given fpace, it is evident that the fuppofed coincidence of the pulfes in the founds cannot fo affect or reach an ear unlefs it be placed exactly at equal diftances from each of the founds; whereas, by placing himfelf exactly in the middle of the right line joining two unifon founds, and gradually approaching one of the founds, every poffible diflocation or deviation of the pulfes from coincidence will prevail, in their action upon one of the ears of an obferver, while in moft cafes the other ear will be very differently acted upon, owing to its relative diftances from the founding bodies being different. And hence, as Dr. Robifon concludes, "a mufical found is the fenfation of a certain form of the aerial undulation which agitates the auditory organ. The perception of harmonious found is the fenfation produced by another definite form of the agitation. This is the compofition of two other agitations; but it is the compound agitation only that affects the ear, and it is its form or kind which determines the fenfation, making it pleafant or unpleafant," or in other words, a concord or a difcord.

On the fuppofition that nature has appointed no certain limits between concords and difcords, Dr. Smith (Harmon. p. 15.) inquires into the order of fimplicity of the confonances between different founds, perfectly adjufted according to their ratios, on the principle, that one confonance may be confidered as more or lefs fimple than another, according as the cycle of times belonging to it is more or lefs fimple than the cycle belonging to the other, or, as the fum of the leaft terms expreffing the ratio of the fingle vibrations is fmaller than the like fum in the other confonance; and that, when feveral fuch fums are the fame, thefe confonances are fimpler in the fame order as the leffer terms of their ratios are fmaller; and he difpofes the confonances in a table, differing little, except in arrangement of the columns, from the following:

Order of the Simplicity.	Ratios of the vibra ions.	Concords.	Order of the Simplicity.	Ratios of the vibrations.	Concords.
1	1 : 1	Unifon.	16	1 : 16	XXIX
2	1 : 2	VIII	$16\frac{1}{8}$	2 : 15	
3	1 : 3	XII	$16\frac{1}{2}$	5 : 12	10^{th}
4	1 : 4	XV	$16\frac{7}{8}$	8 : 9	
$4\frac{1}{2}$	2 : 3	V	17	1 : 17	*
5	1 : 5	XVII	18	1 : 18	
6	1 : 6	XIX	$18\frac{2}{9}$	3 : 16	18^{th}
$6\frac{1}{3}$	2 : 5	X	$18\frac{1}{3}$	4 : 15	
$6\frac{2}{3}$	3 : 4	4^{th}	$18\frac{8}{9}$	9 : 10	
7	1 : 7	*	19	1 : 19	*
$7\frac{2}{3}$	3 : 5	VI	20	1 : 20	XXXI
8	1 : 8	XXII	$20\frac{2}{5}$	5 : 16	13^{th}
$8\frac{3}{4}$	4 : 5	III	22	1 : 22	*
9	1 : 9		$22\frac{2}{11}$	3 : 20	XX
10	1 : 10	XXIV	$22\frac{4}{11}$	5 : 18	
$10\frac{1}{5}$	2 : 9		$22\frac{7}{11}$	8 : 15	
$10\frac{2}{5}$	3 : 8	11^{th}	24	1 : 24	XXXIII
$10\frac{4}{5}$	5 : 6	3^{d}	$24\frac{2}{3}$	9 : 16	
11	1 : 11	*	28	1 : 28	*
12	1 : 12	XXVI	$28\frac{2}{7}$	5 : 24	17^{th}
$12\frac{1}{3}$	3 : 10	XIII	$28\frac{4}{7}$	9 : 20	
$12\frac{2}{3}$	5 : 8	6^{th}	30	1 : 30	
$12\frac{5}{6}$	6 : 7	*	$30\frac{14}{15}$	15 : 16	
13	1 : 13	*	$76\frac{31}{38}$	32 : 45	
14	1 : 14	*	$108\frac{22}{47}$	45 : 64	
15	1 : 15				

The firft and fecond columns of this table can fcarcely need any explanation; the third contains the concords, major and minor, expreffed as in the fecond column of the general table of concords, which follows in this article: the blanks in this column denote the difcords, fuch as are marked with a * being compofed of primes larger than 5, as 7, 11, 13, &c. and have no exiftence in mufic, except in the falfe notes

of

of the TRUMPET, HORN, &c.; fee thofe articles: the others, or their octaves, will be found in the table of DISCORDS; fee that article.

On the other hand, Dr. Robifon and other writers have maintained, and we think juftly, that nature has not left the concords without other diftinctions than the capricious and uncertain preference given to them by muficians, but in addition to the almoft univerfal delight which concords afford to every defcription of auditors, that the phenomena of flow and audible beats, accompanying each concord, when flightly tempered either in excefs or defect, fufficiently diftinguifh fuch from all other mufical intervals, comprifed properly under the denomination of difcords, or imperfect concords; and we cannot but agree with Dr. R. in thinking, that the ftudy of the principles of harmonics would be greatly facilitated by confidering the concords as the elements or fundamental intervals of melody fixed by nature, and that we fhould proceed to fupply the other fteps wanting in the fcale, from their differences or combinations, rather than by affuming the tones and hemitones (which are difcords that the moft refined ear cannot accurately appreciate) to be the elements for compofing the practical intervals of mufic; which it is not meant to contend, that they cannot accurately do in theory, but that concords of the truth or exact magnitude of which ordinary ears can at once judge with fufficient exactnefs (while the curious can adjuft fuch in practice, by help of the beats, to any defired degree of accuracy) are better adapted to the purpofes of harmonical computations and reafonings, and will admit of more direct and perhaps alfo of fome new applications in practice.

For illuftrating this fubject, we beg to be allowed to mention an experiment by Dr. Robifon, made with a wheel monochord, perhaps improperly fo named, becaufe it had two ftrings, which, by means of a refined revolving wheel, could be made to yield clear and even founds for any required fpace of time: one of the ftrings giving conftantly the fame found, while the length of the other, after being accurately tuned in unifon therewith, admitted of being fhortened in any required degree, without altering its tenfion.

Beginning with the unifon (but which was not exactly the order in the Doctor's experiment), the moveable bridge, which determined the length of the variable ftring, was flowly and gradually moved forwards; at firft a very flow, and by degrees a quicker, beating of the imperfect unifon was heard, which increafed in rapidity until the beats could no longer be counted, and at length they became a violent rattling flutter, which degenerated into a difagreeable jar. Still advancing the bridge, vile difcordant noifes refulted from the found of the two ftrings, until the variable ftring had been fhortened nearly $\frac{1}{10}$, or when a little more than $\frac{9}{10}$ of the ftring continued to found; when a very rapid angry flutter commenced, that became rather lefs rapid and offenfive as the point $\frac{9}{10}$ was approached, and again increafed after that, until the difcordant jar prevailed again; and this continued, until $\frac{8}{9}$ of the ftring was approached, when a fimilar flutter commenced, decreafed, and again increafed as this point was paffed by the bridge; the jar beginning again, and accompanying the motion of the bridge, until it almoft arrived at $\frac{5}{6}$ths of the ftring's length, when a flutter and rapid beat commenced, decreafing in frequency, until at $\frac{5}{6}$, or when the minor third (3^{d}) was founded, they ceafed entirely, and the refult was a concord rather agreeable than otherwife, but ftrongly marked by a mournful melancholy in the expreffion; which, being fufficiently noticed, the bridge was again advanced, and produced the fame beating, flow at firft, then quicker, and at length fluttering, until the like grating diffonance fucceeded as before. This continued, until near the point marked $\frac{4}{5}$, when the beatings again commenced, having a peevifh fretful expreffion as they decreafed in quicknefs, owing to the advance of the bridge, to the point of the major third (III), when the beats ceafed, and the peculiarly enlivening and gay character of this concord was experienced by the hearers, who noticed an angry and wafpifh expreffion to accompany the fucceeding beats as the ftring fhortened, but which gave place gradually to the fame flutter and jar as before.

When little more than $\frac{3}{4}$ths of the ftring's length continued to found, the flutterings and rapid beats were again heard, and the latter decreafed and ceafed entirely, at the point marking the fourth (4^{th}) which was noticed as a foft and agreeable concord. To this firft flow, and then rapid, beats fucceeded, and rapid flutterings, and a jarring noife. Near $\frac{3}{4}\frac{2}{5}$ths of the ftring the fluttering commenced again, and decreafed until about fix of them could be counted in a fecond of time as the falfe IV was paffed, after which they increafed again in rapidity as the bridge advanced, and an indiftinct and jarring noife fucceeded, which foon again became a flutter that decreafed until at $\frac{4}{6}\frac{5}{4}$ths of the ftring about eight of thefe angry flutters could be counted in a fecond, correfponding to the falfe fifth, after which they increafed in rapidity, and the jarring noife was again heard.

The bridge being progreffively moved, the flutterings began, beats fucceeded, and paffed into a gentle and not unpleafant undulation which ceafed entirely at $\frac{2}{3}$ds of the ftring, when the fifth (V) with the cheering fweetnefs which characterizes it, was heard in the accordance of the two founds, neither of which could be feparately diftinguifhed: after which the flow and rapid beats, and fluttering, and jar fucceeded as before. Some time before the bridge reached the mark for $\frac{5}{8}$ths of the ftring the flutter and beats began again, and at that point the minor fixth (6^{th}) a confonance in a flight degree pleafant was heard of a mournful character, without any beatings, but which were heard to recommence and increafe as the bridge advanced; and the jarring diffonance contiuued, until little more than $\frac{3}{5}$ths of the variable ftring was left founding, when flutters and beats fucceeded, and fuch ceafed when the true major fixth (VI) was heard, the character of which it was found difficult to exprefs, otherwife than as being greatly inferior to the V in fweetnefs, and to the III in gaiety, but poffeffing in a lower degree both of thefe qualities: fhifting the bridge forwards, beats, flutters, and difcordant noifes fucceeded, attended with two perceptible changes to flutters, in its progrefs towards the $\frac{1}{2}$ of the ftring; which was not reached without the violent flutters, rapid and flower beats, fo often before defcribed; but when the beatings ceafed the true octave (VIII) was heard, the treble note being with difficulty diftinguifhed from the bafs or fundamental* afforded by the other ftring, and not at all fo if the notes were duly apportioned in loudnefs. After this, if the bridge was ftill further advanced, beats, flutters, &c. fucceeded as before, anfwering to the octaves of the founds already defcribed, as the bridge advanced to make half of the lengths of the former ftrings, refpectively.

The doctor concludes his account of this very interefting experiment by remarking, that he has perhaps been rafh in affixing certain moral or fentimental characters to certain concords; becaufe he had feen inftances of perfons who gave them different denominations, but thefe were never contradictory to his, but always expreffed fome fentiment allied to thofe above affigned. A perfon capable of a little difcriminating reflection was never met with by the doctor, who did not acknowledge a manifeft fentimental diftinction among the different

different concords, which could not be confounded. Speaking in another place on this ſubject, the doctor remarks, that he had made numberleſs trials of the different concords with perſons altogether ignorant of muſic; none of all thus examined had much pleaſure from an octave; all without exception, were delighted with a fifth, and with a major third, and many of them preferred the latter. All of them agreed in calling the pleaſure from the fifth a ſweetneſs, and that from the major third a cheerfulneſs or ſmartneſs, or by names of ſimilar import. The greater part preferred even the major ſixth to the fourth, and ſome felt no pleaſure at all from the fourth. Few had much pleaſure from the minor third or minor ſixth. Care was in the above inſtances taken, to ſound theſe concords without any preparation, merely as ſounds, not as making part of any muſical paſſage, circumſtances which have great effect on the mind. When the minor third and ſixth were heard as making part of the minor mode, all were delighted with them, and called them ſweet and mournful. In like manner the chord $^{6}_{4}$ never failed to give pleaſure. Dr. Smith (Harmonics, p. 21.) ſeemed to think that the concords within the octave would be found to affect the ear with ſmoother and pleaſanter ſenſations in the following order: *viz.* VIII, V, 4th, VI, III, 3^{d}, 6th, the laſt being the leaſt harmonious; but this concluſion he ſeemed to have formed from the numerical ſimplicity of their ratios as expreſſed in his Table above, rather than from a ſeries of experiments on their effects: but it is plain that this cannot expreſs the order of harmoniouſneſs, becauſe four diſcords will be found to intervene among the ſeven concords above, two of which alſo include the primes 7 and 11, which excludes them from our ſcale of muſic.

It will appear from the above, that each of the ſeven concords has a natural foundation and place in the ſcale of melody, but perhaps they will not all be found equally fit to be conſidered as elements in compoſing the ſcale. Reſpecting which, it may be right here to obſerve, that no general and ſtrictly accurate method of notation, for compoſing or ſhewing the relations of muſical intervals, can have leſs than three terms (for logarithms are only an approximation to their ratios, depending on the number of places of figures uſed) whether theſe are the muſical integers, 2, 3, and 5: the intervals T, *t*, and H; Σ, *f*, and *m*, or any other (Phil. Mag. xxvii. 195, and xxviii. 140). The comparative perfection of the harmony of the VIII, V, and 4th, the facility with which they can be tuned by the ear, and the ſimplicity of their ratios $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$, might ſeem to point them out as the moſt eligible, for concordant elements of the ſcale, but conſiderable experience in theſe kinds of calculations and inquiries has led us to prefer the three ſmalleſt concords, or 4th, III, and 3^{d} for this purpoſe; (ſee *Common* Chord,) becauſe ſubſtraction of the ratios is thereby moſt avoided, at the ſame time that the larger concords can by inſpection be formed, out of theſe, in moſt inſtances. The following Table has been calculated and arranged with conſiderable care and trouble, and it will, we hope, prove uſeful to our muſical readers in ſaving much of their time when purſuing theſe curious and uſeful ſpeculations.

A TABLE of the Relations which the ſeveral Concords bear to the Key-Note, within the Compaſs of Seven Octaves.

1	2	3	4	5	6	7
84	L	c^6	$\frac{1}{128}$	7.8927900,3	$\frac{1}{2.2.2.2.2.2.2}$	${}^{7}4+{}^{7}\mathrm{III}+{}^{7}3,\ {}^{7}\mathrm{VIII},\ {}^{7}\mathrm{VI}+{}^{7}3,\ {}^{7}6+{}^{7}\mathrm{III},\ {}^{7}\mathrm{V}+{}^{7}4$
81	XLVIII	a^5	$\frac{3}{320}$	7.9719712,7	$\frac{3}{2.2.2.2.2.2.5}$	${}^{7}4+{}^{7}\mathrm{III}+{}^{6}3,\ {}^{6}\mathrm{VIII}+\mathrm{VI},\ {}^{7}\mathrm{VI}+{}^{6}3,\ {}^{6}6+4+{}^{7}\mathrm{III},\ {}^{6}\mathrm{V}+{}^{7}4+\mathrm{III}$
80	48th	ba^5	$\frac{5}{512}$	7.9897000,4	$\frac{5}{2.2.2.2.2.2.2.2.2}$	${}^{7}4+{}^{6}\mathrm{III}+{}^{7}3,\ {}^{6}\mathrm{VIII}+6,\ {}^{7}6+{}^{6}\mathrm{III},\ {}^{6}\mathrm{VI}+4+{}^{7}3,\ {}^{6}\mathrm{V}+{}^{7}4+3$
79	XLVII	g^5	$\frac{1}{96}$	8.0177287,7	$\frac{1}{2.2.2.2.2.3}$	${}^{6}4+{}^{7}\mathrm{III}+{}^{7}3,\ {}^{6}\mathrm{VIII}+\mathrm{V},\ {}^{7}\mathrm{V}+{}^{6}4,\ {}^{6}\mathrm{VI}+\mathrm{V}+{}^{6}3,\ {}^{6}\mathrm{VI}+\mathrm{III}+{}^{7}3$
77	46th	f^5	$\frac{3}{256}$	8.0688812,8	$\frac{3}{2.2.2.2.2.2.2.2}$	${}^{7}4+{}^{6}\mathrm{III}+{}^{6}3,\ {}^{6}\mathrm{VIII}+4,\ {}^{6}\mathrm{V}+{}^{7}4,\ {}^{6}\mathrm{VI}+4+{}^{6}3,\ {}^{6}6+4+{}^{6}\mathrm{III}$
76	XLV	e^5	$\frac{1}{80}$	8.0969100,1	$\frac{1}{2.2.2.2.5}$	${}^{6}4+{}^{7}\mathrm{III}+{}^{6}3,\ {}^{6}\mathrm{VIII}+\mathrm{III},\ {}^{6}6+{}^{7}\mathrm{III},\ \mathrm{VI}+{}^{6}\mathrm{V}+{}^{5}4,\ {}^{6}\mathrm{VI}+\mathrm{V}+{}^{5}3$
75	45th	be^5	$\frac{5}{384}$	8.1146387,8	$\frac{5}{2.2.2.2.2.2.2.3}$	${}^{6}4+{}^{6}\mathrm{III}+{}^{7}3,\ {}^{6}\mathrm{VIII}+3,\ {}^{6}\mathrm{VI}+{}^{7}3,\ 6+{}^{6}\mathrm{V}+{}^{5}4,\ {}^{6}6+\mathrm{V}+{}^{5}\mathrm{III}$
72	XLIII	c^5	$\frac{1}{64}$	8.1938200,3	$\frac{1}{2.2.2.2.2.2}$	${}^{6}4+{}^{6}\mathrm{III}+{}^{6}3,\ {}^{6}\mathrm{VIII}\ \ {}^{6}\mathrm{VI}+{}^{6}3,\ {}^{6}6+{}^{6}\mathrm{III},\ {}^{6}\mathrm{V}+{}^{6}4$
69	XLI	a^4	$\frac{3}{160}$	8.2730012,7	$\frac{3}{2.2.2.2.2.5}$	${}^{6}4+{}^{6}\mathrm{III}+{}^{5}3,\ {}^{5}\mathrm{VIII}+\mathrm{VI},\ {}^{6}\mathrm{VI}+{}^{5}3,\ {}^{5}6+4+{}^{6}\mathrm{III},\ {}^{5}\mathrm{V}+{}^{6}4+\mathrm{III}$
68	41ſt	ba^4	$\frac{5}{256}$	8.2907300,3	$\frac{5}{2.2.2.2.2.2.2.2}$	${}^{6}4+{}^{5}\mathrm{III}+{}^{6}3,\ {}^{5}\mathrm{VIII}+6,\ {}^{6}6+{}^{5}\mathrm{III},\ {}^{5}\mathrm{VI}+4+{}^{6}3,\ {}^{5}\mathrm{V}+{}^{6}4+3$
67	XL	g^4	$\frac{1}{48}$	8.3187587,6	$\frac{1}{2.2.2.2.3}$	${}^{5}4+{}^{6}\mathrm{III}+{}^{6}3,\ {}^{5}\mathrm{VIII}+\mathrm{V},\ {}^{6}\mathrm{V}+{}^{5}4,\ {}^{5}\mathrm{VI}+\mathrm{V}+{}^{5}3,\ {}^{5}\mathrm{VI}+\mathrm{III}+{}^{6}3$
65	39th	f^4	$\frac{3}{128}$	8.3699112,8	$\frac{3}{2.2.2.2.2.2.2}$	${}^{6}4+{}^{5}\mathrm{III}+{}^{5}3,\ {}^{5}\mathrm{VIII}+4,\ {}^{5}\mathrm{V}+{}^{6}4,\ {}^{5}\mathrm{VI}+4+{}^{5}3,\ {}^{5}6+4+{}^{5}\mathrm{III}$
64	XXXVIII	e^4	$\frac{1}{40}$	8.3979400,1	$\frac{1}{2.2.2.5}$	${}^{5}4+{}^{6}\mathrm{III}+{}^{5}3,\ {}^{5}\mathrm{VIII}+\mathrm{III},\ {}^{5}6+{}^{6}\mathrm{III},\ \mathrm{VI}+{}^{5}\mathrm{V}+{}^{4}4,\ {}^{6}\mathrm{VI}+\mathrm{V}+{}^{4}3$
63	38th	be^4	$\frac{5}{192}$	8.4156687,7	$\frac{5}{2.2.2.2.2.2.3}$	${}^{5}4+{}^{5}\mathrm{III}+{}^{6}3,\ {}^{5}\mathrm{VIII}+3,\ {}^{5}\mathrm{VI}+{}^{6}3,\ 6+{}^{5}\mathrm{V}+{}^{4}4,\ {}^{5}6+\mathrm{V}+{}^{4}\mathrm{III}$
60	XXXVI	c^4	$\frac{1}{32}$	8.4948500,2	$\frac{1}{2.2.2.2.2}$	${}^{5}4+{}^{5}\mathrm{III}+{}^{5}3,\ {}^{5}\mathrm{VIII},\ {}^{5}\mathrm{VI}+{}^{5}3,\ {}^{5}6+{}^{5}\mathrm{III},\ {}^{5}\mathrm{V}+{}^{5}4$
57	XXXIV	a'''	$\frac{3}{80}$	8.5740312,6	$\frac{3}{2.2.2.2.2}$	${}^{5}4+{}^{5}\mathrm{III}+{}^{4}3,\ {}^{4}\mathrm{VIII}+\mathrm{VI},\ {}^{5}\mathrm{VI}+{}^{4}3,\ {}^{4}6+4+{}^{5}\mathrm{III},\ {}^{4}\mathrm{V}+{}^{5}4+\mathrm{III}$
56	34th	ba'''	$\frac{5}{128}$	8.5917600,3	$\frac{5}{2.2.2.2.2.2.2}$	${}^{5}4+{}^{4}\mathrm{III}+{}^{5}3,\ {}^{4}\mathrm{VIII}+6,\ {}^{5}6+{}^{4}\mathrm{III},\ {}^{4}\mathrm{VI}+4+{}^{5}3,\ {}^{4}\mathrm{V}+{}^{5}4+3$
55	XXXIII	g'''	$\frac{1}{24}$	8.6197887,6	$\frac{1}{2.2.2.3}$	${}^{4}4+{}^{5}\mathrm{III}+{}^{5}3,\ {}^{4}\mathrm{VIII}+\mathrm{V},\ {}^{5}\mathrm{V}+{}^{4}4,\ {}^{4}\mathrm{VI}+\mathrm{V}+{}^{4}3,\ {}^{4}\mathrm{VI}+\mathrm{III}+{}^{5}3$
53	32d	f'''	$\frac{3}{64}$	8.6709412,8	$\frac{3}{2.2.2.2.2.2}$	${}^{5}4+{}^{4}\mathrm{III}+{}^{4}3,\ {}^{4}\mathrm{VIII}+4,\ {}^{4}\mathrm{V}+{}^{5}4,\ {}^{4}\mathrm{VI}+4+{}^{4}3,\ {}^{4}6+4+{}^{4}\mathrm{III}$
52	XXXI	e'''	$\frac{1}{20}$	8.6989699,9	$\frac{1}{2.2.5}$	${}^{4}4+{}^{5}\mathrm{III}+{}^{4}3,\ {}^{4}\mathrm{VIII}+\mathrm{III},\ {}^{4}6+{}^{5}\mathrm{III},\ \mathrm{VI}+{}^{4}\mathrm{V}+{}^{3}4,\ {}^{4}\mathrm{VI}+\mathrm{V}+{}^{3}3$
51	31ſt	be'''	$\frac{5}{96}$	8.7166987,7	$\frac{5}{2.2.2.2.2.3}$	${}^{4}4+{}^{4}\mathrm{III}+{}^{5}3,\ {}^{4}\mathrm{VIII}+3,\ {}^{4}\mathrm{VI}+{}^{5}3,\ 6+{}^{4}\mathrm{V}+{}^{3}4,\ {}^{4}6+\mathrm{V}+{}^{3}\mathrm{III}$
Intervals in half-notes.	Intervals, Major and Minor.	Letters.	Ratios.	Common Logarithms.	Ratios in their Component Primes.	Tuneable Intervals.

A TABLE of the Relations which the feveral Concords bear to the Key-Note, within the Compafs of Seven Octaves.

1	2	3	4	5	6	7				
48	XXIX	c‴	$\frac{1}{16}$	8.7958800,2	$\frac{1}{2.2.2.4}$	$^{4}4+{}^{4}III+{}^{4}3$,	$^{4}VIII$,	$^{4}VI+{}^{4}3$,	$^{4}6+III$,	$^{4}V+{}^{4}4$
45	XXVII	a″	$\frac{3}{40}$	8.8750612,6	$\frac{3}{2.2.2.5}$	$^{4}4+{}^{4}III+{}^{3}3$,	$^{3}VIII+VI$,	$^{4}VI+{}^{3}3$,	$^{3}6+4+{}^{4}III$,	$^{3}V+{}^{4}4+III$
44	27th	ba″	$\frac{5}{64}$	8.8927900,3	$\frac{5}{2.2.2.2.2.2}$	$^{4}4+{}^{3}III+{}^{4}3$,	$^{3}VIII+6$,	$^{4}6+{}^{3}III$,	$^{3}VI+4+{}^{4}3$,	$^{3}V+{}^{4}4+3$
43	XXVI	g″	$\frac{1}{12}$	8.9208187,5	$\frac{1}{2.2.3}$	$^{3}4+{}^{4}III+{}^{4}3$,	$^{3}VIII+V$,	$^{4}V+{}^{3}4$,	$^{3}VI+V+{}^{3}3$,	$^{3}VI+III+{}^{4}3$
41	25th	f″	$\frac{3}{32}$	8.9719712,7	$\frac{3}{2.2.2.2.2}$	$^{4}4+{}^{3}III+{}^{3}3$,	$^{3}VIII+4$,	$^{3}V+{}^{4}4$,	$^{3}VI+4+{}^{3}3$,	$^{3}6+4+{}^{3}III$
40	XXIV	e″	$\frac{1}{10}$	9 0000000,0	$\frac{1}{2.5}$	$^{3}4+{}^{4}III+{}^{3}3$,	$^{3}VIII+III$,	$^{3}6+{}^{4}III$,	$VI+{}^{3}V+{}^{2}4$,	$^{3}VI+V+{}^{2}3$
39	24th	be″	$\frac{5}{48}$	9.0177287,6	$\frac{5}{2.2.2.2.3}$	$4+{}^{3}III+{}^{4}3$,	$^{3}VIII+3$,	$^{3}VI+{}^{4}3$,	$6+{}^{3}V+{}^{2}4$,	$^{3}6+V+{}^{2}III$
36	XXII	c″	$\frac{1}{8}$	9.0969100,1	$\frac{1}{2.2.2}$	$^{3}4+{}^{3}III+{}^{3}3$,	$^{3}VIII$,	$^{3}VI+{}^{3}3$,	$^{3}6+{}^{3}III$,	$^{3}V+{}^{3}4$
33	XX	a′	$\frac{3}{20}$	9.1760912,5	$\frac{3}{2.2.5}$	$^{3}4+{}^{3}III+{}^{2}3$,	$^{2}VIII+VI$,	$^{3}VI+{}^{2}3$,	$^{2}6+4+{}^{3}III$,	$^{2}V+{}^{3}4+III$
32	20th	ba′	$\frac{5}{32}$	9.1938200,2	$\frac{5}{2.2.2.2.2}$	$^{3}4+{}^{2}III+{}^{3}3$,	$^{2}VIII+6$,	$^{3}6+{}^{2}III$,	$^{2}VI+4+{}^{3}3$,	$^{2}V+{}^{3}4+3$
31	XIX	g′	$\frac{1}{6}$	9.2218487,5	$\frac{1}{2.3}$	$^{2}4+{}^{3}III+{}^{3}3$,	$^{2}VIII+V$,	$^{3}V+{}^{2}4$,	$^{3}VI+V+{}^{2}3$,	$^{2}VI+III+{}^{3}3$
29	18th	f′	$\frac{3}{16}$	9.2730012,7	$\frac{3}{2.2.2.2}$	$^{3}4+{}^{2}III+{}^{2}3$,	$^{2}VIII+4$,	$^{2}V+{}^{3}4$,	$^{2}VI+4+{}^{2}3$,	$^{2}6+4+{}^{2}III$
28	XVII	e′	$\frac{1}{5}$	9.3010299.9	$\frac{1}{5}$	$^{2}4+{}^{3}III+{}^{2}3$,	$^{2}VIII+III$,	$^{2}6+{}^{3}III$,	$VI+{}^{2}V+4$,	$^{2}VI+V+3$
27	17th	be′	$\frac{5}{24}$	9.3187587,8	$\frac{5}{2.2.2.3}$	$^{2}4+{}^{2}III+{}^{3}3$,	$^{2}VIII+3$,	$^{2}VI+{}^{3}3$,	$6+{}^{2}V+4$,	$^{2}6+V+III$
24	XV	c′	$\frac{1}{4}$	9.3979400,1	$\frac{1}{2.2}$	$^{2}4+{}^{2}III+{}^{2}3$,	$^{2}VIII$,	$^{2}VI+{}^{2}3$,	$^{2}6+{}^{2}III$,	$^{2}V+{}^{2}4$
21	XIII	a	$\frac{3}{10}$	9.4771212,5	$\frac{3}{2.5}$	$^{2}4+{}^{2}III+3$,	$VIII+VI$,	$^{2}VI+3$,	$6+4+{}^{2}III$,	$V+{}^{2}4+III$
20	13th	ba	$\frac{5}{16}$	9.4948500,2	$\frac{5}{2.2.2.2}$	$^{2}4+III+{}^{2}3$,	$VIII+6$,	$^{2}6+III$,	$VI+4+{}^{2}3$,	$V+{}^{2}4+3$
19	XII	g	$\frac{1}{3}$	9,5228787,5	$\frac{1}{3}$	$4+{}^{2}III+{}^{2}3$,	$VIII+V$,	$^{2}V+4$,	$VI+V+3$,	$VI+III+{}^{2}3$
17	11th	f	$\frac{3}{8}$	9.5740312,6	$\frac{3}{2.2.2}$	$^{2}4+III+3$,	$VIII+4$,	$V+{}^{2}4$,	$VI+4+3$,	$6+4+III$
16	X	e	$\frac{2}{5}$	9.6020599,9	$\frac{2}{5}$	$4+{}^{2}III+3$,	$VIII+III$,	$6+{}^{2}III$,	$VI+V$,	$V+4+III$
15	10th	be	$\frac{5}{12}$	9.6197887,5	$\frac{5}{2.2.3}$	$4+III+{}^{2}3$,	$VIII+3$,	$VI+{}^{2}3$,	$6+V$,	$V+4+3$
12	VIII	c	$\frac{1}{2}$	9.6989699,9	$\frac{1}{2}$	$4+III+3$,	VIII,	$VI+3$,	$6+III$,	$V+4$
9	VI	A	$\frac{3}{5}$	9.7781512,5	$\frac{3}{5}$	$4+III$,	$VIII-3$,	VI		
8	6th	bA	$\frac{5}{8}$	9.8958800,1	$\frac{5}{2.2.2}$	$4+3$,	$VIII-III$,	6		
7	V	G	$\frac{2}{3}$	9.8239087,5	$\frac{2}{3}$	$III+3$,	$VIII-4$,	V,		
5	4th	F	$\frac{3}{4}$	9.8750612,6	$\frac{3}{2.2}$	4,	$VIII-V$,	4,	$6-3$,	
4	III	E	$\frac{4}{5}$	9.9030899,9	$\frac{2.2}{5}$	III,	$VIII-6$,	III,	$V-3$,	
3	3d	bE	$\frac{5}{6}$	9.9208187,5	$\frac{5}{2.3}$	3,	$VIII-VI$,	3,	$6-4$,	
	Key	C	$\frac{1}{1}$	0.0000000,0	$\frac{1}{1}$	Unifon				
Intervals in half-notes.	Intervals, Major and Mior.	Letters.	Ratios.	Common Logarithms.	Ratio in their Component Primes.	Tuneable Intervals.				

The titles of the columns are placed at the bottom of the foregoing Table, becaufe it is intended to be read from the bottom upwards, agreeably to the practice of muficians, who read their notes upwards. Column 1 contains the number of finger-key interva's or half-notes: it will be found of ufe, in rough calculations refpecting mufical intervals; thus, fuppofe a VI were to be added to a 6^{th}, and it was required to know on what note the fum would fall, we have $9 + 8 = 17$, which anfwers in the Table to the 11^{th}, and which happens to be exactly their fum, as is evident by comparing column 7: fuppofe again, that it was required to know the interval anfwering to three III^{ds}, we have in this cafe $4 \times 3 = 12$; this in the Table anfwers to the VIII, but it is evident from col. 7, that this is only an approximate value, becaufe this is $4 + III + 3$ inftead of 3 III, the difference being an enharmonic diefis, or the Tierce wolf of earl Stanhope.

Column 2 contains the marks of the intervals, the major intervals being denominated by Roman, and the minor intervals by Arabic characters, or numbers. Column 3 fhews the notes of the gamut, diftinguifhing the feven different octaves, the firft or loweft by Roman capitals, the next by Italic fmall letters, the third by thefe accented, the fourth by the fame double accented, the fifth by three accents, and the fixth and feventh octaves by fmall figures or indices, to exprefs the number of accents.

Column 4 contains the ratios of the feveral notes, in their loweft terms. Column 5 contains the common or Briggs's logarimths to eight places of figures, the laft being feparated by a comma, in order to agree with the common Tables,

tables, which have only ſeven places: whenever this number only is wanted, the ſeventh figure muſt be increaſed an unit, in every caſe where the eighth figure in the table exceeds 5.

Column 6 ſhews the ratios, expreſſed in their component primes, for the convenience of decompoſing the ſame into tuneable intervals, as explained in our article Comma; thus, the ſecond fraction, or $\frac{3}{2.2.2.2.2.2.5}$ may be divided or expreſſed by $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{2}$, $\frac{3}{5}$ which ſhews it to be equivalent to 6 VIII + VI, as in column 7. The fraction anſwering to the 6th, or $\frac{5}{2.2.2}$ may be thus ſtated, *viz.* $\frac{1}{2}$, $\frac{5}{4}$, or VIII − III, the laſt term being negative, becauſe the ratio or fraction expreſſing it is found reverſed.

Column 7 contains ſeveral different values of each interval in col. 2, all expreſſed in tuneable intervals, or concords: the firſt, in each caſe, is expreſſed in the concordant elements, or ſmalleſt concords 4, III and 3d; the next expreſſion in each line has one or more VIIIths in its compoſition; we have next given thoſe tuneable intervals, which are found to expreſs each interval by two terms only; and have then added two others, (being all that our room would admit) of the various expreſſions in tuneable intervals, which can be had for any concord in col. 2, eſpecially if negative ſigns are admitted, as we have done in the loweſt octave of our table. Matter for curious reflection will preſent itſelf to the muſical ſtudent, who attentively conſiders the laſt column of our table, ſuch as; 1ſt, that the octave is the only concord which admits of being added to itſelf, without producing a diſcord; 2dly, that the complement of every concord to an octave (or to 2, 3, 4, &c. octaves,) is a concord; 3dly, that all the ſimple combinations by one, by two, or by three, of our concordant elements 4th, III and 3d, produce concords; 4thly, after theſe ſimple combinations are made, no farther ones can be made, except the addition of an equal number of each of the concordant elements (as 4 + III + 3, $^{2}4$ + 2 III + $^{2}3$, &c.) without producing diſcords; &c. If the difference between any two concords be wanted, as between the XVII and the X, ſuch is readily obtained from column 7th thus; $^{2}4$ + 3 III + $^{2}3$ − 4 − 2 III − 3 is equal to 4 + III + 3, or the octave. The ſum alſo of any concords, as a VI and 6th, is thus obtained; 4 + III + 4 + 3, or $^{2}4$ + III + 3, which anſwers to the 11th, as before obſerved, when explaining the uſes of column 1.

It may be of uſe here to mention, that the differences between each adjoining concord, in each ſeveral octave in column 7, will be found to be 3d, III − 3 (or the minor ſemitone, $\frac{24}{26}$). 4 − III (or the major ſemitone $\frac{15}{16}$) III + 3 − 4, or V − 4 (or the major ſemitone $\frac{8}{9}$), 4 − III, III − 3, and 3d; and this, whether we begin at the top or at the bottom of the octave, which ſhews that nature has diſtributed theſe ſix concords, in a ſurpriſingly uniform manner, between the uniſon and the octave. The intervals which will, in addition to thoſe above, be found by deducting every concord within the octave from each other, are, 4 − 3 (or the minor tone, $\frac{9}{10}$) and 4 + III − 3, or VI − 3 (or the comma-deficient tritone or ſharp fourth $\frac{18}{25}$).

It has been remarked by Mr. Holder, that the number 6 combined with itſelf, or with every leſs integer, produces in every inſtance a concord, thus $\frac{6}{6}$, $\frac{6}{5}$, $\frac{6}{4}$, $\frac{6}{3}$, $\frac{6}{2}$, and $\frac{6}{1}$, expreſs the uniſon, 3d, V, VIII, XII and XIX.

Concord, or *Concordia*, in *Mythology*, was perſonified by the Romans, and worſhipped as a deity under this appellation. Concord is commonly repreſented on coins as a graceful female, holding a cup in her right hand, and in her left ſometimes a ſceptre, and at other times a cornucopia, to intimate that plenty is the reſult of unanimity and friendſhip. Her ſymbols were two hands joined, as is ſeen on a coin of Aurelius Verus, and another of Nero; alſo two ſerpents twiſting round a caduceus. Mr. Spence obſerves, that concord is ſometimes repreſented with two cornucopias in one of her hands, a thing, ſays he, which I do not remember to have ſeen in any figure but her's, and as agreement often doubles the advantages we receive from the world, they ſeem to be given her with more propriety than perhaps they could be to any other.

Concord, *Temple of*, a building erected in Rome, at the expence of the public, upon an eminence at the foot of the capitol; ſo that it was ſeen from the forum, and the places where the aſſemblies were held and juſtice was adminiſtered. This temple was built in purſuance of a vow of Camillus to this purpoſe. See the article Camillus.

Concord had ſeveral other magnificent temples, beſides this and another erected by Tiberius, at the requeſt of his mother Livia. In one of theſe temples were depoſited the rich ſpoils of the temple of Jeruſalem.

CONCORDANCE, a dictionary or index to the bible, wherein all the leading words, uſed in the courſe of the inſpired writings, are ranged alphabetically; and the various places where they occur referred to; to aſſiſt in finding out paſſages, and comparing the ſeveral ſignifications of the ſame word.

Cardinal Hugo de St. Charo is ſaid to have employed five hundred monks at the ſame time in compiling a Latin concordance: beſides which, we have ſeveral other concordances in the ſame language; one, in particular, called the concordance of England, compiled by J. Darlington, of the order of Prædicants; another more accurate one, by the Jeſuit de Zamora.

R. Mordecai Nathan has furniſhed us with a Hebrew concordance, firſt printed at Venice in 1523, containing all the Hebrew roots branched into their various ſignifications, and under each ſignification all the places in ſcripture wherein it occurs: but the beſt and moſt uſeful Hebrew concordance is that of Buxtorf, printed at Baſil in 1632.

Dr. Taylor publiſhed, in 1754, a Hebrew concordance in two volumes folio, adapted to the Engliſh Bible, and diſpoſed after the manner of Buxtorf. See the preface of this work.

The Greek concordances are only for the New Teſtament: indeed we have one of Conr. Kircher's on the Old; but this is rather a concordantial dictionary than a concordance; containing all the Hebrew words in an alphabetical order; and underneath, all the interpretations or ſenſes the LXX. give them; and in each interpretation, all the places where they occur in that verſion.

In 1718, Trommius publiſhed his Greek concordance for the Septuagint at Amſterdam, in two volumes folio; and Schmidius, improving on a ſimilar work of H. Stephens has given an excellent Greek concordance for the New Teſtament, the beſt edition of which is that of Leipſic, an. 1717.

Calaſius, an Italian Cordelier, has given us concordances of the Hebrew, Latin, and Greek, in two columns: the firſt, which is Hebrew, is that of R. Mordecai Nathan, word for word, and according to the order of the books and chapters: in the other column is a Latin interpretation of each paſſage of Scripture quoted by R. Mordecai; this interpretation is Calaſius's own; but in the margin he adds that of the LXX. and the Vulgate, when different from

his.

his. The work is in four volumes folio, printed at Rome in 1621.

Of all the helps towards underſtanding the Hebrew Scriptures, ſays Dr. Geddes (Proſpectus, p. 71.) a good concordance is undoubtedly the moſt uſeful. But we yet want a good concordance; and the man who ſhould devote five or ſix years to the compiling of one from Buxtorf, Calaſio, Noldius, Taylor, Kircher, Montfaucon, and Trommius, would do a ſingular ſervice to biblical ſtudies. Buxtorf's method of arrangement, with very little improvement, ſhould be ſtrictly followed; the errors of orthography rectified from the authority of manuſcripts and other ſources of emendation; and the various acceptations of the ſame word in the ancient verſions exactly noted and methodically diſtinguiſhed. Such a work would be worth all the commentaries that have ever been made.

We have ſeveral very copious concordances in Engliſh; as Newman's, &c. but the laſt and beſt eſteemed is that in 4to. by Alex. Cruden.

CONCORDANT *Elements*, in *Muſic*, are the fourth (4^{th}) the major third (III) and the minor third (3^{rd}); ſee Concord. Dr. Smith conſiders the major tone (τ) the minor tone (t) and the hemitone (η) as elements; Harmonics, p. 13.

Concordant *Verſes*, ſuch as have ſeveral words in common; but which, by the addition of other words, convey an oppoſite, at leaſt, a different meaning. Such are theſe,

Et { *Canis* / *Lupus* } *in ſilva* { *venatur* / *nutritur* } *& omnia* { *ſervat.* / *vaſtat.* }

CONCORDAT, in the *Canon Law*, denotes a covenant, or agreement concerning ſome beneficiary matter, as a reſignation, permutation, promotion, or the like.

The council of Trent, ſeſſ. vi. *de reform.* cap. 4. ſpeaking of concordats made without the authority and approbation of the pope, calls them *concordias quæ tantum ſuos obligant auctores, non ſucceſſores*. And the congregation of cardinals, who have explained this decree, declares alſo, that a concordat cannot be valid ſo as to bind ſucceſſors, unleſs confirmed by the pope.

Concordat is alſo uſed, abſolutely, among the French, for an agreement concluded at Bologna in 1516, between pope Leo X. and Francis I. of France, for regulating the manner of nominating to benefices. The concordat ſerves in lieu of the pragmatic ſanction, which has been abrogated; or, rather, it is the pragmatic ſanction ſoftened and reformed. The king went in perſon to the parliament to offer the concordat to be regiſtered, and letters patent were made out, requiring all the judges and courts of juſtice to obſerve this act, and ſee it executed. The parliament, after deliberating a month upon this important matter, concluded not to regiſter the concordat, but to obſerve ſtill the pragmatic ſanction, unleſs the former edict was received and eſtabliſhed in as great an aſſembly as that was, which publiſhed the latter in the reign of Charles VII. And when, by violence and force, they were obliged to publiſh the concordat, they joined to the publication a ſolemn proteſt and an appeal from the pope to the next general council, into both which meaſures the univerſity and the clergy entered with the greateſt alacrity and zeal. But royal and papal deſpotiſm at length prevailed. The chancellor De Prat, who was principally concerned in promoting the concordat, has been generally regarded as an enemy to the liberties of the Gallican church. The illuſtrious and learned Hainault has defended his memory againſt this accuſation, and juſtified the concordat as an equitable contract, and as a meaſure attended with fewer inconveniences, than the pragmatic ſanction. He obſerves, that by the king's being inveſted by the concordat with the privilege of nominating to the biſhoprics and vacant benefices of the firſt claſs, many corruptions and abuſes were prevented, which aroſe from the ſimoniacal practices that prevailed almoſt every where, while, according to the pragmatic ſanction, every church choſe its biſhop, and every monaſtery its abbot. He obſerves moreover, that this nomination was the natural right of the crown, as the moſt conſiderable part of the great benefices had been created by the kings of France; and he particularly inſiſts on this conſideration, that the right which Chriſtian communities have to chuſe their leaders, cannot be exerciſed by ſuch large bodies without much confuſion and many inconveniences; and that the ſubjects, by entruſting their ſovereign with the government of the ſtate, inveſt him, *ipſo facto*, with an authority over the church, which is a *part* of the ſtate, and its nobleſt branch. The moſt ſpecious objection that was made to the concordat was this: that, in return for the nomination to the vacant benefices, the king granted to the popes the annates, or firſt fruits, which had too long been complained of as an intolerable grievance. There is, however, no mention of this equivalent in the concordat. And it was by a papal bull that ſucceeded this compact, that the pontiffs claimed the payment of the firſt fruits, of which they had put themſelves in poſſeſſion in the year 1316, and which had been ſuſpended by the pragmatic ſanction.

As the concordat gave to the kings of France the abſolute right of ſucceeding to all the great, or what are called the conſiſtorial benefices, of the Gallican church; it was a very important edict. Since the eſtabliſhment of the pragmatic ſanction and of the concordat, the clergy of France in general (before the late Revolution) manifeſted leſs reſpect to the decrees of the papal court than the clergy of any other Catholic country. In all the diſputes which their ſovereign has had with the pope, they have almoſt conſtantly taken part with the former. Their independence on the court of Rome ſeems to have been principally founded on this act.

The concordat between the pope and the republic of Venice reſembles the former.

There is alſo a German concordat, made between the emperor Frederic III. and the princes of Germany, in 1448, relating to beneficiary matters, confirmed by pope Nicholas V.

Concordat, as it is now uſed in France, is a term that applies excluſively to an agreement or convention exchanged between the pope, Pius VII., and the French government, the 23d Fructidor, an. 9, or September the 10th, 1801. In this agreement the Roman catholic religion is acknowledged to be that of the majority of the French people; and the better to conſolidate the reſtoration of its worſhip, which had been almoſt totally neglected ſince the year 1792, the pope engages not to diſturb the proprietors or purchaſers of eſtates, which, before the French revolution of 1789, belonged to the church; and he acknowledges in the firſt conſul of the French government the ſame rights and prerogatives which the ancient government poſſeſſed. By virtue of the ſaid concordat, the whole territory of European France is divided into ten archbiſhoprics; *viz.* Paris, containing eight biſhoprics, Malines ſeven, Beſançon five, Lyons four, Aix four, Toulouſe five, Bourdeaux three, Bourges three, Tours ſeven, and Rouen four; and fifty biſhoprics; *viz.* Troyes, Amiens, Soiſſons, Arras, Cambray, Verſailles, Meaux, Orleans, Namur, Tournay, Aix la Chapelle, Treves, Gand, Liege, Mayence, Autun, Metz, Straſbourg, Nancy, Dijon, Mende, Grenoble, Valence, Chambéry, Nice, Avignon, Ajaccio, Digne, Cahors, Montpellier,

Carcaſſonne, Agen, Bayonne, Poitiers, La Rochelle, Angoulême, Clermont, Saint Flour, Limoges, Le Mans, Angers, Nantes, Rennes, Vannes, Saint Brieux, Quimper, Coutances, Bayeux, Siez, and Evreux. The nomination to the ſees reſts with the French government; the pope only confirms each nomination by his canonical inſtitution, according to the forms anciently eſtabliſhed with regard to the Gallican church, whoſe privileges and immunities continue in full force. The biſhops, before they enter upon their functions, ſhall take before the firſt conſul, in perſon, the oath of fidelity which was in uſe before the change of government, expreſſed in the following terms; "I ſwear and promiſe to God, upon the holy evangeliſts, to preſerve obedience and fidelity to the government eſtabliſhed by the conſtitution of the French republic. I alſo promiſe to have no correſpondence, nor to aſſiſt at any council or cabal, either within the country or out of it, that ſhall be contrary to the cauſe of the public tranquillity; and if in my dioceſe, or elſewhere, I ſhall learn of any plot or machination prejudicial to the ſtate, I ſhall inform the government of it." The clergy of the ſecond order ſhall take the ſame oath before the civil authorities appointed by the government. The following prayer ſhall be recited at the end of divine ſervice in all the Catholic churches of France:

Domine, ſalvam fac rempublicam!
Domine, ſalvos fac conſules!

The biſhops ſhall make a new diviſion of pariſhes in their dioceſes, ſubject to the conſent of the government: the biſhops ſhall name the curés, ſubject to the approbation of the government. The biſhops may have a chapter in their cathedral, and a ſeminary in their dioceſe, but the government is not engaged to endow them. All the metropolitan, cathedral, parochial, and other churches, undiſpoſed of, ſhall be placed at the diſpoſal of the biſhops. The government engages to ſecure a ſuitable proviſion for the biſhops and curés, whoſe dioceſes and pariſhes ſhall be marked out by the new diviſion. The allowance of the archbiſhops ſhall be 15,000 livres annually, and that of the biſhops 10,000. Biſhops may add to their titles the qualification of "citoyen," or "monſieur." No man can be named a biſhop but a Frenchman, aged at leaſt 30 years, having an atteſtation of his morals delivered by a biſhop, and after an examination of his doctrine by a biſhop and two prieſts: nor ſhall biſhops quit their ſees without the permiſſion of the firſt conſul. Biſhops are required to viſit every year a part of their dioceſe, and the whole every five years. No clergyman ſhall be ordained as prieſt, who is not 25 years of age, and poſſeſſed of 300 livres annual revenue. The curés ſhall reſide in their pariſhes; and prieſts, who do not regularly belong to any dioceſe, ſhall not officiate. The clergy in general ſhall wear black clothes; and the biſhops violet coloured ſtockings. There ſhall be a liturgy and a catechiſm for the French church. The names of the days ſhall be as in the ancient calendar; and Sunday ſhall be the day of reſt for the public functionaries; nor ſhall any other holidays, except Sundays, be kept without the conſent of the government. The bells ſhall only be rung for divine ſervice. The ſame temple ſhall be conſecrated only to one form of worſhip. The nuptial benedictions ſhall be only given by the clergy to thoſe who have been married by the civil officers.

With regard to the Proteſtant religion, no perſon ſhall exerciſe the miniſterial functions but a Frenchman; nor ſhall the Proteſtant churches and their miniſters have any connection with any foreign power. The miniſters and their communities ſhall pray for the proſperity of the French republic, and the conſuls. No doctrine, nor alteration of doctrine, ſhall be publiſhed or taught, without being firſt authorized by the government. The maintenance of the miniſters ſhall be provided for, wherever the property and oblations of the communities fall ſhort. The articles for the liberty of foundations, in the organic laws of the Catholic worſhip, ſhall be common to the Proteſtant churches. There ſhall be two ſeminaries, one in the eaſt of France, for the inſtruction of miniſters of the confeſſion of Augſburg; and the other at Geneva for the reformed churches. The profeſſors are to be named by the firſt conſul, and no miniſter to be appointed without a certificate of his having ſtudied in the ſeminary of his religion. The regulations of the ſeminaries are to be ſettled by the government. The reformed churches of France ſhall have paſtors, local conſiſtories, and ſynods. There ſhall be a conſiſtorial church for every 6000 ſouls of the ſame communion. Five conſiſtorial churches ſhall form the diſtrict of a ſynod. The number of miniſters or paſtors in the ſame conſiſtorial church cannot be increaſed without the authority of government; nor can the paſtors reſign without ſtating their motives to government, which ſhall approve or reject them. The title of election ſhall be preſented to the firſt conſul for his approbation. Each ſynod ſhall conſiſt of a paſtor and a notable of each church. The ſynods ſhall ſuperintend the celebration of worſhip and conduct of eccleſiaſtical affairs, and all their deciſions ſhall be ſubmitted for the approbation of government. The ſynods cannot aſſemble until they ſhall have received the permiſſion of government; nor ſhall any ſynodal aſſembly laſt more than ſix days.

The churches of the confeſſion of Augſburg ſhall have paſtors, local conſiſtories, inſpections, and general conſiſtories. The paſtors and conſiſtorial churches ſhall be ſubject to the regulations preſcribed for the reformed paſtors and churches. The churches of this confeſſion ſhall be ſubordinate to the inſpections. Five conſiſtorial churches ſhall form an inſpection, which is to aſſemble only by permiſſion of government. Each inſpection to chooſe an inſpector, and two laymen of ſuch choice to be confirmed by the firſt conſul. There are to be three general conſiſtories; one at Straſburg, for the Proteſtants of Augſburg, of the departments of the Upper and Lower Rhine; a ſecond at Mentz, for thoſe of the departments of the Sarte and Mont-Tonnerre; and the third at Cologne, for thoſe of the departments of the Rhine, Moſelle, and Roer.

Concordat *Militaire*, Fr., an agreement entered into by officers of the ſame corps, to eſtabliſh a fund or proviſion for one of them that quitted it. This agreement, however, was only tolerated in particular caſes and circumſtances, to which the chiefs ſeemed to conſent, without either openly, or with their ſignatures, giving their approbation to the ſame.

CONCORDIA, in *Ancient Geography*, a town of Italy, with the title of colony; placed by Ptolemy in the country of the Carni, but by Pliny in that of the Veneti, between Pons Liquentiæ and Tilavemptus. Eutropius and the Itinerary of Antonine place it in Venetia. It took the name of *Julia*, becauſe a colony had been ſent thither by Julius Cæſar.—Alſo, a town of Spain, placed by Ptolemy in Luſitania, ſuppoſed to have been the preſent *Tomar*.—Alſo, a town and Roman fortreſs of Gaul, in Germania Prima, between Brocomagum and Noviomagum, according to the Itinerary of Antonine.

Concordia, in *Geography*, a town of Italy, in the duchy of Mirandola, on the Sechia; 6 miles W. of Mirandola; between which cities there is a fine canal, which facilitates the communication of both.—Alſo, a town of Italy, in the country of Friuli; which, though in ruins, is the ſee of a biſhop, who reſides at Porto Gruato.

CONCOTS, a town of France, in the department of the Lot; 3 leagues S.S.E. of Cahors.

CONCOU, in *Botany*, a name given by the people of Guinea to an herb which is in great efteem with them for killing that troublefome fort of worm called the Guinea-worm, which breeds in their flefh. They bruife the leaves, and mixing them with oil, apply them in form of a cataplafm. The leaves of this fhrub fomewhat refemble thofe of the caggow, but they are thicker and ftiffer, and are not fo full of veins. They are broadeft within one third of the bafe, and from thence they go tapering to each end. They are placed on long footftalks of a fine green throughout. Phil. Tranf. N° 232.

CONCOURE'S, in *Geography*, a town of France, in the department of the Aveiron, and diftrict of Rhodez; 7 miles N.N.E. of Rhodez.

CONCOURSE, or CONCURRENCE, the reciprocal action of divers perfons or things co-operating toward the fame effect or end.

The fchoolmen diftinguifh two kinds of concurrence; *viz.* mediate, which confifts in giving a power or faculty to act; and immediate, which is a contemporary influence of one caufe along with another, to produce an effect. Thus, the grandfather concurs mediately to the production of a grandfon, as he originally gives the power of generating to the father; but the father concurs immediately with the mother to the production of the fame child. With refpect to the agency of God, fome divines maintain both thefe kinds of concurrence; others deny the latter. See CAUSE.

CONCOURSE, *Point of.* See FOCUS.

CONCQUE, Fr. A piece of artillery, of which the bore is wider towards the muzzle than towards the breech. It is alfo the name of a fhell, which the ancients made ufe of in their armies inftead of a trumpet.

CONCRESSAUT, or CONCORSAUT, in *Geography*, a town of France, in the department of the Cher, on the Saudre, almoft ruined by the civil wars; 25 miles N. of Bourges.

CONCRETE, in the *School Philofophy*, an affemblage, or COMPOUND.

CONCRETE, *Phyfical*, or a CONCRETE *body*, may denote any mixed body, or body compofed of different principles; and confequently, all fenfible bodies whatever, as all bodies arife from a coalition of divers elements, or at leaft of divers principles, matter, and form.

But, in ftrictnefs, concrete is only ufed for thofe compounds wherein the ingredients ftill retain their diftinct natures, nor are wholly converted into any new common nature.

Authors diftinguifh *natural* concretes and *artificial* ones: antimony is a *natural* concrete, and foap a *factitious* concrete.

CONCRETE *Juices.* See JUICES.

CONCRETE, *Logical*, or a CONCRETE *word*, called alfo *paronymum*, is that which has a compound fignification, as denoting both the fubject and fome quality or accident of the fubject, which gives it its denomination.

Such, *e. gr.* are *man*, *learned*, *white;* for *man* fignifies as much as *having human nature; learned*, as much as *having learning*, &c. Hence, the word concrete is chiefly ufed to exprefs the union of qualities or quantities with the bodies or fubjects, without any feparation, even in idea. The oppofite term, whereby things are feparated in thought, is *abftract.*

Concrete properly fignifies a fubject accompanied with its form or quality; as *pious*, *hard*, *white: abftract*, on the contrary, expreffes the form and quality without the fubject, as *piety*, *hardnefs*, *whitenefs.*

CONCRETE *Numbers*, are thofe which are applied to exprefs or denote any particular fubject: as two men, three pounds, two thirds of a fhilling, &c.

Whereas, if nothing be connected with a number, it is taken abftractedly or univerfally: thus, three fignifies only an aggregate of three units; let thofe units be men, pounds, or what you pleafe.

CONCRETION, the act whereby foft bodies are rendered hard; or an infenfible motion of the particles of a fluid or foft body, whereby they come to a confiftence.

The word is ufed indifferently for *induration*, *condenfation*, *congelation*, and *coagulation.*

CONCRETION is alfo ufed for the coalition of feveral little particles into a fenfible mafs, called a CONCRETE; by virtue of which union, the body acquires this or that figure, and thefe or thofe properties.

CONCRETION, in *Surgery*, from *concretio*, the adhefion or growing together of parts. This term alfo denotes the impacting or cohering of fubftances together, fo as to form a mafs; as in the fanguineous concretion, the bilious or biliary concretion, the calculous concretion, &c. The coalefcence of parts which ought to be feparate, as of the fingers and eyelids, might be rather called agglutination or cohefion.

Membranes and other parts may adhere together, either from natural or accidental caufes; but the moft frequent caufe of external concretions is an ulceration or abrafion of the fkin, fo that two furfaces lying in contact fhall unite by inflammation and reciprocal granulation. In all fuch cafes, where an operation is practicable and neceffary, the furgeon muft feparate the united parts with a fcalpel, and keep them afunder during the cure. See STONE and CALCULUS.

CONCUBINAGE fometimes expreffes a criminal, or prohibited commerce between the two fexes: in which fenfe it comprehends *adultery*, *inceft*, and *fimple fornication.*

Promifcuous concubinage is productive of a great variety of evils, and tends not only to the corruption, but to the ultimate deftruction, both of individuals and of fociety. It is not only ineffectual to promote love, and the tender affections, either between perfons themfelves, or towards their offspring, but it contributes towards exciting and maintaining endlefs jealoufies and quarrels among mankind. The great and radical mifchief attending unreftrained promifcuous concubinage in a ftate of fociety, confifts in its tendency to diminifh marriages, and thus to defeat the feveral beneficial purpofes refulting from this inftitution. (See MARRIAGE.) It difcourages marriage by weakening the force of a very urgent motive and temptation to it, arifing from the intention of the original former of mankind, and the conftitution of human nature. "The male part of the fpecies," fays Dr. Paley, "will not undertake the incumbrance, expence, and reftraint of married life, if they can gratify their paffions at a cheaper price; and they will undertake any thing rather than not gratify them."

A juft idea may be formed of the magnitude of this mifchief, by attending to the importance and variety of the ufes to which marriage is fubfervient; and by duly confidering that the malignity and moral quality of each crime are not to be eftimated by the particular effect of one offence, or of one perfon's offending, but by the general tendency and confequence of crimes of the fame nature. The libertine may not be confcious that thofe irregularities hinder his own marriage; from which, as he may allege, he is deterred by different confiderations; nor may he perceive, or be difpofed to acknowledge, that his indulgences hinder the marriage of others;

others; but it behoves him to reflect, what would be the confequence of univerfal licentioufnefs in this refpect, and what fhould prevent its becoming univerfal, if it be innocent or allowable in him. Moreover, fornication fupports proftitution; and proftitution entails on its victims almoft certain mifery, occafioned by the indigence, difeafe, and infult, to which thefe wretched outcafts of fociety, who infeft populous cities, are fubject; the whole aggregate of which is a general confequence of fornication, and to the increafe and continuance of which, every act and inftance of fornication contribute. Befides, fornication promotes habits of ungovernable lewdnefs, which introduce the more aggravated crimes of feduction, adultery, violation, &c.; to which we may add, in this connection, that the criminal commerce of the fexes depraves the mind and moral character more than any fingle fpecies of vice whatfoever; thefe indulgences prepare an eafy admiffion for every other crime: in low life, they are ufually the firft ftage in men's progrefs to the moft defperate villainies; and, in high life, to that lamented diffolutenefs of principle which manifefts itfelf in a profligacy of public conduct, and a contempt of the obligations of religion and moral probity. Habits of libertinifm alfo incapacitate and indifpofe the mind for all intellectual, moral, and religious pleafures, which would very much contribute to every man's happinefs.

It deferves further to be confidered, that fornication perpetuates a difeafe, which may be accounted one of the fevereft maladies of human nature; and the effects of which are faid to contaminate the conftitution of even diftant generations. This dreadful malady, the fevereft fcourge, fays Dr. Robertfon, (Hift. of America, vol. ii. p. 87), with which, in this life, offended Heaven chaftens the indulgence of criminal defires, feems to have been peculiar to the Americans; and he adds, that by communicating it to their conquerors, they have not only amply revenged their own wrongs, but by adding this calamity to thofe which formerly embittered human life, they have, perhaps, more than counterbalanced all the benefits which Europe has derived from the difcovery of the New World.

Dr. Hartley, in his "Obfervations on Man," (p. 443), remarks, that the fhameful, loathfome, and often fatal difeafe, which peculiarly attends the vice of lewdnefs, may be confidered as a moft unqueftionable evidence of the Divine Will. This difeafe, with all its confequences, would foon ceafe among mankind, could they be brought under the reftraints of lawful marriage; but muft ever continue, whilft licentioufnefs continues. Without this check, however, the licentioufnefs which has always been obferved to follow improvements in arts and politenefs, and to attend upon bodies politic in their declenfion, and which the corruption of the Chriftian religion in fome, and the difbelief of it in others, have, in a manner, authorized, would have brought on utter diffolutenefs in this weftern part of the world, fuch as would have been inconfiftent with the very exiftence of regular government. Nay, it may be, that this will ftill be the cafe, and that we are haftening to our period, through the great wickednefs of the world in this refpect particularly, though our lives, as a body politic, be fomewhat prolonged by this correction.

If we appeal to the Chriftian fcriptures on the fubject of this article, it is certain that thefe facred writings condemn fornication abfolutely and peremptorily, and that they clafs this crime with murders, thefts, falfe witnefs, and blafphemies. Befides, the aggravated fin of idolatry is reprefented by adultery and fornication in the prophetic writings. Although the fcriptures give no fanction to thofe aufterities which have been impofed upon the world under the name of Chriftianity, as the celibacy of the clergy, the practice of perpetual virginity, the "prohibitio concubitûs cum gravidâ uxore;" yet, with a juft regard to the condition and intereft of the human fpecies, they have provided, by the marriage of one man with one woman, an adequate gratification for the propenfities of their nature, and have *reftrained* them to that gratification. The avowed toleration, and in fome countries the licenfing, taxing, and regulating of public brothels (fee BAWDY-HOUSE), have appeared like a fanction of fornication, and have contributed, with other concurring caufes, fo far to vitiate the public opinion, that there is no practice, the immorality of which is fo little thought of or acknowledged, although there are few in which it can be more eafily and more fatisfactorily evinced. The legiflators who have patronized receptacles of proftitution ought to have forefeen this effect, and alfo to have confidered, that whatever facilitates fornication, diminifhes marriage. As to the ufual apology for this relaxed difcipline, the danger of greater enormities if accefs to proftitutes were too ftrictly watched and prohibited, "it will be time enough," fays Dr. Paley, "to look to that, when the laws and magiftrates have done their utmoft." After all, thefe fears are without foundation in experience. The men are in all refpects the moft virtuous, in countries where the women are the moft chafte.

In its more reftrained fenfe, concubinage is ufed for a man's and a woman's cohabiting together in the way of marriage without having paffed the ceremony thereof.

This fpecies of cohabitation is, without doubt, diftinguifhable from vagrant concubinage, and by reafon of its refemblance to marriage, may be thought to participate of the fanctity and innocence of that ftate. In modern phrafe, it is denominated "the keeping of miftreffes," under the fuppofed favourable circumftance of mutual fidelity. For this practice the following kind of apology has been fometimes alleged:

"That the marriage rite being different in different countries, and in the fame country among different fects, and with fome, fcarcely any thing; and, moreover, not being prefcribed or even mentioned in fcripture, can be regarded only as a form or ceremony of human invention; and that, confequently, if a man and woman betroth and confine themfelves to each other, their intercourfe muft be the fame, as to all moral purpofes, as if they were legally married; for the addition or omiffion of that which is a mere form and ceremony can make no difference in the fight of God, or in the actual nature of right and wrong."

To this fpecious fort of reafoning, archdeacon Paley has replied:

1. If the fituation of the parties be the fame thing in marriage, why do they not marry? 2. If the man choofe to have it in his power to difmifs the woman at his pleafure, or to retain her in a ftate of humiliation and dependence inconfiftent with the rights which marriage would confer upon her, it is not the fame thing. 3. It is not at any rate the fame thing with refpect to the children. Moreover, as to the marriage rite being a mere form, and that alfo variable, the fame may be faid of figning and fealing of bonds, wills, deeds of conveyance, and the like, which yet make a great difference in the rights and obligations of the parties concerned in them. And with refpect to the rite not being appointed in fcripture, the fcriptures forbid fornication, that is, cohabitation without marriage, leaving to the law of each country to pronounce what is, or what makes, a marriage; in like manner as they forbid theft, that is, the taking away of another's property, leaving it to the municipal law to fix what makes the thing property, or whofe it is, which alfo,

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as well as marriage, depends on arbitrary and mutable forms. Independently of the injunctions of fcripture, the plain account of the queftion feems to be this; it is immoral, becaufe it is pernicious, that man and woman fhould cohabit, without undertaking certain irrevocable obligations, and mutually conferring certain civil rights: if, therefore, the law has annexed thefe rights and obligations to certain forms fo that they cannot be fecured or undertaken by any other means, which is the cafe in this inftance (for whatever the parties may promife to each other, nothing but the marriage ceremony can make their promife irrevocable), it becomes in the fame degree immoral, that men and women fhould cohabit without the interpofition of thefe forms. Paley's Principles of Moral and Political Philofophy, vol. 1. b. 3. c. 2.

Concubinage was anciently tolerated: the Roman law calls it an allowed cuftom, *licita confuetudo.* When this expreffion occurs in the conftitutions of the Chriftian emperors, it fignifies what we now call a "marriage in confcience."

The concubinage tolerated among the Romans in the time of the republic, and of the heathen emperors, was that between perfons not capable of contracting marriage together: nor did they even refufe to let inheritances defcend to children which fprung from fuch a tolerated cohabitance.

Concubinage between fuch perfons they looked on as a kind of marriage, and even allowed it feveral privileges: but then this concubinage was confined to a fingle perfon, and was of perpetual obligation, as much as marriage itfelf. Hottoman obferves, that the Roman laws had allowed of concubinage long before Julius Cæfar made that law whereby every one was allowed to marry as many wives as he pleafed. The emperor Valentinian, Socrates tells us, allowed every man two.

Concubinage is alfo ufed for marriage performed with lefs folemnity than the formal marriage; or a marriage with a woman of inferior condition, and to whom the hufband does not convey his rank, or quality.

Cujas obferves, that the ancient laws allowed a man to efpoufe, under the title of concubine, certain perfons, fuch as were efteemed unequal to him, on account of the want of fome qualities requifite to fuftain the full honour of marriage. He adds, that though concubinage was beneath marriage, both as to dignity, and civil effects; yet was concubine a reputable title, very different from that of *miftrefs* among us.

The commerce was efteemed fo lawful, that the concubine might be accufed of adultery in the fame manner as a wife.

This kind of concubinage is ftill in ufe in fome countries, particularly in Germany, under the title of a *half-marriage, morgengabic marriage,* or *marriage with the left hand;* alluding to the manner of its being contracted, *viz.* by the man's giving the woman his left-hand inftead of the right.

This is a real marriage, though without folemnity: the parties are both bound for ever; though the woman be thus excluded from the common rights of a wife, for want of quality or fortune.

The children of concubines were not reputed either legitimate or baftards, but natural children, and were capable only of donations.

They were deemed to retain the low rank of the mother; and were on this ground unqualified for inheriting the effects of the father.

Concubinage, in a *Legal Senfe,* is ufed as an exception againft her that fueth for dower, alleging thereby, that fhe was not a wife lawfully married to the party, in whofe lands fhe feeks to be endowed, but his concubine. Brit. c. 107. Bract. lib. iv. tract. 6. cap. 8.

CONCUBINE, a woman whom a perfon takes to cohabit with him, in the manner, and under the character, of a wife, without being authorized thereto by a legal marriage.

Concubine is alfo ufed for a real, legitimate, and only wife, diftinguifhed by no other circumftances but a difparity of birth or condition between her and the hufband. Du-Cange obferves, that one may gather from feveral paffages in the epiftles of the popes, that they anciently allowed of fuch concubines. The feventeenth canon of the firft council of Toledo declares, that he, who with a faithful wife keeps a concubine, is excommunicated; but that if the concubine ferved him as a wife, fo that he had only one woman, under the title of concubine, he fhould not be rejected from communion: which fhews that there were legitimate wives under the title of concubines.

In effect, the Roman laws did not allow a man to efpoufe whom he pleafed; there was required a kind of parity, or proportion, between the conditions of the contracting parties; but a woman of inferior condition, who could not be efpoufed as a wife, might be kept as a concubine; and the laws allowed of it, provided the man had no other wife.

It is certain the patriarchs had a great number of wives, and that thefe did not all hold the fame rank; fome being fubaltern to the principal wife; which were what we call concubines, or half-wives. The Romans prohibited a plurality of concubines, and only had regard to the children iffuing from a fingle concubine, becaufe fhe might become a legitimate wife. Solomon had 700 wives, and 300 concubines: the emperor of China has fometimes two or three thoufand concubines in his palace. Q. Curtius obferves, that Darius was followed in his army by 365 concubines, all in the equipage of queens; and Diodorus Siculus fays, that he maintained as many as the days of the year. Artaxerxes had by his concubines 115 children. The concubines were introduced to the Perfian king, each in her turn; whence fome have concluded, that the ancient Perfian year confifted of 360 days, fince feveral of the Perfian monarchs had this number of concubines, who went to their kings in conftant courfes.

CONCUPISCENCE, among divines, an irregular defire, appetite, or luft after carnal things, inherent in human nature.

The dominion or prevalence of concupifcence, according to F. Malebranche, is what we call original fin.

The origin of concupifcence he afcribes to thofe impreffions made on the brain of our firft parents at their fall; which are ftill tranfmitted and continued on thofe of their children; for as animals produce their like, and with like traces in the brain (whence the fame fympathies and antipathies in the fame kind; and whence the fame conduct on the fame occafions); fo our firft parents, after their fall, received fuch deep traces in the brain, by the impreffion of fenfible objects, that they might well be fuppofed to communicate them to their children.

The fchoolmen ufe the term *concupifcible appetite* for the defire we have of enjoying any good; in oppofition to *irafcible appetite,* whereby we efchew what is evil.

CONCURRENCE. See Concourse.

CONCURRING, or Congruent *Figures,* in *Geometry,* fuch as, being laid upon one another, do exactly correfpond to, and cover one another, and confequently muft

muft be equal among themfelves. Thus, triangles having two fides and the contained angle equal each to each, appear to be equal to one another in all refpects. See CONGRUITY.

CONCUSSION *crimen repetundarum*, in *Jurifprudence*, is the abufe of power by fome perfon entrufted with a public commiffion or employment; by extorting money from thofe under his power or command. This crime is taken notice of in the heads of the Digeft, or Code—*ad legem Juliam repetundarum;* and it is to be obferved, that he who gave a bribe contrary to the oath he had taken, might be profecuted as well as the receiver: and that the judge who was corrupted was deemed guilty of concuffion, as much as he who purchafed property which was in a courfe of litigation. The magiftrates were even forbidden to acquire any thing by way of purchafe, donation, or otherwife, in the provinces wherein they refided, under pain of being guilty of concuffion.

The crime of concuffion was not ranked in the number of public offences, except when committed by a magiftrate; when committed by a perfon of inferior ftation, it was only a private crime; but it is not the quality of the perfon which renders the crime public or private, but the nature of the crime itfelf.

CONCUSSION, in *Surgery*, from *concutio*, a fhaking together. This term is moftly applied to a violent commotion of the body, and efpecially of the brain; but a concuffion of the nervous fyftem in general, or of the fpinal marrow in particular, may produce the fame train of fymptoms in a partial degree, as a commotion of the brain does in the whole body. A concuffion of the brain may be occafioned not only by blows on the head, but alfo by violence inflicted upon other parts of the body. It is frequently occafioned by a fall upon the thighs when ftretched out ftraight, or upon the breech; it is alfo obferved in cafes of contufion of the face, and fractured bones, occafioned by a fall from a confiderable height, in gun-fhot wounds attended with a fplintering of the bones, and, in general, in every cafe of external violence attended with confiderable commotion of the whole body. However, from whatever caufe it may arife, it always requires furgical treatment.

Moft of the fymptoms attending compreffion of the brain occur alfo in concuffion; but in a compreffed ftate of the brain they are more permanent. See COMPRESSION.

There is no difcharge of blood from the eyes, nofe, or ears, which frequently happens in compreffion; and inftead of that apoplectic ftertor in breathing which accompanies compreffion, the patient feems to be in a found and natural fleep. The pulfe is irregular and flow in compreffion, and grows ftronger and fuller by blood-letting; but in concuffion it is weaker, being foft and equal, and finks by blood-letting. There are befides, convulfions in compreffions, which are not obferved in a ftate of concuffion. The fymptoms arifing from concuffion come on immediately after the injury is received. In the violent degrees of thefe, the patient remains quite infenfible; the pupils are much dilated, and do not contract though the eyes be expofed to the ftrongeft light.

In more violent accidents, efpecially when the patient is rendered infenfible, it is extremely difficult to diftinguifh between concuffion and depreffion; for fymptoms which have been fuppofed to arife entirely from concuffion, have, after death, been found to be owing to extravafation or undifcovered fracture; and extravafation has been blamed, when, on diffection, not the leaft morbid appearance could be difcovered.

The fymptoms confequent upon concuffion of the brain are various, in proportion to the different degrees of the violence inflicted. In its flighteft degree, it produces ftupor and inclination to fleep, debility of the intellectual and corporeal faculties, infenfibility, or paralyfis of fome particular part. In the fecond degree, the patient lies without fenfation and motion in a ftate of profound coma, from which he cannot be roufed. But at the fame time he is generally reftlefs, toffes about, fpeaks much in his fleep, fometimes looks up, ftares wildly, raves, is affected with convulfions, and generally his pulfe betokens irritation. In the third degree, death fupervenes, either immediately, or as the fymptoms increafe in violence.

Thefe fymptoms, however, are not always of the fame nature and origin, and therefore require different methods of treatment. Thus the blood-veffels of the brain may be weakened in confequence of the violence inflicted; the blood may be preternaturally accumulated in them, and dilate them, to which fometimes alfo a congeftion in the head contributes. Sometimes, alfo, the external violence acts upon the fubftance of the brain itfelf and the whole nervous fyftem, either by the irritation or by the debility and paralytic ftate which it induces: in the firft of thefe cafes fpafmodic affections, reftleffnefs, want of fleep, or coma attended with delirium and convulfions, are obferved, and in the fecond the patient is thrown into a ftate fimilar to fyncope.

Before the external violence has been inflicted, it may happen that the patient may have been in a ftate of great anxiety and fear, and he may have been greatly terrified by the danger whilft it was ftill impending, in which cafes the confequences of thefe violent emotions of the mind, may be miftaken for effects of a concuffion of the brain. The patient is in a very different ftate when the injury has been inflicted whilft he was intoxicated, or in anger, or when his ftomach was full. Not unfrequently alfo fome of the fymptoms proceed from lefions of other parts of the body more remote from the head, or from collateral caufes, efpecially from inflammatory, and bilious complaints in the vifcera; which frequently produce not only a determination towards the head, but alfo various other fymptoms indicative of irritation.

All thefe fymptoms the furgeon muft take into mature confideration, in order to be able to form a proper judgment concerning the ftate of the patient in whom he difcovers fymptoms of concuffion of the brain. Thefe fymptoms are commonly of a fourfold nature; that is, they are fymptoms indicative of compreffion of the brain, and arife from the congeftions in the veffels; or they are fymptoms of debility and inactivity of the concuffed nervous fyftem; or they are fymptoms of irritation in the nervous fyftem: or finally, they are confequences of preternatural irritating caufes in the abdominal vifcera. Commonly the fymptoms belonging to each of thefe four different heads are combined; but frequently thofe of one clafs are more violent than thofe of the reft, and to this circumftance the furgeon muft efpecially attend in regulating his method of treatment.

With refpect to the cure, much alfo depends upon making the proper diftinction between the fymptoms of concuffion and thofe of extravafation. In many cafes this may eafily be done; for the fymptoms of concuffion come on immediately after the violence has been inflicted, whilft thofe of extravafation generally fupervene within a longer or fhorter time after. This criterion is however not always to be depended upon, nor difcoverable in every cafe; for when the patient was alone at the time when the accident happened, and is now deprived of his fenfes, the furgeon cannot afcertain-

afcertain whether the fymptoms followed the accident immediately.

If the fymptoms abate after the ufe of antiphlogiftic remedies, fuch as blood-letting, evacuations, glyfters, wafhing with cold water, &c. they ought to be continued; but in the contrary cafe, they are to be relinquifhed and an oppofite method of treatment adopted. The effects of blood-letting alone fometimes form an important criterion; for in cafes of concuffion of the brain it frequently lowers the pulfe to a great degree, nay, even aggravates the fymptoms; whilft in extravafations, even though it be frequently repeated, it produces a far lefs decifive effect upon the pulfe, and frequently alleviates the fymptoms.

Amongft the various remedies that have been recommended in concuffions of the brain, blood-letting is moft generally employed; but it ought to be moderate. Topical detraction of blood from the head has fometimes been found ufeful. Purgatives are always very ferviceable, but in general it is neceffary to adminifter them in large and repeated dofes. Still more beneficial are emetics, and amongft thefe tartar emetic and vitriolated zinc commonly prove the moft efficacious; though, on account of the infenfibility of the patient, they muft ufually be adminiftered in very large dofes, in order to produce their effect. Many recommend alfo ftimulating glyfters, and various other ftimulating remedies; fuch as the volatile alkalies, blifters applied to the head, and it is affirmed that fome have even adminiftered wine internally with the beft effects. Cold fomentations are here particularly ufeful, as they are adapted to all cafes, as are likewife all the remedies ufually employed in fyncope. Where there are fymptoms of irritation, fpafms, and convulfions, antifpafmodics are frequently found to produce great benefit; and in thefe cafes Dover's powder is particularly recommended. Before ufing it, the warm bath, and when the patient is plethoric, blood-letting is prefcribed. This remedy muft be continued as long as the fymptoms remain, and it muft be repeated when they return. Alfo a mixture of three parts of Vin. Antimonii and one part Tinct. Theb. given in dofes of ten drops every four hours, is found very ufeful. The ufe of laudanum alone has fometimes removed the fymptoms of concuffion.

Notwithftanding that all the above mentioned remedies ftand recommended by authentic experience, yet as they are fo oppofite to each other in their properties, it cannot poffibly be advifeable to prefcribe them all together, or any fingle one in all cafes; and the furgeon has therefore in every fingle cafe to choofe thofe remedies that are particularly adapted to remove the moft urgent fymptoms of the difeafe. Thus, when the fymptoms of preternatural repletion of the veffels of the brain are urgent, he muft employ blood-letting, cold fomentations, evacuations, and glyfters; to the latter of which it has been particularly recommended to add powder of fquills: when the urgent fymptoms are thofe of debility bordering on fyncope, he may ufe volatile alkali, wine, epifpaftics, cold fomentations, emetics, and other tonic remedies; when the fpafmodic fymptoms are the moft prominent, Dover's powder, Tinct. Antimon. and laudanum; when the fymptoms of bilious effufions prevail, emetics and purgatives.

As there is always reafon at firft to fufpect an accumulation of blood, and to apprehend inflammation, it will almoft always be advifeable firft to draw blood, unlefs it fhould be contraindicated by any peculiar fymptoms. Stimulants and tonics will produce more benefit after the fymptoms have continued for fome time, than if adminiftered at the beginning. If after the firft or fecond blood-letting, the pulfe finks whilft the other fymptoms remain the fame, or are even aggravated, it ought not to be perfifted in, but a contrary mode of practice is to be attempted. We may expect advantage from blood-letting, purgatives, and emetics, when the pulfe is full, hard, and quick; from antifpafmodics, when it is fmall and hard; and from ftimulant and tonic remedies, when it is fmall and foft. Neutral falts, gentle purgatives, and blood-letting, may be employed when the patient is ftrong, vigorous, plethoric, and florid; ftimulant antifpafmodics, when he is weakly, very irritable, pale, and cold.

Finally, we muft alfo attend to the ftate in which the patient has been before the injury: fhould he have received it whilft in a ftate of intoxication, cooling evacuants, and blood-letting are neceffary; if he has received it whilft his ftomach was full, or whilft in a paroxyfm of anger, emetics and purgatives are indicated; if whilft under the influence of great fear or apprehenfion, tonic and antifpafmodic remedies will be proper. Moreover, the head of the patient muft be carefully guarded againft all motion and concuffion during the courfe of the cure.

Should the patient recover under the ufe of the above-mentioned remedies, he muft ftill for fome time after carefully avoid all commotion of the head, and whatever tends to accelerate the circulation, as anger, wine, violent bodily exercife; it is alfo proper to continue ftill for fome time, to wafh or bathe the head in cold water; and fometimes to take tonic remedies, fuch as Peruvian bark, acid of vitriol, &c. When the patient, though in other refpects recovered, ftill continues to labour under debility or paralyfis of particular parts, thefe complaints may fometimes be removed by the continued ufe of internal and external tonics and ftimulants, efpecially volatile alkali, emetics, blifters, electricity, &c. But when the fymptoms increafe in fpite of the moft careful treatment, the furgeon is authorized, efpecially when the diagnofis is doubtful, to fuppofe an extravafation, and to trepan the part that has been injured. And fuppofing even that the furgeon has drawn a falfe conclufion, the operation of the trepan, if fkilfully performed, will do no harm, nay, may even in fome inftances be productive of benefit, in confequence of the difcharge of blood which it occafions.

On this important fubject Mr. Abernethy's obfervations deferve particular attention. He is of opinion that the effects of concuffion have not been juftly defcribed by authors, nor the fymptoms related by them thofe which ufually occur. In his Surgical Effays, he, therefore, felects two cafes out of many others, in order to fhew what really are the common confequences of this injury named concuffion.

"The whole train of fymptoms following a concuffion of the brain," fays he, "may, I think, be properly divided into three ftages. The firft is, that ftate of infenfibility and derangement of the bodily powers which immediately fucceed the accident. While it lafts, the patient fcarcely feels any injury that may be inflicted on him. His breathing is difficult, but, in general, without ftertor; his pulfe intermitting, and his extremities cold. But fuch a ftate cannot laft long; it goes off gradually, and is fucceeded by another, which I confider as the fecond ftage of concuffion. In this, the pulfe and refpiration become better, and though not regularly performed, are fufficient to maintain life, and to diffufe warmth over the extreme parts of the body. The feeling of the patient is now fo far reftored that he is fenfible if his fkin be pinched; but he lies ftupid, and inattentive to flight external impreffions. As the effects of concuffion diminifh, he becomes capable of replying to queftions put to him in a loud tone of voice, efpecially when they refer to his chief fuffering at the time, as pain in the head,

head, &c. otherwife, he anfwers incoherently, and as if his attention was occupied by fomething elfe. As long as the ftupor remains, the inflammation of the brain feems to be moderate; but as the former abates, the latter feldom fails to increafe; and this conftitutes the third ftage, which is the moft important of the feries of effects proceeding from concuffion.

"Thefe feveral ftages vary confiderably in their degree and duration; but more or lefs of each will be found to take place in every inftance where the brain has been violently fhaken. Whether they bear any certain proportion to each other or not, I do not know. Indeed this will depend upon fuch a variety of circumftances in the conftitution, the injury, and the after treatment, that it muft be difficult to determine.

"With regard to the treatment of concuffion, it would appear, that in the firft ftage very little can be done; and perhaps, what little is done, had better be omitted, as the brain and nerves are probably infenfible to any ftimulants that can be employed. From a loofe, and, I think, fallacious analogy between the infenfibility in fainting, and that which occurs in concuffion, the more powerful ftimulants, fuch as wine, brandy, and volatile alkali, are commonly had recourfe to, as foon as the patient can be got to fwallow. The fame reafoning which led to the employment of thefe remedies in the firft ftage, in order to recal fenfibility, has given a kind of fanction to their repetition in the fecond, with a view to continue and increafe it.

"But here the practice becomes more pernicious, and lefs defenfible. The circumftance of the brain having fo far recovered its powers, as to carry on the animal functions in a degree fufficient to maintain life, is furely a ftrong argument that it will continue to do fo, without the aid of means which probably tend to exhauft parts already weakened by the violent action they induce.

"And it feems probable that thefe ftimulating liquors will aggravate that inflammation which muft fooner or later enfue. The accefs of it, in the cafes which I have related, is fufficiently evident; and its cure is to be effected by the common methods. The great benefit of evacuations was, in thofe cafes, very evident."

After fome further remarks in oppofition to the cordial plan of treatment, and the relation of a fatal cafe of fimple concuffion, in which that fyftem would have been manifeftly hurtful, Mr. Abernethy adverts to the very defirable object of pointing out the marks by which we may diftinguifh between compreffion and concuffion of the brain; for thefe, he apprehends, may in general be diftinguifhed.

"As far as my obfervation goes," fays he, "the infenfibility is much lefs in concuffion, efpecially after a fhort time has elapfed. Patients in this cafe, though they feem reluctant to anfwer queftions, yet complain much if their heads are moved; and in thofe inftances where it was judged neceffary to infpect the bone, I have generally found they made great complaint during the operation. The pupils alfo are ufually more contracted than in compreffion of the brain, the mufcles of the limbs retain their natural ftate of tone, and refpiration is performed with little or no ftertor, though the pulfe generally intermits in a very confiderable degree. In the flighter cafes of concuffion, the ficknefs of the patient is often very great.

"But, in cafes of compreffion of the brain, circumftances very much the reverfe of thofe juft related take place; the fenfibility is much diminifhed in proportion to the degree of the injury; from this caufe alfo the pupils are dilated, and the limbs relaxed; the refpiration is attended with ftertor; and the pulfe is fubject to much lefs intermiffion."

COND, Con, or Conn, in *Sea Language,* fignifies to guide or conduct a fhip in her right courfe.

He that conds her, ftands aloft with a compafs before him, and gives the word of direction to the man at the helm how he is to fteer. See Steering.

If the fhip go before the wind, or, as they call it, betwixt the fheets, the word is either *ftarboard,* or *port the helm*; according as the conder would have the helm put to the right or left fide of the fhip, upon which the fhip always goes the contrary way.

If he fays, *helm a mid fhip,* he would have the fhip to go right before the wind, or directly between her two fheets.

If the fhip fail by wind, or on a quarter wind, the word is, *aloof, keep your luff, fall not off, veer no more, keep her to, touch the wind, have a care of the lee-latch*: all which expreffions are of the fame import, and imply that the fteerfman fhould keep the fhip near the wind.

On the contrary, if he would have her fail more large, or more before the wind, the word is, *eafe the helm, no near, bear up.*

If he cries *fteady,* it means, keep her from going in and out, or making yaws (as they call it), howfoever fhe fails, whether large or before a wind; and when he would have her go juft as fhe does, he cries *keep her thus, thus.* &c

CONDA, or Kond, fignifies fortrefs, and often occurs as a termination of words in the fouth part of India, in this fenfe, as *cotta* and *cote,* which have the fame fignification, do in the north.

CONDABORA, in *Ancient Geography,* a town of Spain, placed by Ptolemy in Celtiberia.

CONDALIA, in *Botany,* Cavanilles, Icon. tab. 525. Clafs and order, *pentandria monogynia.* Nat. Ord. *rhamni.*

Gen. Ch. *Cal.* one-leafed, with five lanceolate divifions, permanent. *Cor.* none. *Stam.* five. *Pift.* Germ fuperior, egg-fhaped, furrounded by the glandular difk of the calyx; ftyle one; ftigma emarginate. *Peric.* Drupe egg-fhaped; nut one-celled.

Sp. C. *parvifolia.* A fhrub. *Branches* numerous, fpinous. *Leaves* fmall, egg-fhaped, acute, clustered in the axils of the fpines. *Flowers* yellowifh, very fmall, axillary. Ruiz and Pavon, in their Flora Peruvienfis, have given the fame name to another genus, confifting of fome herbaceous plants difcovered by them in Peru. Clafs and order, *tetrandria monogynia.*

Gen. Ch. *Cal.* one leafed, four-toothed, permanent. *Cor.* monopetalous, funnel-fhaped; tube inflated; border with four lanceolate divifions. *Stam.* four, very fhort. *Pift.* Germ inferior; ftyle bifid. *Peric.* Berry egg-fhaped, crowned by the calyx, hollow, fpongy, two-celled. *Seeds* feveral, attached to a pedicelled receptacle, adnate to the interior of the partition.

CONDALUS, in *Antiquity,* a kind of ring ufually worn by flaves.

CONDAMINE, Charles-Marie de la, in *Biography,* a celebrated traveller, was born at Paris in the year 1701. In early life he diftinguifhed himfelf as a military man; but quitting the profeffion of arms for the purpofe of indulging a laudable curiofity, and a thirft for natural fcience, he diligently furveyed all the countries bordering on the coafts of the Mediterranean, and travelled into various parts of Leffer Afia, Egypt, and Turkey. He was elected a member of the Academy of Sciences, and propofed a voyage to the equator, in order to meafure a degree of the meridian. In 1736 he went, with other mathematicians, to Peru for this purpofe, and exhibited the greateft affiduity and fkill in accomplifhing the work. On his return he defcended the celebrated river of the Amazons; in this enterprize he

he suffered many hardships, which were, however, more than requited by the instruction, which regions so remote, and so fruitful of the wonders of nature, afforded him. Here he compared the number of vibrations made by the same pendulum, which he had used at Paris, at Quito, and other places, and he found that for 100,000 vibrations at Paris, 98,770 were made by the same pendulum at the side of the Amazons, 98740 at Quito, and 98720 on Pinchincha. He published in the year 1745 an account of his travels, under the title of "Relation Abrégée d'un Voyage fait dans l'Interieur de l'Amerique Meridionale;" and in 1751, a "Journal du Voyage fait par Ordre du Roi a l'Equateur, avec un Supplement, en deux Parties." Condamine, after a short residence at home, went to Italy, where he was honoured with the particular notice of the pope, who granted him a dispensation to marry his own niece. In 1762 he published some remarks on what he had seen in his tour through Italy. He then visited England, and, among other interesting objects, he became warmly attached to the new practice of inoculation for the small-pox. On his return he published in two volumes "Memoires et Lettres sur l'Inoculation." About this period he was elected member of the French Academy of Belles Lettres; he likewise received the same honour from several foreign learned societies, as those of London, Petersburgh, Berlin, and Bologna. He died in February 1774, in consequence of an operation for the hernia. "The acquisitions of M. de la Condamine," says one of his biographers, "were more extensive than profound; and he possessed rather an ardour for making researches on a variety of subjects, than patience completely to investigate any." Nouv. Dict. Hist. Gen. Biog. See also the article BOUGUER.

CONDANORE, in *Geography*, a town of Hindoostan, in the country of Golconda; 15 cosses E. of Adoni. N. lat. 15° 40′. E. long. 78°.

CONDAPILLY, a town of Hindoostan, and capital of a circar of the same name, near the bay of Bengal; 142 miles S.E. of Hydrabad. N. lat. 16° 40′. E. long. 80° 40′.

CONDAPILLY, a circar of Hindoostan, bounded on the N.E. by the circar of Ellore, on the S.E. by the bay of Bengal, on the S.W. by the river Kistnah, which divides it from Guntoor, and on the N.W. by the country of Golconda; about 60 miles long and 25 broad.

CONDATCHY, a bay of Ceylon in the East Indies, lying on the west side of the island, six miles southward from Arippo, and about 12 miles from Manaar. N. lat. 8° 45′. E. long. 80°. In this bay all the boats are collected for the pearl-fishery. The bay forms nearly a half-moon; the beach which surrounds it is an extensive sandy waste, with only a few miserable huts scattered along the shore between the bay and the woods which skirt the beach. Such is the appearance which this bay presents at most seasons of the year; but during the fishery the scene is entirely reversed. At that time the bay is crowded with small vessels, and the beach presents an astonishing multitude of people from every quarter of India. The principal bank for the fishery is opposite to Condatchy, and lies out at sea about 20 miles. See PEARL-*Fishery*.

CONDATE, in *Ancient Geography*, an appellation, probably of Celtic original, bearing relation to the idea of *Confluent*, and giving name to several towns, such as follow.

CONDATE, or REDONES, *Rennes*, a town of Armorica, the capital of the Redones, according to Ptolemy.—Also, *Montreau*, a town of Gaul, between Melodunum and Agedinium, which afterwards bore the name of Monasteriolum.—Also, *Combe*, a place of Gaul between Noviomagus and Durocasses.—Also, *Cone*, a town of Gaul, between Nevirnum and Brivodurum.—Also, *Coignac*, a town of Gaul, between Mediolanum Santonum and Vesunna, according to the table of Peutinger.—Also, a place of the isle of Albion, between Manucium or Manchester and Deva or Chester in Antonine's Itinerary: generally placed at Congleton; but Mr. Horsley hath made it very probable that it was somewhere near Northwich.

CONDAT-EN-FERRIERES, in *Geography*, a town of France, in the department of the Tarn; 10 miles N. of Murat.

CONDATOMAGUS, in *Ancient Geography*, a place of Gaul, marked in the Peutingerian table between Ségodunum and Luteva.

CONDAVIR, in *Geography*, a fortified place of Hindoostan, and a principal post in the circar of Guntoor; strongly situated on a mountain, eight cosses to the west of Guntoor, and ten from the bank of the Kistnah. Not far from Condavir is Colore, a diamond mine on the southern bank of the Kistnah. Condavir is distant S.E. from Hydrabad 131 miles; from Madras 276 miles; from Nagpour, S. 385 miles; and N.E. from Seringapatam 414 miles.

CONDE, LEWIS I. *De Bourbon*, in *Biography*, was the son of Charles of Bourbon, duke of Vendome, and born in 1530. He distinguished himself when very young at the battle of St. Quintin, and behaved with great gallantry till the death of Henry II., when he became a leader of the Huguenots. He was accused of having been the principal contriver of the conspiracy of Amboise, but, in the presence of the king, he vindicated his honour with all the intrepidity natural to him, and offered to maintain his innocence in single combat against his accuser. He was set at liberty, but engaging in another plot, he was condemned by his judges to have his head struck off on a scaffold before the king's apartment. To the sudden death of the sovereign he was indebted for his freedom a second time; he now openly put himself at the head of the Huguenots, and was admitted, with Admiral Coligny, to share their full confidence. After many and very important instances of success, he was wounded and taken prisoner in the battle of Dreux in 1562. At the battle of Jarnac 1569, he encountered the enemy with his arm in a scarf, and as he marched to the attack, the horse of his brother-in-law reared and broke his leg; superior however to this painful accident, he thus addressed his followers: "Nobility of France, know, that the prince of Condé, with an arm in a scarf, and broken leg, fears not to give battle, since you attend him." The village of Jarnac has been rendered memorable by the courage and constancy with which the Huguenots disputed the day; but their leader Condé, exhausted with fatigue, was surrounded and taken prisoner. Those to whom he had yielded his sword, had placed him at the foot of a tree, when Montesquieu, captain of the duke of Anjou's guards, shot him dead, in cold blood, in revenge of a private quarrel. This savage, and truly infamous deed has affixed an indelible stain on the character of the duke of Anjou who was supposed to have authorised it. The body of Condé, thrown upon an ass, was carried to the castle of Jarnac, and after being exposed to the view of the victorious army, was delivered to the duke of Longueville, his brother-in-law, who caused it to be interred with those of his ancestors at Vendome. In his person, the prince of Condé was ungraceful and diminutive, yet his wit and vivacity rendered him a great favourite with the ladies. His amours gave occasion to the conclusion that he engaged in the cause of the Huguenots more as a party-man, than as a religionist. This trait in his character was a foil to quali-

ties

ties the moſt ſplendid, and to virtues the moſt heroic. Of high and determined courage, he was formed to ſhine in camps as well as courts, and though his income was narrow, he diſplayed a magnificence of temper worthy his birth and ſtation. Nouv. Hiſt. Dict. Hiſt. de France.

CONDE, LEWIS II. *de Bourbon*, was born at Paris, Sept. 7, 1621. He was ſtyled Duke d'Enguien, and is known in hiſtory, under the appellation of the *great Condé*. He ſucceeded to the rank of prince by his father's death in 1646. In his infancy he was of an extremely delicate conſtitution, and was ſent into the country for the ſake of pure air. At a proper age the prince took upon himſelf the taſk of governor, and ſelected, as his aſſiſtant, in this important buſineſs, M. de la Bouſſieres, a private gentleman, upon whom he could depend for the moſt exact attention to the orders given him. Two jeſuits were likewiſe aſſigned to him as preceptors, who, with ſome officers of high rank and eminent probity and diſcretion, formed the houſhold of the young prince. With theſe attendants he went to Bourges, where he frequented the college of jeſuits, and became diſtinguiſhed in every branch of learning. His inclination was evidently turned towards the military art, and at the age of eighteen he made a campaign under Marſhal de la Meilleraye, that laid the foundation of that renown by which he was afterwards diſtinguiſhed as the greateſt general of his age. In the year 1643, he was entruſted with the command of the army oppoſed to the Spaniards who had invaded France; by a ſignal victory which he at that time gained, he was looked upon as the guardian genius of his country. So much coolneſs did he diſplay on this occaſion, that on the night preceding the battle, after he had made all the proper diſpoſitions, he ſlept ſo ſoundly that it was neceſſary to awaken him when it was time to begin the attack. He next formed the project of beſieging Thionville, and propoſed the ſcheme to the council of regency, who unwillingly conſented to it. The duke, contrary to expectation, carried it into execution with ſo much ſkill that the town ſoon ſurrendered. After this he was engaged in many combats in Germany, in one of which he threw his general's ſtaff into the enemies trenches, and led on a regiment, ſword in hand, to recover it. The victories of the duke d'Enguien, and his great and growing reputation rendered him an object of jealouſy to Cardinal Mazarin, who did every thing in his power to thwart his ambitious projects. The treachery of the cardinal, and the artifices of the leaders of the country party, excited cabals and troubles, but the duke d'Enguien, who, by the death of his father, had ſucceeded to the title of the prince of Condé, was careſſed by both parties. He at length took part with the court, though he felt it was an ungrateful taſk, and he protected the miniſter without feeling for him the leaſt eſteem.

The royal family left Paris privately, and went to St. Germains, upon which the parliament ſent deputies to learn from the queen the cauſes of her departure; but Mazarin diſmiſſed them contemptuouſly and without an anſwer. Exaſperated at this, the people made a common cauſe, and reſolved to defend themſelves againſt the power of the court. With about 8000 men, the prince of Condé formed a deſign of reducing above 500,000 intrenched behind walls. He had neither money nor magazines; neverthelеſs he triumphed over Paris, and this ſucceſs added not a little to the glory he had already attained. During the ſiege he conſtantly defeated the troops of the malecontents; he prevailed on the army that marched to their aſſiſtance under Turenne, to abandon their general; he ſtopped the progreſs of the duke de Longueville, who had cauſed an inſurrection in Normandy, and got the ſtart of the Spaniards who were advancing to give him battle. Peace was at length concluded, but Condé alone acquired glory by this war, and after the treaty was ſigned, the prince traverſed the ſtreets in his coach alone. All perſons of any rank paid their compliments to him, and he received a vote of thanks from the parliament. The people, however, were uneaſy at the king's abſence, and Condé at length brought the royal family to Paris amidſt the acclamations of the public: for this he was not recompenſed in the manner which he had anticipated; he accordingly united with the malecontents, was arreſted in 1650, and detained a year in priſon. Soon after his liberation, he broke out into open revolt, and a civil war followed which was attended with various ſucceſs. Condé exhibited great prowеſs, and ſuſtained his military reputation through the whole of this unhappy warfare, though he was engaged in the ſervice of the Spaniards, the inveterate foes of his country, whom he had formerly obtained ſo much glory in reſiſting. At the peace of the Pyrenees in 1659, the re-eſtabliſhment of the prince of Condé was made a condition. In 1668, he contributed very materially to the conqueſt of Franche-Comtè. He took part in the invaſion of Holland in the year 1672, and received a wound at the famous paſſage of the Rhine. He fought the bloody battle of Seneſ againſt the prince of Orange, in which he had three horſes killed under him, and was anxious to lead to a fourth attack, but as an officer obſerved, "No one but the prince of Condé was deſirous of fighting any longer." After the death of his great rival Turenne in 1675, Condé was ſent to check the progreſs of the imperial army, in Alſace, and diſplayed as much caution in this buſineſs, as he had before exhibited ardour and impetuoſity. By his conſummate prudence and judgment he forced the enemy to croſs the Rhine, and then, full of glory, he reſigned the military profeſſion, and retired to Chantilly, where he ſpent the remainder of his days in cultivating and patronizing letters and the fine arts, to which he had been always attached. During the laſt two years of his life his faculties had ſo much declined, that ſcarcely a trait was left of the *great Condé*. He died in 1686 at Fontainbleau, leaving behind him two ſons, by his wife, the niece of cardinal Richelieu. Nouv. Dict. Hiſt. Hume.

CONDE', in *Geography*, a ſmall town of France, in the department of the Aiſne, and chief place of a canton in the diſtrict of Chateau-Thierry, 9 miles S.E. from Chateau-Thierry. The place contains 568 and the canton 9613 inhabitants. The territory includes 235 kiliometres and 27 communes.—Alſo, a fortified town of France, in the department of the North, on the confluence of the Haine and Scheldt, 9 miles N.E. from Valenciennes, known at preſent by the name of Nord Libre, which it took under the republican government of France. After a blockade of nearly four months, it ſurrendered to the Auſtrians on the 11th of July 1793, but was ſoon evacuated. It is the chief place of a canton in the diſtrict of Douay, and contains 5978 inhabitants. The territorial extent comprehends $87\frac{1}{2}$ kiliometres, with 10 communes, and 13,621 inhabitants. Before the revolution of 1789, Condé was a principality from which the princes of Condé derived their title. There are in France ſeveral other ſmall towns of the name of Condé, which ſignifies confluence, from the Latin *condare*, *circumdare*, and means a place built on the ſpot where two rivers meet. See CONDATE.

CONDE' *ſur Noireau*, a town of France, in the department of Calvados, on the river Nireau, or Noireau, chief place of a canton in the diſtrict of Vire, 24 miles S. from Caen, and 150 W. from Paris. The place contains 3030,

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and the canton 10,681 inhabitants. The territory includes $122\frac{1}{2}$ kiliometres, and 12 communes. The inhabitants carry on a confiderable trade in cloth, leather, and cutlery.

CONDE' *fur Iton*, or CONDE' *l'Eveque*, a town of France, in the department of the Eure; 12 miles S.W. of Evreux.

CONDEAU, a town of France, in the department of the Orne, and diftrict of Bellefme; 10 miles E. of Bellefme.

CONDECEDO, a cape or promontory of North America, in the province of Yucatan; 100 miles W. of Merida. N. lat. 20° 50′. W. long. 91° 27′.

CONDEMNATION, the act of paffing, or pronouncing SENTENCE, or giving judgment againft a man; whereby he is fubjected to fome penalty or PUNISHMENT; either in refpect of fortune, reputation, or life.

CONDEMNATION *to the galleys*. See GALLEYS.

CONDEMNATION *of prizes* taken from the enemy. See PRIZE.

CONDENSATION (from *condenfate*, and condenfate from the Latin *condenfatus*), denotes the contraction of a given quantity of matter into a fmaller fpace, and in this fenfe only the word condenfation ought to be ufed; however, in common language, the infpiffation, the thickening, or hardening of certain compound fubftances, in confequence of the efcape of fome of their component ingredients, is frequently expreffed by the fame term; thus the juices of fruit, of plants, of meats, &c. are often faid to be condenfated over the fire. Compreffion and condenfation (though fometimes ufed the one for the other) differ in this; *viz.* that the former denotes a diminution of bulk, occafioned by the application of external force; whereas the latter expreffes the fame effect, when produced without that external application, as is the cafe with moft bodies in cooling. But the word condenfation has been more commonly ufed for denoting the converfion of vapour into water, or of vapours in general into liquids.

The particulars which might be noticed with refpect to condenfation are, the quantity and rate of contraction in different bodies, the caufes which produce it, and the limits of that contraction. Thefe particulars, however, will, with more propriety, be ftated under the articles EXPANSION, THERMOMETER, and PYROMETER, which fee.

Notwithftanding the above-mentioned definition, it is to be remarked, that in every cafe of condenfation, or of the contraction of a body into a narrower fpace, the effect is produced by the efcape of fomething; and in bodies, which feem to be the fimpleft in nature, the contraction which they undergo in cooling, is occafioned by the efcape of the caloric, which the prefent ftate of philofophical knowledge reckons amongft the elementary fubftances. But the reverfe of this propofition is not always true; *viz.* bodies are not always contracted in their dimenfions when the caloric efcapes from them; and fuch has been found to be the cafe with water, with iron, and with fome other fubftances, in certain temperatures. This will be rendered more evident in the fequel.

Moft bodies are fufceptible of three fucceffive ftates of exiftence; namely, the folid, the liquid, and the elaftic or vaporous; and all thefe are effected by the introduction of different dofes of caloric. During every one of thofe ftates, a different degree of condenfation is produced by the intermediate gradations of temperature; *viz.* fuch as are not quite fufficient to induce a different ftate of exiftence in the body concerned. Thus, a quantity of the vapour of water, which, at the temperature of 242° (Fahrenheit's thermometer), and under the mean gravity of the atmofphere, occupies the fpace of 3600 cubic inches; if it be gradually cooled until the temperature becomes equal to about 212°, its bulk will be contracted fo as to occupy the half of the fpace it did before, *viz.* about 1800 cubic inches. If the temperature be lowered below 212°, the vapour will be condenfed into liquid water, which will occupy the fpace of not more than a fingle cubic inch. If the cooling be continued, the water will be contracted in its bulk, but not very regularly (that is, the decrements of bulk will not be exactly proportional to the decrements of heat); until the temperature defcends to about 42°. Below that degree, the water, inftead of contracting its bulk, is expanded by further cooling; *viz.* by a further abftraction of caloric. This is a very remarkable property of water, upon which fome interefting phenomena of nature are depending. The water, though expanding below the temperature of 42°, ftill continues fluid as far as about the temperature of 32°; but below this laft mentioned point, by farther cooling it becomes a folid; namely, ice; and in this ftate water occupies a greater fpace than it did in a liquid ftate. (See CONGELATION.) Similar irregularities have been obferved in the condenfations of feveral other bodies, both folid and fluid; and it is to be wifhed that experiments capable of determining the laws of condenfation were inftituted with all thofe bodies which are at all fufceptible of the trial.

The caufes of condenfation are by no means thoroughly underftood. It may feem, at firft fight, fufficient to fay, that fince caloric is an elementary fubftance, which is combined in various proportions with every other known body, the feparation of part of that element from the other bodies, naturally enables the particles of the latter to come clofer to one another in virtue of their mutual attraction. But that this cannot be the fole caufe of the condenfation in its whole extent, is eafily pointed out by the following queries. 1ft. How are the particles of bodies difpofed, that they may be capable of approaching, or of receding from each other? 2dly, Why the degrees, or quantities, of condenfation are not always proportional to the degrees of caloric that are abftracted from bodies? And, 3dly, Why clouds, fogs, mifts, &c. (which confift of the vapour of water fufpended in the atmofphere) are not always condenfed into liquid water below the temperature of 212°; which is actually the cafe in the atmofphere?

It has for a long time been an opinion prevalent amongft philofophers, that the particles of bodies do not actually touch one another; for otherwife it feemed impoffible to comprehend how a body could be expanded and condenfed. But the leaft confideration will eafily fuggeft a variety of difpofitions of the particles, which, whilft they actually touch one another, will readily admit of the dilatation and condenfation of the aggregate. Conceive, for inftance (as profeffor Prevoft of Geneva juftly obferves), the particles to be elongated, and united at their extremities like the legs of a pair of compaffes, and they may turn, with regard to this point of union, as a centre, and produce condenfations and dilatations of the whole apparent mafs of the body. A fponge likewife will dilate in water without interrupting the continuity of its parts. One may alfo conceive the particles of bodies arranged in the form of rings; that is, many of them to be in abfolute contact, one with the next, and this with the following, &c., fo as to form circular or oval rings. With this difpofition of particles, the dilatation and condenfation of the aggregate is nothing more than an alteration of the form of thofe rings; *viz.* they become more like circles when the body is expanded, and more oblong when the body is condenfed; it having been demonftrated by mathematicians, that the circle comprehends an ampler fpace than any other figure of the fame periphery. Though the general difpofition of the particles of a body is not known, yet a variety

riety of phenomena clearly indicate that they are not confufedly placed; but that fome arrangement, probably a peculiar one, for the particles of each different body, actually takes place; and to this peculiar arrangement fome of the effects of dilatation and condenfation, at leaft the irregularities of thofe alterations, muft undoubtedly be attributed. Thus the particles of water cryftallize in freezing; that is, they difpofe themfelves with a peculiar regularity, fomewhat refembling the filaments of a feather. Thefe filaments of water form angles of about 60 degrees with a larger filament, which is, as it were, the ftem of the feather; and to this cryftallization the enlargement of the bulk of water in freezing is with propriety attributed. Such is the force with which the particles of water endeavour to arrange themfelves in that particular order, and of courfe to enlarge the bulk of the aggregate, that feveral aftonifhing effects are produced by their united efforts. Pieces of timber, ftones, and other bodies, are burft by the freezing of inclofed water. Even iron mortar-fhells, fuch as are ufed in war, filled with water, and accurately ftopped, have been burft by the freezing, and the confequent enlargement of the inclofed water.

Since the enlargement of the bulk of water commences at about the temperature of 42°, which is 10 degrees above the point of melting ice, commonly called the *freezing point*, which is 32°, it is evident that the particles of water begin to arrange themfelves in a particular order long before the freezing takes place. And, by following the analogy, it may be fuppofed, that in every ftate of exiftence the particles of bodies have, more or lefs, a tendency to arrange themfelves in a certain order; to which tendency the irregularities in the condenfations of bodies are probably to be attributed.

The above-mentioned particulars, refpecting the condenfation of water, muft in great meafure be underftood to belong to a great variety of bodies; for all thofe which have been fubjected to decifive experiments have been found to contract or to enlarge their bulk with irregularity, in fome part at leaft, if not throughout, the whole fcale of heat.

The condenfation of vapour in the atmofphere, which is not always accompanied with a proportionate degree of temperature, forms another difficulty, which the prefent ftate of philofophical knowledge is not entirely capable of explaining. We fhall, however, briefly ftate certain facts and certain confiderations, which ought to be kept in view by thofe who are willing to inveftigate this intricate and interefting fubject. The converfion of water into vapour is attended with an increafe of its capacity for containing heat, or caloric, and likewife with an increafe of its capacity for containing electric fluid; fo that if a quantity of water, held in an open and infulated veffel, be fuffered to evaporate, the vapour will deprive the veffel of part of its heat, and of part of its electric fluid: confequently, the veffel will be cooled and electrified negatively. Now that which philofophers wifh to afcertain is, whether the influx of the caloric and of the electric fluid produces the evaporation, or the converfion of the water into vapour draws the caloric and the electric fluid from the contiguous bodies. In the firft cafe, we fee no reafon why the caloric and the electric fluid fhould fpontaneoufly quit the contiguous bodies, and run to the water in order to force it to evaporate, becaufe both the water and the contiguous bodies are in an equilibrium; that is, in the fame ftate with refpect to temperature as well as of electricity. In the fecond cafe, if the influx of heat and of electricity does not force the water to evaporate, what other caufe can produce that effect?

The fame reafoning which has been applied to the converfion of water into vapour, may, *mutatis mutandis*, be adapted to the contrary effect; *viz.* to the condenfation of vapour into water, it being equally difficult to comprehend how the vapour can remain in the elaftic ftate, that is, without being converted into water, at a temperature much lower than 212°, which in the atmofphere is generally the cafe. There is one confideration, however, which may throw fome light upon this remarkable phenomenon; *viz.* that in order to depofit the caloric and the electric fluid, which muft neceffarily take place in the condenfation of vapour, there muft be a body or bodies ready to receive both. But in the atmofphere, the only body which can receive them is the air, and it is well known, that air is a bad conductor of heat as well as of electricity. The laft remark which we have to fubjoin is, that it has been obferved with feveral fubftances, and efpecially with water, that though placed in a colder temperature, they do not part with their caloric fo eafily as it might be expected, and this is particularly the cafe when they are to undergo a change in their ftate of exiftence; thus water will fometimes continue fluid when its temperature is 4 or 5 or even more degrees below 32°; though when once formed into ice, this will not melt at a temperature lower than 32°, and yet it will evaporate if expofed to the air whilft its temperature is many degrees below 32°.

CONDENSER, from *condenfe*, is an inftrument capable of collecting, or of drawing into a fmaller fpace any fcattered matter, or quality, or effect. In philofophy and in mechanics, three different inftruments have obtained the name of condenfers; *viz.* the *condenfer of air*, the *condenfer of electricity*, and the *condenfer of forces*.

The *condenfer of air*, in pneumatics, is a fyringe, by means of which a confiderable quantity of air may be forced into a veffel fitted for the purpofe. Fig. 1 and 2, *Plate* XIV. *Pneumatics*, reprefent two conftructions of this fort of condenfer, which differ but little from each other. They are generally made of brafs or of iron. A B, *fig* 1, reprefents a cylindrical tube, at moft, two inches in diameter, and from 8 to 12 inches in length, or even longer. Its flat bottom B is perforated with a hole, on the outfide of which, a valve, (confifting of a piece of oil filk, or rather of leather, ftretched over a fmall flat piece of brafs), is adapted, fo that if any air be forced from the infide of the cylinder A B, that fluid will eafily lift up the valve, and make its exit through the hole at B. But fhould any fuction take place within the cylinder A B, the air cannot poffibly enter through the hole at B, becaufe the valve on the outfide prevents it by ftopping that hole. The pifton *c d* fits the cavity of the cylinder A B pretty tightly, by means of leathers foaked in oil; and it may be moved up or down by the handle E which is faftened to its rod. This pifton is perforated with a hole *c d*, the lower part of which is furnifhed with a valve *d*, which, when the pifton is drawn upwards, will permit the air to enter the lower cavity of the cylinder; but if the pifton be pufhed downwards, the air which is contained in the lower cavity of the cylinder, cannot pafs through the hole *c d*, on account of the valve at *d*; therefore it will come out through the hole at B. At the extremity of the cylinder, a brafs or iron cap F G is fcrewed over the valve, allowing however a little room for its free motion. The end G of this cap is perforated quite through, and its outfide is formed into a fcrew.

Fig. 2 reprefents a condenfing inftrument fimpler than the preceding, and fuch indeed is at prefent moftly ufed. Neither the cylinder nor the pifton of this inftrument is furnifhed with any valve. There is a hole through the fcrew at the bottom B of the cylinder, and a hole at C through its fide, and at about two or three inches below its upper end; the pifton has no perforation.

When

When the condenſer, *fig.* 1, is ſcrewed into the aperture of a glaſs or metal veſſel, and the piſton is moved alternately up and down, it will be readily underſtood, that the air will be forced into the veſſel to which the condenſer is adapted; for when the piſton is pulled upwards, that is, towards A, the air cannot enter the cylinder through the hole at B, but it can eaſily paſs through the hole *c d*; and when the piſton is puſhed in, the air which is contained in the cavity of the cylinder, cannot go out of it through the hole *c d*, but it can paſs through the hole at B; hence it is forced to enter the veſſel to which the condenſer is applied. Thus by repeating the movements of the piſton, more and more air is condenſed into the veſſel, until the latter is burſt by the elaſticity of the condenſed air, or the ſame force puſhes ſo hard againſt the valve at B, that the ſtrength of the operator is no longer able to overcome it. The condenſer, *fig.* 2, is uſed exactly in the ſame manner; this, however, muſt be adapted to ſuch veſſels as are furniſhed with a valve within their aperture, which permits the entrance, but not the exit of the air. When the piſton of this condenſer is drawn towards C, a vacuum is formed in the lower part of the cylinder, until the lower part of the piſton is raiſed above the hole C; then the air ruſhes through that hole, and inſtantly fills the cavity, &c.

Theſe inſtruments are generally uſed for condenſing the air into the air-holders of wind-guns, of certain water fountains, and other machines. By this means, the air has ſometimes been condenſed to ſuch a degree, as to become ſix, eight, and even more times, denſer than common atmoſpherical air. The veſſel, in that caſe, is ſaid to contain reſpectively ſix, or eight, or a greater number of atmoſpheres.

In a variety of philoſophical experiments, ſubſtances are frequently placed in a glaſs veſſel in which air is condenſed, in order to obſerve its effects upon the encloſed ſubſtances. For this purpoſe, one of the above-mentioned condenſers is affixed to a frame and apparatus, as is repreſented in *fig.* 3.; and this apparatus, all together, is called a *condenſing engine*.

C D is a braſs condenſer, which is worked by applying the hand to the handle Z of the piſton, and by moving the latter alternately up and down, the air is forced through the braſs pipe D N F into the glaſs receiver A B. This receiver, which muſt be very thick and well annealed, is ſet with its ſmooth and flat edge upon the braſs plate of the machine, which is ſimilar to the plate of an air-pump. A thick piece of braſs L M, is applied in a ſimilar manner to the upper aperture of the glaſs receiver, and a ſlip-wire paſſes through a collar of leathers in this braſs piece. In order to prevent the lifting up of the braſs piece L M from over the glaſs veſſel, or the latter from the plate on the frame of the machine by the force of the condenſed air, two pillars of wood with a croſs piece G H, likewiſe of wood, are annexed, for the purpoſe of keeping down the glaſs veſſel, and the piece of braſs L M. The croſs piece G H is preſſed upon L M by means of the ſcrew-nuts on the pillars I, K. There is a gage E F, annexed to this machine, which indicates the condenſation of the air within the glaſs veſſel, and tube of communication. It conſiſts of a ſtrong and narrow glaſs tube, hermetically cloſed at E, and connected with the braſs tube of communication at F. A ſmall quantity of mercury fills up a ſhort part of the cavity about the middle of the tube, and the ſpace between the mercury and the cloſed end E of the tube, contains air of the uſual atmoſpherical denſity. It is by the contraction of this ſmall quantity of air, that the degree of condenſation in the glaſs receiver is indicated; for in proportion as the air is condenſed into the receiver, or tube of communication, &c., ſo the air between the mercury and the cloſed end of the gage becomes contracted more and more; and the quantity of that contraction is indicated by a ſcale annexed to the glaſs tube; for inſtance, if that air is, by working the machine, compreſſed into the half of the ſpace it occupied at firſt, it ſhews that the air within the receiver is as denſe again as it was before the working of the machine. If the air in the gage is compreſſed into a quarter of its original ſpace, the air within the receiver is ſhewn to be four times as denſe as it was before the working of the machine, and ſo forth; the condenſations in the glaſs receiver being inverſely as the ſpaces occupied by the air in the extremity E of the gage. Theſe degrees of condenſation are commonly expreſſed by ſaying, that *the receiver contains two, or three, or four, or more atmoſpheres*, when the air within it, is twice, or three times, or four times, or more times, denſer than the uſual air of the atmoſphere.

There are certain air-pumps, as thoſe of Smeaton, of Haas and others, the conſtruction of which renders them capable of being uſed for condenſing, as well as for exhauſting the air. See Air-pump. In certain forcing water pumps, in fire engines, and ſome other hydraulic machines, there is a veſſel, in which the air is condenſed by the action of the machine itſelf; the object of which is to produce a conſtant ſtream of water out of the engine, whilſt the piſton of it is moved up and down in the uſual way. This veſſel is called the *air veſſel*, and often the *condenſing-veſſel*, or ſimply the *condenſer*. See Pump, and Fire-*engine*.

The head of an alembic, wherein the vapours are condenſed into a liquid, has ſometimes been called the *condenſer* of the alembic.

Condenser *of Electricity*. This is an inſtrument capable of collecting, or of condenſing into a ſmall ſpace, ſuch quantities of weak and diffuſed electricity, as would otherwiſe remain unperceived, or be inſufficient to affect even the moſt ſenſible electrometer. It was originally invented by a very diſtinguiſhed philoſopher, Mr. Volta of Como, and is by himſelf deſcribed in the 72d vol. of the Philoſophical Tranſactions. But, ſince its original invention, this inſtrument has undergone ſeveral improvements and alterations, which we ſhall now deſcribe, together with their peculiar advantages and defects.

The action of electric atmoſpheres is the principle which ſuggeſted the conſtruction of this moſt uſeful electrical inſtrument. Though the nature of theſe atmoſpheres will be treated of in the article Electricity; it will, nevertheleſs, be neceſſary to give, in this place, ſome idea of their action, by means of an eaſy experiment, in order to render the principle upon which the electrical condenſer acts, manifeſt to the reader. Affix an electrometer of pith-balls to an inſulated metallic plate; that is, a plate of tin or braſs, or other metal, having a glaſs handle. Communicate ſome electricity to it, and obſerve the divergency of the electrometer. In this ſtate, bring the electrified plate near a conductor which is not inſulated, ſuch as the wall of a room or another metallic plate, and you will find that the electrometer collapſes in proportion as the electrified plate comes near to the uninſulated conductor. Remove the electrified plate, and the electrometer will diverge again, nearly as much as it did at firſt; which ſhews, that by the vicinity of the uninſulated conducting body, which could eaſily acquire the contrary electricity, the intenſity of the electricity in the electrified plate was diminiſhed; or, which is the ſame thing, that the capacity of that plate for containing electricity was increaſed. Hence, when an inſulated metallic plate is ſituated near another metallic plate not inſulated, the

the former will thereby be enabled to abforb a much greater quantity of electricity than it otherwife would, from any fource whatever; and if the electrified plate be removed from the other, then that abforbed electricity will be manifefted by the divergency of the electrometer, or even by affording a fpark. It naturally follows, that according as the conductor which is oppofed to the infulated plate, is nearer to, or farther off, fo the capacity of the plate will be increafed more or lefs. Such an infulated plate, placed upon an imperfectly infulating, or an imperfectly conducting plane, for the purpofe of collecting weak and fcattered electricity, was called a *condenfer* by Mr. Volta. The reafon of ufing an imperfectly conducting, or imperfectly infulating plane, is, that when the infulated condenfing plate is placed upon it, the electricity will not pafs from the latter to the former. In fhort, the following particulars fhould be attended to in the conftruction of this, Mr. Volta's, condenfer. The metal plate fhould be about fix inches in diameter, with the edge well rounded, and furnifhed with a varnifhed glafs handle. The inferior plane muft be of a very imperfectly conducting nature, fuch as dry marble, very dry and flightly varnifhed wood, a common piece of wood covered with oiled filk, or fuch like fubftance; but be its fubftance what it may, its furface muft be very fmooth, and fuch as to coincide as well as poffible with the furface of the metal plate, *viz.* the receiving plate; on which account, if a marble flab be chofen for the inferior plane, it will be proper to fit the furface of the metal receiving plate to that of the marble, by grinding one againft the other.

The apparatus, confifting of the above defcribed two planes, being properly conftructed, lay the receiving plate upon the other plane, connect the former with an atmofpherical conductor, not much elevated above a houfe, or with the vapour of boiling water, or, in fhort, with any weak fource of electricity, fuch as could not be difcovered by any other means, and after a certain time lift the receiving plate from over the other plane, holding it by the glafs handle, and prefent it to an electrometer, which will be caufed to diverge fufficiently to afcertain the prefence and the quality of the electricity. Sometimes the receiving plate will even be able to afford a fpark. Yet, in feveral cafes, the receiving plate is electrified fo flightly, as not to occafion the divergency of the moft delicate electrometer. A contrivance of Mr. Cavallo, which is defcribed in his Treatife on Electricity, (fourth edition, vol. ii. p. 265) rendered this weak ftate of electricity capable of affecting the electrometer in a very fenfible degree. His defcription of this contrivance is as follows:

"I naturally thought that, for the fame reafon which enabled the condenfing plate of Mr. Volta's apparatus, to manifeft fuch fmall degrees of electricity as could not otherwife be obferved, another fmaller plate, or fmall condenfing apparatus, might be employed to collect and to render fenfible the weak electricity of the large metal plate. Accordingly, I conftructed a fmall plate of about the fize of a fhilling, having a glafs handle covered with fealing-wax; and when the large metal plate feemed to be electrified fo weakly as not to affect an electrometer fenfibly, I placed the fmall plate upon the inferior plane, and touched it with the edge of the large plate; then, after removing the large plate, I took up the fmall one from the plane, holding it by the extremity of the glafs handle, and prefented it to the electrometer, which generally was fo much affected by it as to diverge to its utmoft limits.

"In this manner I have often obtained electricity, more than fufficient to afcertain its quality, from a fingle ftroke of the corner of an handkerchief; *viz.* the large plate being laid upon the proper plane, was ftroked once with the handkerchief; then, being removed and prefented to an electrometer, it appeared not electrified; but by touching the fmall plate with the edge of it, that fmall plate acquired thereby electricity fufficient to make an electrometer diverge."

With this condenfing apparatus Mr. Volta, and other philofophers, made feveral difcoveries; yet the ufe of it was not always attended with the defired effect, which was principally owing to the changeable nature of the femiconducting plane, upon which the receiving plate was placed; it being difficult to obtain, and much more difficult to preferve, fuch plane in a middling or femiconducting ftate; for fometimes it would carry off the electricity from the fuperimpofed receiving plate, and at other times it was not of a conducting nature fufficient to enable the upper plate to condenfe the electricity. It, likewife, often happened that this plane would acquire fome electricity either in confequence of the flighteft friction, or by communication, which rendered the action of the upper plate quite equivocal. With a view to remove thefe inconveniences Mr. Cavallo contrived an inftrument capable of anfwering the fame purpofe, but quite free from all the above-mentioned objections. The principle of this inftrument is like that of Mr. Volta's condenfer; excepting that the receiving plate does not touch the other plane, though it comes very near it, and it likewife oppofes another plane to the other fide of the receiving plate. Thofe planes are of metal, and by their not touching the receiving plate, enable the latter to act with certainty and without obftruction. Upon this principle, *viz.* of the two plates not actually touching, but approaching one another very nearly, the prefent electrical condenfers are conftructed, however they may have been varied in fize, in name, and in fhape. By the aid of thefe condenfers various important difcoveries have been made in electricity, and efpecially in that branch of it, which is called galvanifm. The original defcription of this inftrument of Mr. Cavallo, is in the 78th. vol. of the Philofophical Tranfactions, for the year 1788, from which we make the following extracts.

"The properties of this machine, which from its office may be called *a collector of electricity*, are firft, that when connected with the atmofphere, the rain, or in fhort with any body which produces electricity flowly, or which contains that power in a very rarefied manner, it collects the electricity, and afterwards renders both the prefence and quality of it manifeft by communicating it to an electrometer. Secondly, this collecting power, by increafing the fize of the inftrument and efpecially by ufing a fecond or fmaller inftrument of the like fort to collect the electricity from the former, may be augmented to any degree. Thirdly, it is conftructed, managed, and preferved with eafe and certainty; and it never gives, nor can it give, an equivocal refult, as I have proved experimentally, and as will appear by confidering its conftruction."

"The figures 4 and 5, *Plate*, II. *Electricity*, exhibit this inftrument, *viz. fig.* 4 fhews the inftrument in the ftate of collecting the electricity, and *fig.* 5 fhews it in the ftate in which the collected electricity is to be rendered manifeft. An electrometer is annexed. The letters of reference indicate the fame parts in both figures. A B C D is a flat tin plate, thirteen inches long and eight inches broad; to the two fhorter fides of which are foldered two tin tubes, AD and BC, which are open at both ends. DE and EF, are two glafs fticks covered with fealing wax by means of heat, and not by diffolving the fealing wax in fpirits. They are cemented in the

the lower apertures of the tin tubes, and alfo in the wooden bottom of the frame or machine, at E and F, fo that the tin plate, ABCD, is fupported by thofe glafs fticks in a vertical pofition, and is exceedingly well infulated. GHILKM and NOPV, are two frames of wood, which being faftened to the bottom boards, by means of brafs hinges, may be placed fo as to ftand in an upright pofition and parallel to the tin plate, as fhewn in *fig.* 4. or they may be opened, and laid upon the table which fupports the inftrument, as fhewn in *fig.* 5. The inward furfaces of thofe frames from their middle upwards are covered with gilt paper, X, Y; but it would be better to cover them with tin plates, hammered very flat. When the lateral frames ftand ftraight up, they do not touch the tin plate; but they ftand at about one-fifth part of an inch afunder. They are alfo a little fhorter than the tin plate, in order that they may not touch the tin tubes, AD, BC. In the middle of the upper part of each lateral frame is a fmall flat piece of wood, S and T, with a brafs hook; the ufe of which is to hold up the frames without the danger of their falling down when not required, and at the fame time it prevents their coming nearer to the tin plate than the proper limits. It is evident that when the inftrument ftands as fhewn in *fig.* 4, the gilt furface of the paper, X, Y, which covers the infide of the lateral frames ftands contiguous and parallel to the tin plate."

"When the inftrument is to be ufed, it muft be placed upon a window, a table, or other convenient fupport, a bottle electrometer is placed near it, and is connected, by means of a wire, with one of the tin tubes, AD, BC; and by another conducting communication the tin plate muft be connected with the electrified fubftance, the electricity of which is required to be collected on the plate, ABCD: thus, for inftance, if it be required to collect the electricity of the rain, or of the air, the inftrument being placed near a window, a long wire muft be put with one extremity into the aperture, A or B, of one of the tin tubes, and with the other extremity projecting out of the window. If it be required to collect the electricity produced by evaporation, a fmall tin pan, having a wire or foot of about fix inches in length, muft be put upon one of the tin tubes; fo that the pan may ftand about two or three inches above the inftrument. A lighted coal is then put into the pan, and a few drops of water poured upon it, will produce the defired effect."

"The quantity of electricity, which the tin plate, ABCD, is capable of collecting, principally depends on three circumftances, *viz.* 1ft. On the diftance between the tin-plate and the conducting lateral furfaces: the fmaller that diftance is, the greater being the collecting power; 2dly. On the fize of the inftrument; and 3dly, On the quantity of electricity poffeffed by the body from which it muft be collected or taken away."

"I need not expatiate on the principle upon which the action of this inftrument depends; this being the fame as that of the electrophorus of Mr. Volta's condenfer, and of many other electrical experiments; namely, that a body has a much greater capacity for holding electricity, when its furface is contiguous to a conductor which can eafily acquire the contrary electricity, than when it ftands not in that fituation."

Though this original condenfer, which, by way of diftinction, its inventor called a collector, anfwers the purpofe for which it was intended perfectly well; yet for the common run of experiments, its fize may be difpenfed with, as it takes up too much room on the table of an electrician. On this account, not only the fize of the inftrument has been reduced, but its fhape alfo has been varied according to the fancy of almoft every philofophical inftrument maker. For the fake of fimplification in the condenfers which are at prefent in general ufe, one conducting plane only is oppofed to the receiving plate, which anfwers the purpofe fufficiently well; for if the electricity collected by the receiving plate happens to be too weak to affect the electrometer, a fmaller condenfer may be ufed, which will condenfe the electricity of the former, &c.

The forms of the condenfers that are moftly ufed at prefent, are reprefented in *figs.* 6, 7, 8, and 9. *Fig.* 6 exhibits a vertical fection of the condenfer conftructed by Mr. John Read of Knights-bridge; *a a* is a circular flat plate of brafs, about eight inches in diameter, ftanding infulated, by means of the glafs ftick *f*, on the wooden foot *g*; *gh* is a hollow brafs cylinder, terminating in the hollow brafs cone *ccdh*; and to this cone the flat perforated brafs plate *bccb* is affixed. The glafs ftick *f*, which, by means of a brafs ferril, is faftened to the plate *a a*, has its lower extremity cemented in a cylindrical piece of wood, and this piece of wood is fixed in the bottom *g*. Now it will be eafily perceived, by infpecting the figure, that the hollow cylinder *hg* may be moved up or down by fliding it upon the cylindrical piece of wood; and that, by fo doing, the plate *bccb* may be brought near to, or removed from the plate *aa*, which is the receiving plate of this condenfer; *i* is a milled-head fcrew, which ferves to fix the plate *bb* at a proper diftance from *aa*, where a ftop is made for that purpofe; when *i* is loofened, the plate *bb*, with *chg*, which is all one piece, falls in the fituation reprefented in the figure, and in that ftate an electrometer is put in contact with the plate *aa*, in order to manifeft the electricity which *aa* condenfed whilft *bccb* ftood near it.

Fig. 7 reprefents a condenfer of another form, as made by Mr. Cuthbertfon. This fort of condenfer is both fimple in its conftruction, and commodious in practice; *ab* is a brafs plate of about 8 inches in diameter (the inftrument being fhewn in profile), which is fcrewed tight into the wooden head *c*, which is cemented on the glafs ftick *d*, and this is cemented with its lower extremity into the wooden ftand *ee* of the inftrument; *fi* is a fimilar plate of brafs, faftened to the brafs head and pillar *gi*, the lower part of which turns round a pin at *h*, fo that it may either ftand upright, or it may be inclined after the manner of the dotted reprefentation *hm*. It is almoft fuperfluous to add, that *ab* is the receiving plate of this condenfer. *Fig.* 8 fhews a front view of a condenfer of this fort, placed clofe to a gold leaf electrometer, furnifhed with a fmaller condenfer, *viz.* fuch as is reprefented by itfelf in *fig.* 9. The fmall condenfer, *fig.* 9, is fimilar to the one reprefented in *fig.* 7; faving that in *fig.* 9 the receiving plate is affixed to the cap of a gold-leaf electrometer; fo that this apparatus, *viz. fig.* 9, may be ufed by itfelf in moft experiments; but in certain cafes it will be neceffary to employ the condenfer *fig.* 7 firft, and afterwards the electricity may be farther condenfed by means of the apparatus *fig.* 9, as fhewn in *fig.* 8.

There is an inftrument contrived by Mr. Wilfon, which he calls "a compound electrical inftrument for condenfing and doubling." But as the conftruction, as well as the principal ufe, of that inftrument properly belongs to another clafs of electrical inftruments, its defcription will be found in another part of this work. See DOUBLER, and MULTIPLIER *of electricity*.

CONDENSER *of forces*. This name was given by Mr. R. Prony to a contrivance for obtaining the greateft poffible effect from a firft mover, the energy of which is fubject to augmentation

augmentation or diminution within certain limits; and in general to vary at pleafure the refiftance to which the effort of the firft mover forms an equilibrium in any machine whatever, without changing any part of their conftruction. (Bulletin of the Philomathic Society at Paris, No. 83.)

The general problem in mechanics, of which this condenfer is intended as a practical folution, is enunciated by Mr. Prony in the following terms:

"Any machine being conftructed, to find, without making any change in the conftruction, a means of tranfmitting to it the action of the firft mover, by fulfilling the following conditions; *viz.*"

"1. That it may be poffible at pleafure, and with great fpeed and facility, to vary the refiftance (againft which the effort of the firft mover muft continually make an equilibrium) in limits of any required extent."

"2. That the refiftance, being once regulated, fhall be rigoroufly conftant until the moment when it is thought proper to increafe or diminifh the fame."

"3. That in the moft fudden variations of which the effort of the firft mover may be capable, the variation in velocity of the machine fhall never undergo a folution of continuity."

Mr. Prony applies this folution of this problem to the dynamic effect of wind; but it will be eafy to make the fame general, when other firft movers are ufed. *Fig.* 10 (*Plate* XVI. *Mechanics*) reprefents the plan, and *fig.* 11 the elevation of the machine. O O is the vertical arbor to which windmill-fails are adapted; *e e e e* is an affemblage of carpentry, of which one of the radii, O *e*, bears a curved piece, *b d*, of iron or fteel: vertical axes of rotation *a a a*, being placed round the axis OO; they alfo divide the circumference in which they are found, into equal parts. Each of thefe axes carries a curve *a f*, of iron, fteel, or copper; fo fituated, that when the wind acts upon the fails, the curve *b d* preffes againft one of the curves *a f*, and caufes the vertical axis to which this laft curve is affixed, to make a portion of a revolution. The curves *b d*, and *a f*, muft be fo difpofed, that when *b d* ceafes to prefs on one of the curves *a f*, it fhall at the fame inftant begin to act upon the following curve: the number of axes which are provided with thefe curves, muft be determined by the particular circumftances of each cafe, and it is alfo practicable to fubftitute, inftead of *b d*, a portion of a toothed wheel having its centre in the axis O O, and to place portions of pinions inftead of the curves *a f*; but the difpofitions reprefented in the figure are preferable. Each of the axes *a a a a* (which are all fitted up alike, though, for the fake of clearnefs, only one of them has its apparatus reprefented in the drawing), carries upon it a drum or pulley, *t t r r*, on which is wound a cord that paffes over a pulley *p*, and ferves to fupport a weight Q, by means of the lever F G, upon which this weight may be flided and faftened at different diftances from the point of motion G. The fame axes, *a*, *a*, pafs through the pinions *q*, *q*, to which they are not fixed; but thefe pinions carry clicks or ratchets, which bear againft *r r*; fo that when the weight Q tends to rife, the ratchet gives way, and no other effect is produced on the pinion *q q*, either by the motion of the axis or of the drum *t t r r*, excepting that which caufes the afcent of the weight *q q*. But the inftant that the curve, or tooth *b d*, ceafes to bear againft one of the curves *a f*, after having caufed the correfponding weight Q to rife, that weight Q tends to re-defcend, and then the toothed wheel *r r* acts againft the ratchet, fo that Q cannot defcend without turning the pinion *q q* along with the drum *t t r r*. The pinion *q q* takes in the wheel *a b*, from the motion of which the ufeful effect of the machine immediately refults; fo that the effect of the defcent of one of the weights Q is to folicit the wheel A B to motion, or to continue the motion in concurrence with all the other weights Q, which defcend at the fame time. This wheel, A B, carries beneath it oblique or bevelled teeth, G D, which take in a like wheel, C E, and caufe the buckets at S to rife.

From the preceding defcription, it is feen that the machine being fuppofed to ftart from a ftate of repofe, the wind will at firft raife a number of weights, Q, fufficient to put the machine into motion, and will continue to raife new weights, whilft thofe before raifed are fallen, fo that the motion once impreffed will be continued.

Among the numerous advantages of this new mechanifm, the following may be remarked:

1. No violent fhock can take place in any part of the mechanifm. 2. The ufeful effect being proportioned to the number of weights Q, which defcend at the fame time, this effect will increafe in proportion as the wind becomes ftronger, and caufes the fails to turn with greater velocity. 3. The weights, Q, being moveable along the levers F G, it will always be very eafy to place them in fuch a manner as to obtain that ratio of the effort of the firft mover to the refiftance, which will produce the maximum of effect. 4. From this property it refults, that advantage may be taken of the weakeft breezes of wind, and to obtain a certain product in circumftances under which all other windmills are in a ftate of abfolute inactivity. This advantage is of great importance, particularly with regard to agriculture: the windmills employed for watering lands, are fometimes inactive for feveral days, and this inconvenience is more particularly felt in times of drought. A machine capable of moving with the flighteft breeze, muft, therefore, offer the moft valuable advantages.

CONDENSING OF WINES. See WINES.

CONDEON, in *Geography*, a town of France, in the department of the Charente; 25 miles S.E. of Saintes.

CONDER, a river of England, in the county of Lancafter, which runs into the Irifh fea; 3 miles S. of Lancafter.

CONDERCUM, in *Ancient Geography*, a ftation of Britain on the line of Severus's wall at Benwell-hill, where the prefect of the firft wing of the Afti was placed. Not. Imp.

CONDERS, from the Fr. *Conduire*, to conduct, perfons who were employed in the fifhery to give notice where fhoals of herrings were paffing; otherwife called *Balkers*; which fee.

CONDESCENSION, in *Ethics*, denotes that fpecies of benevolence, which defignedly difregards the fuppofed advantages of birth, title, or ftation, in order to accommodate itfelf to the ftate of an inferior, and diminifh the reftraint which the apparent diftance is calculated to produce. Accordingly, it greatly enhances the value of every other fpecies of benevolence.

CONDESUYOS DE AREQUIPA, in *Geography*, a jurifdiction of South America, under the bifhop of Arequipa, 30 leagues diftant from that city; which extends about 30 leagues, with different temperatures of the air, and confequently produces grains and fruits. In this jurifdiction is bred the wild cochineal, with which the Indians carry on a kind of trade with the provinces in which the woollen manufactures flourifh. They firft pulverize the cochineal by grinding it, and after mixing four ounces of it with twelve of violet maize, they form it into fquare cakes called "mango,"

" mango," each weighing four ounces, and fell it for a dollar per pound. This country abounds in gold and filver mines, which have of late been much neglected.

CONDETTA, a town of France, in the department of the ftraits of Calais, and diftrict of Boulogne; $1\frac{1}{2}$ league S. of Boulogne.

CONDICA, in *Ancient Geography*, a town of Afia Minor, in Lycia, and in the country called Mylas, according to Ptolemy.

CONDIGNITY, Merit of, in *Theology*. See Merit.

CONDIGRAMMA, in *Ancient Geography*, a fmall town of Afia, on this fide the mouth of the Indus, upon the coaft of Gedrofia, according to Pliny.

CONDILLAC, Stephen Bonnet de, in *Biography*, a French metaphyfician, member of the Academy, and preceptor to the infant Don Ferdinand, prince of Parma, an honour to which he arrived from the high reputation that he had gained from his writings. The work by which he was firft known was an " Effay on the Origin of Human Knowledge," in 2 vols. publifhed in 1746; in which he endeavours to develope the faculties of the mind, by giving a fort of hiftorical account of its feveral functions. In 1754, he gave to the world a " Treatife on Senfations," in 2 vols. 12mo.: here he confiders what would be the conceptions of a ftatue, provided at firft with a fingle fenfe, and fucceffively with the others; and hence he undertakes to account for the origin of memory, judgment, and the mental affections, and the gradual formation and correction of fenfible ideas. In the courfe of the following year he publifhed a " Treatife on Animals;" in which he refutes the notions of Defcartes and Buffon concerning the merely mechanical nature of brutes, and fhews in what manner their faculties are acquired. In 1776 his great work, entitled, " A Courfe of Study drawn up for the Inftruction of the Prince of Parma," was publifhed in 16 vols. 12mo. As an introduction to thefe volumes, we have a difcourfe on the different modes of communicating inftruction; giving a decided preference to the gradual advance from particular facts up to general principles, inftead of the contrary method. Metaphyfical lectures, logic, and the philofophy of the human mind, are among the earlier parts of this courfe of ftudy; and from thefe, as preliminary fteps, he proceeds to the ftudy of hiftory, of which he has given an ample and well-arranged abridgment, in eleven volumes. As an appendix, is added a volume confifting chiefly of political reflections. This ingenious writer publifhed alfo a fmall work, entitled, " Commerce and Government confidered relatively to each other." In all his works he exhibits an extenfive knowledge, a mind well imbued with the principles of humanity, and with the moft liberal notions of government. He died in the year 1780, highly refpected by his countrymen, and characterized for the foundnefs of his judgment, for the clearnefs of his ideas on every fubject which he undertook to difcufs, and for his general knowledge in almoft every department of literature. Nouv. Dict. Hift.

CONDITION, in the *Civil Law*, an article of a treaty, or contract; or a claufe, charge, or obligation, ftipulated in a contract, or added in a donation, legacy, teftament, &c.

The donee does not lofe his donative, if it be charged with any difhoneft or impoffible conditions. Lawyers diftinguifh three kinds of conditions, under which a legacy or donation may be made: thefe are the *cafual*, which depends merely on chance; the *poteftative*, which is abfolutely in our power; and the *mixed condition*, which is both cafual and poteftative together.

Condition, in *Common Law*, is a manner, quality, or reftriction, annexed to an act; qualifying or fufpending the fame; and making it precarious and uncertain, whether or not it fhall take effect.

Accordingly, it is defined to be what is referred to an uncertain chance, which may or may not happen. Or, condition is a modus, or quality, annexed by him that hath eftate, intereft, or right to the land, &c. whereby an eftate, &c. may be either created, defeated, or enlarged upon an uncertain event: and it differs from a *limitation* (which fee), which marks the bounds or compafs of an eftate, or the time how long the eftate fhall continue.

A condition is alfo confidered as one of the terms upon which a grant may be made; and in this fenfe a *condition in a deed* is a claufe of contingency, on the happening of which the eftate granted may be defeated; as " provided always, that if the mortgager fhall pay the mortgagee 500 *l.* upon fuch a day, the whole eftate granted fhall determine;" and the like.

Of conditions there are various kinds; *viz.* conditions in deed or exprefs, and in law or implied; conditions precedent and fubfequent; conditions inherent, and collateral, &c.

Condition *in deed*, or *exprefs*, is annexed by exprefs words to the feoffment, leafe, or grant, either in writing, or without. As, if a man make a leafe of lands to another, referving a rent to be paid at fuch a feaft; *upon condition*, if the leffee fail in payment, it fhall be lawful for the leffor to re-enter.

Condition *implied*, called alfo *condition in law*, is when a man grants to another the office of a fteward, bailiff, keeper of a park, &c. for life: though there be no condition expreffed in the grant, yet the law makes one covertly; which is, that if the grantee do not juftly execute all things belonging to the office, it fhall be lawful for the grantor to difcharge him.

Condition *precedent*, is when a leafe or eftate is granted to a perfon for life, upon condition of the payment of a certain fum by the leffee to the leffor at a certain day, when he fhall have fee-fimple: in this cafe the condition precedes the eftate in fee, and on performance gains the fee fimple.

Condition *fubfequent*, is when a man grants to another his manor in fee, upon condition that the grantee fhall pay to him a certain fum on fuch a day, or that his eftate fhall ceafe: fo that here the condition follows the eftate, and the performance preferves it. From thefe definitions it appears, that a *condition precedent* gets or gains the thing or eftate made upon condition by the performance of it; and that a *condition fubfequent* keeps and continues the eftate by the performance of the condition. If one agree with another to do fuch an act, and for the doing of it the other fhall pay fo much money; here the doing of the act is a *condition precedent* to the payment of the money, and the party fhall not be compelled to pay till the act is done; but when a day is appointed for the payment of money, which day happens before the thing contracted for can be performed, there the money may be recovered before the thing is done; for here it appears, that the party did not intend to make the performance of the thing a *condition precedent*. For a further account of thefe conditions, fee the article Estate *upon condition*. There are other *conditions*, befides thofe already mentioned: fuch are conditions *inherent*, being fuch as defcend to the heir with the land granted; and *collateral condition*, being that which is annexed to any collateral act. Conditions are likewife *affirmative*, which confift of doing; *negative*, which confift of not doing:

 fome

fome are faid to be *reftrictive*, for not doing a thing, and fome *compulfory*, as that the leffee fhall pay the rent, &c. Some conditions are *fingle*, to do one thing only; fome *copulative*, to do divers things; and others *disjunctive*, where one thing of feveral is required to be done. Co. Litt. 201.

Conditions *in reftraint of Marriage*, have not been generally favoured, as contrary to found policy; but where a legacy hath been given over to another, the condition has been held valid; and it feems, that fuch conditions as only reafonably reftrain children from imprudent marriage will be always fupported:—that is, when they operate only as particular, not as univerfal reftrictions. Where a legacy is given on confideration that the legatee fhould not marry without confent, and there is no devife over, the condition is void. 4 Burr. 2055. Com. Rep. 739. The rule of the ecclefiaftical law is, that where a portion is given in confideration that the daughter fhould never marry, the condition is void. As the intent of the teftator chiefly governs in wills, fuch conftruction is always made of the words, as will beft fupport his intent; and therefore thefe words *ad faciendum*, *faciendo*, *ea intentione*, *ad effectum*, &c. in a will create a condition. Co. Litt. 204. *a.* A grant to one to the intent he fhall do fo and fo, is no condition, but a truft and confidence. Some words in a leafe do not make a condition but a covenant, upon which the leffor may bring his action. A covenant not to grant, fell, &c. may be a condition; and covenant, that, paying the rent, the leffor fhall enjoy the land, is conditional. 2 Danv. 2. 6. Where words are indefinite, and proper to defeat an eftate, they fhall be taken to have the force of a condition. Palm. 503. For the performance of conditions and relief againft the breach of them, fee Jacob's Dict. by Tomlins, art. Condition.

Condition of a *Bond*. See Bond.

Condition *without which*, *fine qua non*, is ufed in *Philofophy*, in fpeaking of fome accident or circumftance, which is not effential to the thing, but is yet neceffary to its production. Thus, light is a condition without which a man cannot fee objects, though he have good eyes; and thus fire, though confidered in itfelf, may burn without wood; yet is its prefence a condition without which the wood cannot be burnt.

Condition, *applied to Horfes*, is ufed to fignify that a horfe is well fed and of good appearance; it alfo has another fignification, that of his being brought by fuitable treatment into a ftate of body, that gives him the fulleft ufe of all his faculties in performing any very difficult or arduous exertion or exercife, as for hunting, racing, trotting, or the arts of the manege.

A horfe that is moderately fat may be faid to be in good condition, and fo he is for fale, or for flow heavy draught-fervice; but fuch a one would be totally out of condition for any of the above exercifes. To condition a horfe for thefe a proper fhare of clean nourifhing food and exercife is neceffary, as much only as would confer the utmoft point of ftrength and power, without adding any ufelefs incumbrance of matter to the body that might clog the freedom of refpiration, or increafe the weight and bulk of the animal, and impede rather than affift the functions of the organs, vifcera, and limbs. This art, if properly underftood, fhould impart the greateft facility of wind, and join to lightnefs of the body the greateft poffible elafticity and ftrength of the mufcular fyftem. Such is properly the art of *training*, to which we refer the reader, and in which, though great things have been done, more wonderful might be yet effected; if to a well-founded view of nature in thefe animals was added all that confummate and well-placed art could bring to her affiftance, for nature we are led to believe has been but too often thwarted inftead of affifted by the arts of ftable-men, jockies, and fmiths.

Though mere practice alone will teach much, yet when combined with a juft fyftem or knowledge of caufe and effect, the art, whatever it be, may be carried to much higher perfection than it can otherwife.

For the prefent, we only treat of condition in horfes, for the common and ordinary purpofes to which they are applied.

To ftable fervants is left in general the phyficking, dieting, and conditioning the horfe; and a myftery has often, with the ignorant, more charms than the clear face of truth herfelf. The effects of drugs upon horfes are very little known, perhaps, except the purgative effect of aloes, and the diuretic effect of foaps and turpentines, and neutral falts; we have fcarcely any medicine whofe effects we really know upon the horfe, or that appears at prefent likely to be known, yet are grooms ever phyficking their horfes with fome drugs or other; good clean food in plenty, dry lofty ftables, gentle exercife, and attention to the fkin in keeping it clean, will bring almoft any horfe that is out of condition into condition, unlefs there be fome lurking difeafe; yet naufeous drugs are added to their food, and they are pleafed to fancy that the effects they experience refult from thefe, though it is more probable, as far as they go, and in the uncertain and often idle dofes in which they are exhibited, that they prevent, rather than affift, the purpofe they have in view, and rather difturb their digeftion, and weaken the ftomach, than affift it; or more certainly render naufeous and loathfome the food they could otherwife relifh; antimony, nitre, brimftone, elecampane root, &c. are among their fecrets for this purpofe. Antimony is, however, believed, by better judges than thefe, to affect the fkin of the horfe, and promote perfpiration; this it may poffibly do. We may, however, juft remark, that where it affects the fkin, it has the power of affecting the ftomach; but with pigs, horfes, and a variety of other animals, it does not affect the one, and one fhould doubt whether, in thefe cafes, it would affect the other; for in no quantity whatever, and we have given 4 oz. at a dofe, does it appear to affect the ftomach; nitre in larger quantities than they are ufed to give, will increafe the urine; but how this promotes condition, we have not yet been informed. The reft of their noftrums are obvioufly inert, at leaft their actual effects, when pufhed, till they become externally fenfible, have never been exhibited; and unlefs they are, we cannot know them. There is, however, another, and a more certain purpofe anfwered, in the adminiftration of their drugs, and to which the fcience of medicine, in ignorant hands, is but too frequently made fubfervient; and without which, we believe, there would not be fo much anxiety about the adminiftration of them.

There is one inftance, however, in which we rejoice to have it in our power to concur with thefe men in the ufe of medicine, and that is on horfes coming from grafs; this appears to be a really ufeful practice, and we think, from fufficient experience, we can vouch for the fact, though to give medicines without a direct indication for their ufe, would at firft appear repugnant to reafon, yet it is ufual with grooms to give one, two, or more dofes of phyfic, on the horfe being brought from grafs "to clear him out," as they fay; but if fuch were the only effect, there would be no occafion for it, as the grafs would very naturally come away from him without its good effects: we fhall give a different account of the fudden change of life, from green relaxing watery food, as grafs, to dry hay and ftimulating corn; from free open air and nightly dews, and all kinds of weather, to a

clofe,

close, low, foul, and crowded stable, the air of which is heated to an excess, and filled with stimulating exhalations from the dung; the water which had been received in quantities unrestrained, is now portioned out (though it is really more necessary) in miserable pittances. The body, before exposed, is wrapped in rugs and cloths, and the whole system becomes heated and inflamed by the sudden changes, inflammatory complaints of the lungs, eyes, palate, throat, intestines and feet, are produced; and it is therefore useful on this account, in keeping off these attacks, to lower the habit by physic, after the horse has been a few days in the stable, and to pass by slow degrees to the excessive use of these vigorous stimuli. Dealers like to mix carrots with their corn, and bleed occasionally, and give bran mashes, which has the same effect.

In turning out also, grooms are again for physicking their horses, and under the same pretence of clearing them out, and preparing them for grass. They will, however, be sufficiently lowered and reduced by the grass itself, without any additional reduction by physic. It may not be an useless precaution, however, to withdraw by degrees the use of corn, previous to turning out, and the removing all sort of clothing, to give water in greater abundance, that the change may not be too suddenly felt, and bring on broken wind, farcy, and the diseases induced by too great debility.

In Arabia, where the finest horses of the world are produced, a late traveller in those countries, (Mr. Barker), informs us of the extraordinary simplicity of their treatment of them. They do not use any instrument for dressing or cleaning them. They merely fasten them to a picket by the leg or a halter, to give them their food, which, during the spring, consists only of grass; and when the earth no longer produces that nutriment, they supply the want by camel's milk, which, he says, is most assuredly preferable to any kind of grain.

Beans, malt, oats, clover, hay, and meadow hay, are the general food of horses in England, and are supposed to be stimulant or invigorating to the system of the horse, in the order in which we have placed them. Barley was the ancient food for horses, the discovery of oats being comparatively of modern date.

In the north of Holland, they feed their horses principally on the black sour bread called bumpernickle, made of buck wheat, and there it is eaten also by a large share of the inhabitants; for this purpose, they alight from their vehicles, and, without taking the horses out of their hempen traces, cut it in slices, and give them to eat. We observed that they appeared relaxed by it, but apparently without much debilitating them, as they seemed to do their work very well.

In the "Museum Rusticum" is a proposition founded apparently on actual experiment of feeding horses on carrots, vol. i. p. 333. The following remarks we think worth recording from that communication: "I have a couple of hunters which I value as being very good horses, and these I feed in the season with very little else besides carrots well cleaned from the dirt, and loaves made of the meal of barley and oats, mixed sometimes with a small admixture of coarse but good wheat meal; and if they require to be loosened in their bodies, I now and then give them some bran. As to hay, they eat at this season but little of it, of oats none at all, yet they go through their work to admiration."

Furze or whinns has been found useful food in sustaining horses, after it has been bruised, and the spines or prickles crushed; this some horses will naturally do with their feet. Dr. Darwin relates, that on one particular common, all the horses do it; and that fresh comers starve, till by imitation they learn this practice, as the common, in other respects, is very barren. In Wales, mills, we understand, have been used for crushing the furze for cattle.

Saintfoin is a food that horses are very fond of; but as they eat it very greedily, too much should not be allowed at once for fear of indigestion, and it serves better for horses of slow draught, being a coarse heavy food.

Salt is imagined an useful addition to the food of horses. Salt marshes have often a preference given them over other ground for horses and cattle; whether it is the salt that in itself operates beneficially, or whether the herbage itself is altered by it, and is rendered more salutary to the cattle, is not known. The same correspondent, in the Museum Rusticum, says that salt in substance is abundantly distributed in the mountains by the Swiss, for the use of their cattle and horses, who become excessively fond of it, and more healthy in consequence; it is conceived to be an antidote to worms and other formations in the body, and the long continued use of it to cure them when formed, vol. i. p. 99. Horses, he observes, are fond of it with their oats.

Horses when at liberty are almost ever feeding, therefore long fasting must be injurious to the stomach, and should be as much as possible avoided: they would also naturally, there is reason to believe, feed principally during the night, and sleep during the day; their sleep, however, is hardly ever, in health, profound and fast, but is a state of watchful dozing.

Horses are naturally gregarious, and though they will do very well alone, company, where there is an opportunity for it, is preferable for their health. The stable should be lofty, so as not to confine an atmosphere about them, loaded with exhalations from their own bodies and their dung: the loftiness alone of the stable is their best airing; all partial draughts from doors, windows, or holes into the loft, as far as they affect them, are injurious; for we have often remarked, that though they bear the coldest weather of our seasons when turned out, yet they easily take cold from partial drafts in stables, insomuch, that persons not attentive to these effects would hardly believe their facility.

In cleaning the skin, the curry-comb is considered as a necessary implement. In warmer climates, where the scurf comes away more freely, this instrument is not so much used; and here it is often used to horses whose skins are particularly thin and sensible, yet no difference is made; and though the animal expresses, in every way he can, the excessive torture it occasions, yet it is persisted in, and violence is often had recourse to, to enforce it, and horses are thus rendered vicious and untractable. Where this is found to be the case, it would save much trouble and inconvenience to use a milder kind of comb, or to lay it aside altogether, and use a stiff brush made for the purpose. It is more easy by violence and punishment to create vice, than to overcome a natural dislike by it.

Warm clothing, on account of its keeping up a free perspiration, tends to render the skin cleaner, makes the coat lie better, and have a more glossy appearance, and saves trouble. It is too often, however, carried to an excess, and two or three hot rugs keep the horse in a perpetual fever; and as they are all taken off, when he is most exposed, on going out, the sudden check given to the perspiration by the elements without, lays the foundation of disease, and occasions inflammations of the lungs, catarrhs, and coughs, that might as well be avoided by more moderate and judicious proceedings, besides the weakening effects of such violent perspirations.

There

There is a principle in feeding them that ought not to be overlooked; which is, that good food may be carried too far, till, inſtead of condition, it produces fever and diſeaſe, and deſtroys the condition it is meant to promote. Green vegetable food fills out the body; and from its weight and watery nature weighs down the abdomen, giving an unſightly appearance. Some horſes, however, can work with this, that more ſtimulating food does not ſuit ſo well. The dry diet braces the ſyſtem, and draws up the abdomen. The food is longer retained in the large inteſtines, which occaſions the flanks to appear full and rounded, and greatly adds to the beauty of the horſe's make in theſe parts.

Some horſes we have noticed have voracious appetites, and devour great abundance of corn, and whatever is ſet before them, yet always look meagre and out of condition. When this has been the caſe, we have been led to believe that by too much food, and of too heating a quality, the ſtomach and inteſtines have been paralyzed, and loſt their powers of forming chyle, or abſorbing it. Turning out to the green paſture will often bring them into condition, and they fall off again in the ſtable. Horſes of ſmall make and fiery temper are, we have thought, more particularly ſubject to this diſeaſe.

Water, like the food, ſhould be given often, and not in too large quantities: ſtinting horſes is a dangerous cuſtom; it induces them, where there is an opportunity to take enough at once, to break their wind, or otherwiſe injure themſelves. See art. *Broken* Wind.

The ſkin, to look well and healthy, ſhould be ſmooth, ſupple, and eaſy upon the muſcles, free from knots, and by no means tight about the ribs. The hair clean, bright, and gloſſy, lying to the ſkin, and not diſtorted, or turning away from it, or twiſted, dry, or thready. The effects of cold air on the ſkin of the horſe, in ſetting up the hair, is well known to the grooms, who cautiouſly avoid it.

Exerciſe to animals by nature born to be fleet, is particularly neceſſary; beſides the good it does in moving and forwarding all the ſecretions and excretions. This ſhould be gentle or vigorous, proportioned to the ſtrength and ſtate of the horſe, without diſtreſſing or too much fatiguing him. A gentle perſpiration looſens the ſcurf, and makes him clean better.

The hide ſoon gets foul, and a groom that has much pride in the appearance of his horſe, is almoſt inceſſantly currying, bruſhing, and hard rubbing the coat.

It is a cuſtomary thing with the dealers in horſes, in forming a judgment of the actual ſtate of the horſe, and whether his condition will admit of farther advancement, to handle the creſt, or upper part of the neck which carries the mane: if this be lax in the hand, and eaſily pliant, it is preſumed the condition may be carried farther; if, on the contrary, this part has a ſtiff tenſe feel, it is conſidered that farther improvement is not to be expected. Among the acknowledged indications alſo of poverty and good condition, is the poor mark in the buttock, that is the channel, or depreſſion running down the buttock, at its poſterior part; being a depreſſion formed between the muſcles. If this channel is very viſible and deep, the horſe is out of condition; if obliterated, ſo as to be hardly viſible, he is conſidered in condition.

Blood horſes are more eaſily cleaned than the common kind of horſes; their coat is not ſo thick, it does not retain the perſpiration ſo much, and the hair takes a better poliſh; which makes an experienced groom always prefer them.

Too great excitement from the food, and undue fever, may be known by the heat of the mouth, the fulneſs of the veſſels of the eyes, the ſtrength of the pulſe, and diminiſhed appetite; the ſkin alſo, and extremities, are found too hot or too cold, languor and weakneſs follow: the remedies are before ſtated.

CONDITIONAL, ſomething not abſolute, but ſubject to limitation.

Conditional legacies are not due till the conditions are accompliſhed.

The Arminian divines maintain, that all the decrees of God, relating to the ſalvation and damnation of man, are truly conditional; and the Calviniſts, that they are all abſolute. See Arminian, &c.

Conditional *conjunctions*, in *Grammar*, are thoſe which ſerve to make propoſitions conditional. As, *if*, *unleſs*, *provided that*, *in caſe of*, &c.

Mr. Horne Tooke, in his "ΕΠΕΑ ΠΤΕΡΟΕΝΤΑ, or Diverſions of Purley," &c. has given us a new ſyſtem, with regard to theſe conditionals, as well as other conjunctions. Our conjunction *if*, he ſays, is merely a verb; being the imperative of the Gothic and Anglo-Saxon verb ᵹIꝼAN, Ᵹiꝼan. And in thoſe languages, as well as in the Engliſh formerly, this ſuppoſed conjunction was pronounced and written as the common imperative, purely ᵹIꝼ, Ᵹiꝼ, *gif*. In proof of the truth of this etymology of the word *if*, the author obſerves, that whenever the datum upon which any concluſion depends, is a ſentence, the article *that*, if not expreſſed, is always underſtood, and may be inſerted after *if*. But the article *that* is not underſtood, and cannot be inſerted after *if*, where the datum is not a ſentence, but ſome noun governed by the verb *if* or *give*. This, he ſays, will hold univerſally, not only with *if*; but with many other ſuppoſed conjunctions, ſuch as, *but that*, *unleſs that*, *though that*, *leſt that*, &c. which are really verbs, put in this manner before the article *that*. *An*, now indeed obſolete, but formerly often uſed to ſupply the place of *if*, is alſo a verb; being nothing elſe but the imperative of the Anglo-Saxon verb Anan, which likewiſe means to *give* or *grant*. If recourſe ſhould be had for confuting the author's opinion to the conditionals of the Greek and Latin, and Iriſh, the French, Italian, Spaniſh, Portugueſe, and many other languages, he obviates the objection by alleging, that thoſe words which are called conditional conjunctions, are to be accounted for in all languages in the ſame manner as he has accounted for *if* and *an*. Not that they muſt all mean preciſely as theſe two do—*give* and *grant*; but ſome word equivalent: ſuch as, *be it*, *ſuppoſe*, *allow*, *permit*, *put*, *ſuffer*, &c.; which meaning is to be ſought for from the particular etymology of each reſpective language. "To put this matter of doubt," he ſays, "I mean to diſcard all ſuppoſed myſtery, not only about theſe *conditionals*, but about all thoſe words alſo which Mr. Harris and others diſtinguiſh from prepoſitions, and call *conjunctions* of ſentences. I deny them to be a ſeparate ſort of words or part of ſpeech by themſelves. For they have not a ſeparate *manner of ſignification*; although they are not devoid of ſignification. And the particular ſignification of each muſt be ſought for amongſt the other parts of ſpeech, by the help of the particular etymology of each reſpective language. By ſuch means alone can we clear away the obſcurity and errors in which grammaianrs and philoſophers have been involved by the corruption of ſome common words, and the uſeful abbreviations of conſtruction." See Conjunction.

Conditional *propoſitions*, in *Logic*, are ſuch as conſiſt of two parts, connected together by a conditional particle. Of theſe, the firſt, wherein the condition lies, is called the *antecedent*, and the other the *conſequent*.

Thus, "if the ſoul be ſpiritual, it is immortal;" is a conditional

conditional propofition, wherein, "if the foul, &c." is the antecedent, and "is immortal" the confequent.

The truth of thefe propofitions depends on the truth of the connection of them, and they may be properly denied or contradicted when the negation affects their conjunctive particles. See PROPOSITION.

CONDITIONAL *fyllogifm*, is that whofe major or minor, or both, are conditional propofitions: *e. gr.* "If there be a God, the world is governed by Providence; but there is a God, therefore the world is governed by Providence." See SYLLOGISM.

CONDITIONAL *eflate*, *fees*, *pardons*, and *refignations*. See the fubftantives.

CONDITIONALS, *fcience of*, i. e. of *conditional truths*, imports that knowledge which God has of things, confidered, not according to their effence, their nature, or their real exiftence; but under a certain fuppofition, which imports a condition never to be accomplifhed.

Some of the fchoolmen deny, that God has the knowledge of conditionals: the Thomifts maintain, that God's knowlege of conditionals depends on a predeterminating decree; others deny it.

F. Daniel obferves, that the truths which compofe the knowledge of conditionals, being very different from thofe which compofe the knowledge of intuition, and that of underftanding; a third clafs muft be added; and the knowledge of God be divided into *intuitive*, *intellective*, and *conditional*. See KNOWLEDGE.

CONDIVI, ASCANIO, in *Biography*, an artift whofe works of painting and fculpture are now unknown. He is indeed faid to have poffeffed but an humble fhare of talent, infomuch that although he had the good fortune to be the inmate and difciple of the great Michelangelo Buonaroti for many years, he never attained eminence.

The world however has obligations to Condivi for the life which he wrote of his mafter, in fomewhat the form of a journal, and which he publifhed in 1553, ten years prior to the death of Michelangelo. Mr. Mariette, the celebrated connoiffeur, was decidedly of opinion that the greater part of this narrative was written abfolutely under the immediate inftigation and guidance of Michelangelo himfelf, and of courfe confidered it as infinitely more authentic than the florid, but hafty, compofition of Vafari. Vafari had publifhed a life of the great Florentine artift in his firft edition of 1550. Condivi points out and corrects many of his errors. This Vafari indignantly refents in his fecond edition of 1568; but as Michelangelo was then no longer alive to decide their refpective claims, the veracity of Condivi fhould fuffer no imputation. Vafari however relates many things which the other omits, dwells more largely upon others, and in his fecond edition gives us the fequel of Michelangelo's life, with a long defcription of his magnificent funeral, &c. it was therefore defirable to unite thefe and other fcattered materials into one work: this has lately been done by Mr. Duppa in a handfome quarto volume.

The firft edition of Condivi is in quarto and become rare. Another edition, with copious notes by Antonfrancefco Gori and Mariette, together with extracts from Vafari, was publifhed in Florence, 1746, in folio.

CONDIVICNUM, in *Ancient Geography*, *Nantes*, a town of Gallia Lyonnenfis, according to Ptolemy, and capital of the Namneti, from whom it took its name.

CONDOCHATES, a river of India, on the other fide of the Ganges, according to Pliny and Arrian, which difcharged itfelf into the Ganges, about the 26th degree of latitude.

CONDOLENCE, in *Ethics*. See COMMISERATION.

CONDOM, in *Geography*, a town of France, in the department of the Gers, and chief place of a diftrict, fituated in a beautiful valley on the river Baife, 27 miles N.W. from Auch, and 90 S.E. from Bourdeaux. It has a fub-prefect and a court of juftice. The place contains 6917, and the canton 13,232 inhabitants. The territory of the canton includes $247\frac{1}{2}$ kiliometres and 16 communes. The whole diftrict counts 128 communes and 67,103 inhabitants, upon a territorial extent of $1662\frac{1}{2}$ kiliometres. Its foil is in general fertile, except in the fouthern part, which is an extenfive barren heath; but as there are many marl pits, the wafte land is improved with marl, which renders it tolerably fertile for a term of 20 years, at the end of which the ground is fuffered to lie wafte again, and another extent of heath is rendered productive upon the fame plan. Corn, wine, and brandy are the chief articles of trade, moft of which are fent to Mont de Marfan and Bourdeaux.

CONDOMOIS, a country of France, before the revolution, of which Condom was the capital.

CONDOMA, in *Zoology*, the name given by Buffon to the ftriped antelope of Pennant, the antilope ftrepficeros of Gmelin's Linnæus, the cervus capenfis, or cape deer, of Collin. Act. Ac. Theod. Palat. 1. 487, the bos ftrepficeros of Aldrovand, the ftrepficeros of Caius, Gefner, and Jonfton, and the wild goat of Kolben, &c. It has long, compreffed, wrinkled, tapering, fharp-pointed fpiral horns, with a ridge on one fide which follows the wreaths; the body has a white line along the back, and feveral white ftripes acrofs from that down the fides towards the belly and thighs. This animal inhabits the country near the Cape of Good Hope. It is near nine feet long from the nofe to the rump, and four feet high at the fhoulders; the body is long, flender, and of a reddifh-grey colour; the face is brown, having a white line from the corner of each eye, running forwards and uniting above the nofe; the tranfverfe ftripes above-mentioned are, in general, feven in number, four of which point towards the thighs, and three to the belly; it has a fhort mane on the neck, and long hairs hanging down from the throat to the breaft; the breaft and belly are grey; the tail, two feet in length, is brown above, white on the under fide, and black at the end; the horns are of a dufky colour, and naturally wrinkled, though fuch as are brought to Europe are highly polifhed; they are near four feet long, clofe at the bafes, above two feet and a half diftant at the points, and have two fpiral fcrew-like turns. The female has no horns. It is faid to leap with furprifing activity to a great height.

CONDORCET, JEAN ANTOINE, NICHOLAS CARITAT, *Marquis of*, in *Biography*, celebrated as a writer and political character, was defcended from an ancient family in Picardy in France. He was born in 1743, and was educated at the college of Navarre, where he exhibited an ardent thirft for phyfical and mathematical purfuits, and acquired the reputation of a hard ftudent. Condorcet firft attracted public notice as a mathematician, by his treatife "On Integral Calculations," which he wrote when he was only twenty-two years of age, and in which he propofed to exhibit a general method of determining the finite integral of a given, differential equation, either for differences infinitely fmall, or finite differences. D'Alembert and Bezout, the commiffioners of the academy, employed to examine the merits of this performance, declared that the greater part of the methods were of the author's own invention, that the production itfelf indicated a degree of knowledge very feldom to be met with at fo early an age, and that it afforded a prefage of talents worthy of being excited by the approbation of the academy. This was followed by his "Effay on Analyfis," and other works, which fhewed his fkill in analytica

analytical refearches. In the year 1769, he was admitted member of the Academy of Sciences, the memoirs of which were enriched by various difquifitions prefented by him on the moft abftrufe fubjects. During the adminiftration of Turgot, celebrated no lefs for his integrity, than for his high talents, Condorcet was applied to for affiftance in arranging plans for economical reforms in the ftate. In 1773 he was appointed fecretary to the Academy of Sciences, when he compofed eulogies upon feveral deceafed members who had been neglected by Fontenelle. At this period he was the friend and intimate affociate of Voltaire, D'Alembert, and other diftinguifhed characters. Like D'Alembert he united in himfelf the reputation of an elegant writer, and of profound fcience; and in 1782 he was received into the French Academy, on which occafion he delivered a difcourfe concerning the influence of philofophy. In the following year he fucceeded D'Alembert as fecretary to that academy, and pronounced an able eulogy to the memory of his deceafed friend, whofe literary and fcientific merits are fet forth with great ability. The death of Euler afforded Condorcet another opportunity of difplaying his own talents by appreciating thofe of the departed mathematician. In his difcourfe on this occafion, he exhibited a clear and fcientific ftatement of the improvements and inventions introduced into one department of knowledge by the exertions of an individual. The lives of Turgot and Voltaire, and the eulogy pronounced upon the death of the celebrated Franklin, were decided teftimonies to the abilities of Condorcet as a biographical writer. Turgot had occupied much of his time and attention with moral and political fciences, and was particularly anxious, for the good of his fellow creatures, that the certainty of which different fpecies of knowledge are fufceptible, might be demonftrated by the affiftance of calculation, hoping that the human fpecies would neceffarily make a progrefs towards happinefs and perfection, in the fame manner as it had done towards the attainment of truth. To fecond thefe views of Turgot, Condorcet undertook a work replete with geometrical knowledge. He examined the probability of an affembly's rendering a true decifion, and he explained the limits to which our knowledge of future events, regulated by the laws of nature, confidered as the moft certain and uniform, might extend. If we do not poffefs a *real*, yet he thought, we have at leaft a *mean* probability, that the law indicated by events, is the fame conftant law, and that it will be perpetually obferved. He confidered a forty-five thoufandth part as the value of the rifk, in the cafe when the confideration of a new law comes in queftion; and it appears, from his calculation, which we cannot go into, that an affembly confifting of 61 votes, in which it is required that there fhould be a plurality of nine, will fulfil this condition, provided there is a probability of each vote being equal to four-fifths, that is, that each member voting fhall be deceived only once in five times. He applied thefe calculations to the creation of tribunals, to the forms of elections, and to the decifions of numerous affemblies; inconveniences attendant on which were exhibited by him This work furnifhed a grand, and at the fame time, an agreeable proof of the utility of analyfis in important matters to which it had never before been applied.

Condorcet at this time ftarted the idea of a dictionary, in which objects are to be difcovered by their properties, inftead of being fearched for by their refpective names; he alfo intimated a fcheme for conftructing tables, by which ten milliards of objects might be claffed together by means of only ten different modifications. The talents of Condorcet were very various, and he diftinguifhed himfelf by many philofophical and economical difcuffions, which it is fuppofed, with great juftice, had a great fhare in producing the fubfequent important revolution in France. Without pretending to decide upon the motives of thofe who were active in achieving the downfal of the French monarchy, we fhall bring before the reader a brief account of the part which Condorcet took in this bufinefs. Almoft all his writings tended to pave the way for that moft important change in government which took place in the year 1789. At this period, and in the following two or three years, he engaged in feveral periodical publications, with a view, no doubt, of guiding the public mind. He was a member of the popular clubs at Paris, particularly that of the jacobins, celebrated for democratic violence, where he was a frequent but by no means a powerful fpeaker. He was chofen a reprefentative for the metropolis, when the conftituent affembly was diffolved, and joined himfelf to the Briffotine party which, in point of real talents and integrity, were not inferior to any of the contending factions of the day. But they wanted energy to control the people, and finally fell victims to that revolutionary fpirit which they had excited. Condorcet at this period was the perfon felected from the party to draw up a plan for public inftruction, which he comprehended in two elaborate and very ftriking memoirs; the principles laid down were, perhaps, too abftract for general ufe, and too refined for the prefent ftate of fociety. He was the author of a manifefto addreffed from the French people to the powers of Europe, on the approach of war; and of a letter to Louis XVI., as prefident of the affembly, which was dictated in terms deftitute of that refpect and confideration to which the firft magiftrate of a great people has, as fuch, a juft claim. Condorcet attempted alfo to juftify the infults put upon the fovereign by the loweft, the moft illiterate, and moft brutal part of a delirious populace. On the trial of the king, his conduct was equivocal and unmanly; he had declared that he ought not to be arraigned, yet he had not courage to defend his opinion or juftify thofe fentiments which he had deliberately formed in the clofet.

After the death of Louis, Condorcet undertook to frame a new conftitution, which was approved by the convention, but which did not meet the wifhes and expectations of the nation. A new party, calling themfelves the MOUNTAIN, were now gaining an afcendancy in the convention over Briffot and his friends. At firft the conteft was fevere; the debates, if tumult and difcord may be fo denominated, ran high, and the utmoft acrimony was exercifed on all fides. Condorcet always timid, always anxious to avoid danger, retired as much as poffible from the fcene. By this act of prudence he at firft efcaped the deftruction which overwhelmed the party; but having written againft the bloody acts of the mountain, and of the monfter Roberfpierre, a decree was readily obtained againft him. He was arrefted in July 1793, but contrived to efcape from the vigilance of the officers under whofe care he was placed. For nine months he lay concealed in Paris, when dreading the confequences of a domiciliary vifit, he fled to the houfe of a friend on the plain of Mont-Rouge, who was at the time in Paris. Condorcet was obliged to pafs eight-and-forty hours in the fields, expofed to all the wretchednefs of cold, hunger, and the dread of his enemies. On the third day he obtained an interview with his friend; he, however, was too much alive to the fenfe of danger to admit Condorcet into his habitation, who was again obliged to feek the fafety which unfrequented fields and pathlefs woods could afford. Wearied at length with fatigue, and want of neceffary

neceffary fuftenance, he went to a public-houfe, and afked for an omelette, which he devoured with fo much greedinefs as to induce the fufpicion of a municipal officer who was prefent. At this period, fufpicion and guilt were divided by very narrow boundaries; the unfortunate man was feized and thrown into a dungeon, in order that he might, on the following day, be conducted to the bloody tribunal at Paris. The precaution was, however, unneceffary. Condorcet was found dead in the morning; and as it was generally underftood that he was never without a concealed dofe of the moft active poifon, to this caufe his melancholy end was generally afcribed. Such was the concluding fcene of the career of a man who had fuftained a brilliant part on the ftage of life. He died March 28, 1794.

His character has been varioufly eftimated. His manners were mild, and his talents were unqueftionably of the firft order. He is faid to have been deftitute of thofe fine feelings which diftinguifh great and generous minds; and it is allowed on all hands that he was a prey to timidity; a paffion which at length induced him to commit the act of fuicide. By Madame Rolande, his contemporary and intimate, he was, in his life-time, thus defcribed: "The genius of Condorcet is equal to the comprehenfion of the greateft truths; but he has no other characteriftic befides fear. It may be faid of his underftanding, combined with his perfon, that it is a fine effence abforbed in cotton. The timidity which forms the bafis of his character, and which he difplays even in company, on his countenance and in his attitudes, does not refult from his frame alone, but feems to be inherent in his foul, and his talents furnifh him with no means of fubduing it. Thus, after having deduced a principle, or demonftrated a fact in the affembly, he would give a vote decidedly oppofite, overawed by the thunder of the tribunes, armed with infults, and lavifh of menaces. The propereft place for him was the fecretaryfhip of the academy. Such men fhould be employed to write, but never permitted to act." Condorcet was married, and lived on the moft affectionate terms with his wife. He left one daughter, who has, during the prefent fummer (1807), been married to Arthur O'Connor.

Condorcet was the correfpondent of the great Frederic, and of Catherine, the emprefs of Ruffia. "Letters to the King of Pruffia," he publifhed during his life; and he left behind him, which appeared as a pofthumous work, "A Sketch of a Hiftorical Draught of the Human Mind." In this work, he confiders man as he has been, as he is, and as he may be; and he inculcates, with great energy, his favourite idea of the perfectibility of the human fpecies, and of its advance to actual perfection. He left behind him alfo "A Treatife on Calculation," and "An Elementary Treatife on Arithmetic." His work on the human mind was written during the months that he fecreted himfelf from the favages who were feeking for his blood, with more than inhuman fury; and it is remarkable, and to the credit of the writer, that under fuch circumftances, dreading death at every inftant, he could compofe fo able a treatife, and feel the conviction of the progrefs of his fellow creatures towards moral improvement. Memoirs of the French Revolution. Rolande's Memoirs.

CONDORE, or Pulo Condore, in *Geography*, an ifland of the Eaft Indian ocean, about 20 leagues from the coaft of Cochin-china, taking its name from two Malay words, *Pulo* fignifying an ifland, and *Condore* a calabafh, of which it produces great quantities. This ifland is high and mountainous, and furrounded by feveral fmaller iflands, fome of which are lefs than one, and others two miles diftant. It is of the form of a crefcent, extending, fays Capt. King, near 8 miles from the fouthernmoft point, in a N.E. direction, and its breadth no where exceeds 2 miles. Sir Geo. Staunton fays, it is 11 or 12 miles in length, and about 3 in breadth, confifting of a ridge of peaked hills. From the wefternmoft extremity, the land trends to the S.E. for about 4 miles, and oppofite to this part of the coaft there is an ifland, called by Monf. D Aprés "Little Condore," which runs two miles in the fame direction. This pofition of the two iflands forms a fafe and commodious harbour, the entrance into which is from the north-weft. The diftance between the two oppofite coafts is ¾ of a mile, exclufive of a border of coral rock, which runs down along each fide, extending about 100 yards from the fhore. The anchorage is very good, from 11 to 5 fathoms water, but the bottom is fo foft and clayey, that great difficulty occurs in weighing the anchors. Toward the bottom of the harbour, there is fhallow water for about half a mile, beyond which the two iflands approach fo near each other, as to leave only a paffage at high water for boats. The moft convenient place for watering is at a beach on the eaftern fide, where is a fmall ftream that furnifhes 14 or 15 tons of water a day. Sir George Staunton fays, that beyond the beach, which ftretches acrofs two-thirds of the entrance, at the fouthern extremity of the fpacious bay on the eaftern fide of the ifland, there is a fafe paffage to the inner part of the bay, the north of which is fheltered by a fmall ifland lying to the eaftward. The whole of the bay, he fays, is formed by four fmall iflands, which approach fo nearly to each other as to appear, from feveral points, to join. They all feem to be the rude fragments of primitive mountains, feparated from the great continent in the lapfe of time. This ifland has convenient anchoring-places in either monfoon; and fir Geo. Staunton ftopped there, on the 17th of May, in a fpacious bay on the eaftern fide of the ifland. Capt. Gore, on the 20th of January, ftood for the harbour on the S.W. end of the ifland, which, having its entrance from the N.W. is the beft fheltered during the N.E. monfoon.

This ifland, both with refpect to animal and vegetable productions, is confiderably improved, fince the time when Dampier vifited it. Neither that writer, nor the compiler of the Eaft Indian Directory, mention any other quadrupeds befides hogs, which are faid to be very fcarce, lizards, and the guanoes; and the latter, on the authority of Monf. Dedier, a French engineer, who furveyed the ifland about the year 1720, fays, that none of the fruits and efculent plants, fo common in the other parts of India, are to be found here, except water-melons, a few potatoes, fmall gourds, *chibbols* (a fmall fpecies of onion), and little black beans. At prefent, befides the buffaloes, of which there are large herds, it fupplies remarkably fine fat hogs, of the Chinefe breed. There are alfo fome of the wild fort in the woods, which alfo abound with monkies and fquirrels. One fpecies of the fquirrel is of a beautiful fhining black colour, and another fpecies is ftriped brown and white, which is called the flying fquirrel, from its being provided with a thin membrane, refembling the wing of a bat, extending on each fide of the belly, from the neck to the thighs, which, in ftretching out the legs, fpreads, and enables it to fly from tree to tree, to a confiderable diftance. Lizards are found in great abundance; but Capt. Gore fays, that none of his company difcovered the guano, and another animal defcribed by Dampier as refembling the guano, only much larger. Among the vegetable improvements of the ifland are fields of rice and tobacco, and groves of cabbage palm-trees, plantains, various kinds of pompions, cocoa-nuts, oranges, fhaddocks, and pomegranates. Thefe improvements are afcribed to the French, for the purpofe of making it

it a more convenient refreſhing ſtation for any of their ſhips that may be bound for Cambodia, or Cochin-china; and for this purpoſe it is well ſituated. The woods are well ſtocked with feathered game; and particularly with wild hens and cocks, reſembling thoſe of our own country. The land in the neighbourhood of the harbour is a continued high hill, richly adorned with a variety of fine tall trees, from the ſummit to the water's edge; and among others the tea-tree deſcribed by Dampier.

The town in this iſland is ſituated near the ſea ſide, at the bottom of a retired bay, which affords a ſafe road-ſtead during the prevalence of the S.W. monſoon. It conſiſts of between 20 and 30 houſes, built cloſe together; beſides ſix or ſeven others that are ſcattered about the beach. The roof, the two ends, and the ſide fronting the country are neatly conſtructed of reeds; the oppoſite ſide, facing the ſea, is entirely open; but by means of a fold of bamboo ſcreens, they can exclude or let in as much of the ſun and air as they pleaſe. There are other large ſcreens or partitions, for the purpoſe of dividing, as occaſion requires, the ſingle room, of which the houſe properly ſpeaking, conſiſts, into ſeparate apartments. The largeſt houſe of the town, belonging to the chief or captain, had a room at each end, ſeparated by a partition of reeds from the middle ſpace, which was open on both ſides, and provided with partition-ſcreens like the others. It had, beſides, a pent-houſe, projecting four or five feet beyond the roof, and running the whole length on each ſide. At each end of the middle room were hung ſome Chineſe paintings, repreſenting men and women in ludicrous attitudes. In this apartment Capt Gore's companions were civilly deſired to ſeat themſelves on mats, and they were preſented with betel. In one of the apartments, viſited by ſir George Staunton, was an altar decorated with images; and the partitions were hung with figures of monſtrous deities; but the countenances and deportment of the people exhibited no idea of religious awe, nor was any perſon obſerved in the poſture of prayer or adoration. A few ſpears ſtood againſt the wall with their points downwards, together with ſome match-locks, and a ſwivel-gun.

The inhabitants of this iſland, who are fugitives from Cambodia and Cochin-china, are not numerous. They are of a ſhort ſtature, very ſwarthy, and of a feeble, unhealthy aſpect, but ſeemingly of a gentle diſpoſition. The dreſs of theſe people is compoſed chiefly of blue cotton, worn looſely about them; and their flat faces and little eyes indicate a Chineſe origin or relation. Their colloquial language is altogether different from that which is ſpoken in China, but their written characters are all Chineſe.

The Engliſh ſettled in this iſland in 1702, when the factory of Chuſan, on the coaſt of China, was broken up, and brought with them ſome Macaſſar ſoldiers, who were hired to aſſiſt in building a fort; but the preſident not fulfilling his engagement with them, they watched an opportunity, and in one night murdered all the Engliſh in the fort. Thoſe without the fort, hearing a noiſe, took the alarm, and ran to their boats, very narrowly eſcaping with their lives; but not without much fatigue, hunger, and thirſt, to the Johore dominions, where they were treated with great humanity. Some of them afterward went to form a ſettlement at Banjer-Maſſin, in the iſland of Borneo. Since this event, no Europeans have ever reſided in this iſland. The latitude of this iſland, calculated from a meridional obſervation, as ſtated by ſir Geo. Staunton, is 8° 40′ N.; and its longitude, according to a good chronometer, 105° 55′ E. The harbour in which Capt. Gore was ſtationed, is in N. lat. 8° 40′. E. long., deduced from a great number of lunar obſervations, 106° 18′ 46″; dip of the N. pole of the magnetic needle, 2° 1′; variation of the compaſs, 0° 14′ W.; high water at the full and change of the moon, 4^h 16′ apparent time. The water roſe and fell 7 feet 4 inches perpendicular. Voyage to the Pacific Ocean, by captains Cook, Clerke, and Gore, vol. iii. p. 450. &c.

Condore, in *Ornithology*, the *Vultur Gryphus* of Latham, (Ind. Orn.) Klein, Briſſon, Borowſk., the cuntur of Laet and Ray, the conder of Frezier, Condamine, Buffon, and Molina, and the condor of Latham (Syn. and Sup.) is a bird of enormous ſize, having a longitudinal warty excreſcence on the crown of the head, and a naked throat. It inhabits South America; and its ſize is ſo enormous that the wings, when extended, meaſure 9, 12, or even 16 feet from top to tip; the largeſt quill-feathers of the wings ſometimes meaſure 2½ feet in length, and the quill-part 1½ inch in circumference. The body is of a black colour, with a white back; the neck is ſurrounded with a collar of longiſh white feathers; the chin is reddiſh; the head is clothed with brown down or wool; the eyes are black, with cheſnut or light reddiſh irides; the bill is black, with a whitiſh point; the legs and feet are black, and the claws are ſtraightiſh; the tail is ſmall. The female is conſiderably larger than the male, which it reſembles, except in having a crown creſt or tuft on the ſcrag, or hinder part of the neck. The condore builds its neſt on the higheſt mountains, under the ſhelter of ſome projecting ſhelf of a rock, in which the female lays two white eggs. It preys on calves, ſheep, goats, and ſuch animals, and when very much preſſed by hunger, it has been known to carry off children of ten years of age; and two of them are ſaid to be able to devour the carcaſe of a cow at one meal. When it alights upon the ground, or riſes from it, the noiſe it makes with its wings is ſuch as to terrify, and almoſt to deafen, any one who happens to be near the place. Don Ulloa informs us, that he actually ſaw one of them riſing with a lamb in its talons. The Indians have various ways of catching them: beſides traps and ſnares laid for them near any carrion, they kill a cow or other animal, and moiſten its fleſh with the juice of ſome ſtrong intoxicating herbs, and then bury the body till it putrefies. In this ſtate they take it up and lay it on the ground; and when the condores come near to devour it, they are intoxicated and rendered motionleſs, when the Indians fall upon and kill them.

CONDORMIENTES, religious ſectaries, whereof there have been two kinds. The firſt aroſe in Germany, in the thirteenth century; their leader was a native of Toledo. They held their meetings near Cologne; where they are ſaid to have worſhipped an image of Lucifer, and to have received anſwers and oracles from him: the legend adds, that an eccleſiaſtic having brought the euchariſt to it, the idol broke into a thouſand pieces; which put an end to the worſhip. They had their name from their *lying all together*, men and women, young and old.

The other ſpecies of Condormientes were a branch of Anabaptiſts in the ſixteenth century; ſo called, becauſe they lay, ſeveral of both ſexes, in the ſame chamber; on pretence of evangelical charity.

CONDOTTIERI, in the Italian *Policy*, denoted leaders of bands, who, in the 15th and 16th centuries, made a trade of war, and raiſed ſoldiers in order to hire them out to different ſtates.

CONDREN, Charles de, in *Biography*, ſuperior general of the fathers of the oratory, was born near Soiſſons in the year 1588. By his father, who was in high eſtimation in the court of Henry IV., he was deſigned either for a

poſt about the king, or for the military profeſſion. His own inclinations, however, led him to think of the church, as moſt ſuited to his talents, to which, after ſome heſitation, his father gave an aſſent. He accordingly proſecuted his ſtudies in the college of the Sorbonne at Paris, was ordained prieſt, and admitted a doctor of that ſociety in the year 1614. In the following year he became a member of the congregation of the oratory, and founded ſome houſes belonging to that order. He was not long in obtaining a diſtinguiſhed reputation for integrity and prudence as a man, and for piety and benevolence as a prieſt. On account of theſe traits in his character he was fixed upon as the moſt proper perſon to be confeſſor to the duke of Orleans, only brother to Louis XIII. In this ſituation he was ſucceſsfully employed in confidential buſineſs between the duke and the king, and was the happy means of reſtoring theſe princes to a mutual good underſtanding with one another, after long and violent diſagreements. For theſe ſervices he was offered the archbiſhopric of Lyons, and a cardinal's hat; but he declined accepting offices of honour and emolument for having performed thoſe acts, which, his religion taught him, were binding upon every Chriſtian. He died in the year 1641, leaving behind him many pieces which evidenced ſuperior talents, and a ſincere piety. His principal works are, "Diſcourſes and Letters," 2 vols. 12mo. 1648; and "An Explanation of the Prieſthood of Jeſus Chriſt," publiſhed in 1677. Father Amelotte drew up an account of his life, in which there is a collection of his letters and maxims with an expoſition of his opinions. Nouv. Dict. Hiſt.

CONDRIEUX, in *Geography*, a ſmall town of France, in the department of the Rhône, at the foot of a hill on the river Rhône, 21 miles ſouth from Lyons. This place is celebrated for its excellent ſweet wine.

CONDROS, CONDROTZ, in *Geography*, is a tract of land in the circle of Weſtphalia, ſituated in the biſhopric of Liege, which formed part of the German empire, and is now incorporated with France. Condruſi, in ancient geography, was reckoned part of Belgica. Huy, which was conſidered as the principal town of Condros, is, at preſent, the chief place of the diſtrict of the ſame name in the department de l'Ourthe. See HUY.

CONDUCT, *ſafe*. See SAFE-*conduct*.

CONDUCTOR (from *conduct*, and *to conduct* from the French *conduire) prime*, in *Electricity*, is a body of a conducting ſubſtance, (*viz.* ſuch as will tranſmit the electric power or fluid) placed immediately before the glaſs cylinder, or globe, or plate, or other excitable body, of an electrical machine. Its office is to collect the electricity, and to convey it either in the form of ſparks, or ſilently, to other bodies that may be preſented to it in the courſe of experiments. Without this prime conductor no large ſparks could be drawn immediately from the excited electric, becauſe the electric body, being in its nature incapable of conveying the electric fluid through its ſubſtance, diſcharges, on a body which is preſented to it, that quantity of electricity only which is accumulated upon a ſmall part of its ſurface. But when the prime conductor is placed before the excited electric, the former ſucceſſively collects all the electricity from the ſurface of the latter, whilſt revolving; and if a proper body be brought near its ſurface, the electricity which has been accumulated, will ruſh from every part of the ſurface of the prime conductor in a copious ſtream, or in a full ſpark, to that body.

The forms of prime conductors have been continually varied from the very firſt invention of electrical machines, according as new diſcoveries, or the progreſs of experience, have either detected former defects, or ſuggeſted more advantageous forms. A gun-barrel, or a metallic chain, ſupported by ſilk ſtrings, formed the prime conductor of the earlieſt electrical machines, *viz.* ſuch as were uſed towards the beginning of the laſt, or eighteenth century. And in conſequence of this uſage ſome diſtinguiſhed late writers on the continent, have retained the name of *chain* for the prime conductor, long after the ſhape of that inſtrument had undergone a total alteration. See "l'Elettriciſmo artificiale del P. Beccaria."

Though the gun-barrel or the chain would be highly improper for the modern electrical machines, either of them was quite ſufficient for thoſe of the old conſtruction, in which the excitation was very ſlight and difficultly obtained. But when the glaſs globes or cylinders began to be made much larger, when a better method of excitation was diſcovered, and eſpecially when Mr. Canton's amalgam was introduced, to which the great power of the modern electrical machines is principally owing; then the chain or the gun-barrel was found incapable of retaining the electric power, ſo that every narrow edge, or point, or curvature of the ſame, was found to diſſipate the electricity into the ſurrounding air, as could be eaſily perceived in a darkened room. This ſuggeſted the idea of enlarging the ſize, and ſmoothing the irregularities of the prime conductor, in conſequence of which ſome prime conductors were made of braſs, others of tin, or even of gilt paper; and their ſhape became much more regular and compact. A cylinder with ſpherical terminations has been the moſt uſual form of prime conductors. A few were made ſpherical; Dr. Prieſtley uſed one of a pear-like figure, and ſome have alſo been made of other fanciful ſhapes. But amongſt all thoſe forms, that which the practice of the beſt electricians has found to be, upon the whole, the moſt eligible, is the abovementioned one of a cylinder with hemiſpherical terminations. Thoſe terminations, in ſmall prime conductors, ſometimes are made a little larger in diameter than the cylinder; but in the prime conductors of the larger kind, they do not project beyond the ſurface of the cylindrical part. As the conducting nature of their ſubſtance muſt be of the beſt kind, the prime conductors are made of metal, at leaſt on their ſurface. The ſmall ones are made of hollow braſs, or tin plates, or of wood covered with tin-foil. But the large ones are almoſt always made of wood, or paſte-board covered with tin-foil. The prime conductors of tin are frequently covered with a black varniſh, which is preſerved cleaner than the ſurface of the tin, and may perhaps in ſome meaſure prevent the diſſipation of electricity from their ſurface. In any conſtruction, care muſt be had, that the ſurface of the prime conductors be quite free from points, and ſharp edges; and if holes are to be made in them, which indeed are neceſſary for the performance of various experiments; theſe ſhould be well rounded off and their edges burniſhed. The prime conductor is generally ſupported in an horizontal poſition, by one or two glaſs ſticks, which proceed from the bottom board of the electrical machine, or from ſeparate wooden ſtands; the extremities of thoſe glaſs ſticks entering a little way within the ſurface of the conductor. The direction of the prime conductor is moſtly perpendicular to the axis of the glaſs cylinder of the machine; but in ſome electrical machines, the conductor, or two conductors, are ſituated parallel to the abovementioned axis. When two conductors are affixed to the machine, one of them, which collects the electric fluid from the excited glaſs, is called the *poſitive conductor*, and the other, which is connected with the rubber, is called the *negative conductor*. At that extremity of the prime conductor, which ſtands neareſt to the glaſs globe or cylinder, when the former is perpendicular to the

axis

axis of the latter, or on the fide when it ftands parallel, he collector is affixed. See Collector.

To the oppofite extremity of the prime conductor which ftands fartheft from the glafs cylinder or globe, a thick brafs wire, with a pretty large and fmooth brafs ball, is ufually affixed, and from this ball the longeft and denfeft fpark can be drawn; the greateft endeavour of the electric fluid to efcape from the prime conductor being made at that extremity. In plate machines, *viz.* where glafs plates are ufed inftead of a globe or cylinder, the extremity of the prime conductor is furnifhed with two femicircular projections, which carry the collecting points at their extremities. The fize of the prime conductor muft be proportionate to the fize of the machine; for if the prime conductor be too fmall, the fparks that are drawn from it will not be of the largeft fize poffible to be obtained with that machine; and, on the other hand, if the prime conductor be too large, the diffipation of electricity from its furface will be very confiderable. It is difficult to determine the exact fize which might be the moft advantageous for a given machine; for even with cylinders of the fame fize, different prime conductors might be ufed, according as the glafs cylinders are more or lefs capable of a vigorous excitation. With one of the largeft glafs cylinders ever made in this country, which meafured two feet in diameter, a prime conductor of wood covered with tin-foil was ufed, which meafured fix feet in length and 18 inches in diameter. With a fmall machine, the cylinder of which was feven inches in diameter, a prime conductor of two feet by three inches and a half was found the moft advantageous. When the electrical machine is to be ufed only for charging a battery, then it will be better to ufe a very fmall prime conductor.

The forms of the above-mentioned prime conductors are reprefented in the various plates relating to electricity that are contained in this work.

Conductor *of Lightning.* See Conductors.

Conductor, in *Surgery*, is an inftrument which ferves as a guide for a fcalpel, in feveral operations which do not allow the furgeon's difcerning the exact courfe or extent of a wound. For inftance, in opening a fiftulous orifice, or dilating the abdominal ring in a ftrangulated hernia.

Conductors are either made of fteel or of filver; and always have a groove on one fide, to direct the cutting inftrument. That which furgeons employ in cutting for the ftone is named a Gorget. This is an inftrument generally made of fteel, and introduced, in the operation of Lithotomy, through the artificial orifice, into the bladder, in order to widen the neck of the bladder, and facilitate the introduction of the forceps, with which the ftone is to be extracted. There are two fpecies of this inftrument; the one, which is provided with a knob at the top, is termed the *male* gorget; and the other with an excavation, the *female* gorget. See Lithotomy.

There is alfo a machine invented by Mr. Walker, by means of which, a patient labouring under a fimple or compound fracture of the leg, may be conducted with fafety and convenience from one place to the other, and the extremities of the bones kept in their proper fituation during the progrefs of the cure.

To this head belong the conducting apparatus invented for the fame purpofe by Mr. Theden of Pruffia, which are ufed in fractures of the fuperior and inferior extremities. Machines adapted for fractures of the femur have been defcribed by Mr. Schmucker, and thofe for other parts by Mr. Theden himfelf. Mr. Richter conceives that thefe machines may be rendered more ferviceable, by conftructing them of tinned iron, inftead of wallnut-tree wood.

CONDUCTORS. In two important branches of natural philofophy, a marked diftinction has been obferved between the various known bodies of the earth; and upon the peculiar properties of the two different claffes of bodies, which are difcriminated from each other by the above-mentioned diftinction, numerous phenomena, of confequence to the human fpecies, are abfolutely depending. The two branches, of natural philofophy, above alluded to, are the fcience of electricity and the fubject of heat. In electricity, if an excited piece of glafs, or an electrified conductor, be touched with the extremity of a ftick of fealing-wax, which a man holds by its other extremity; or if it be touched with the extremity of a filk ftring, the electric power will not be diffipated; but if the electrified body be touched with the extremity of a rod of iron or brafs, held in a manner fimilar to the ftick of fealing-wax, the electric power will be inftantly diffipated; *viz.* it will pafs through the metallic rod, and through the perfon that holds it, &c. Hence it evidently appears, that iron or brafs will permit the tranfition of the electric power through its fubftance; whereas fealing-wax or filk will not permit it. Therefore, iron, brafs, and all thofe fubftances through which the electric power can be tranfmitted, are called *conductors of electricity;* and all thofe fubftances, which, like the fealing-wax or the filk, will not permit the paffage of the electric power, are called *non-conductors of electricity.*

A fimilar diftinction has been remarked in the fubject of heat and cold. Take a fmall piece of charcoal, make it red hot at one end, and in that ftate it will be found that a perfon may hold it with his fingers within about a quarter of an inch of the red hot extremity, without feeling any unpleafant degree of heat; but if an iron rod as thick as the charcoal be rendered red hot at one end, a perfon will not be able to hold it within lefs than four or five inches, at leaft, of that end; and fuch is the cafe with all metallic bodies, as well as with fome other fubftances; which fhews that heat will pafs through certain bodies much more eafily than through others. Hence thofe bodies which, like the iron rod, will eafily tranfmit the heat through their fubftance, are called *conductors of heat;* and thofe which will convey it with great difficulty, are called *non-conductors of heat.* It muft be obferved, however, that though heat will pafs incomparably more eafily through certain bodies than through others; yet there are no bodies that are known to be either perfect conductors or perfect non-conductors of heat. And indeed, the like obfervation, though in a much more limited manner, may be made with refpect to the conductors of electricity.

In magnetifm alfo, the name of *conductor of that power* has been given to a fingle fubftance, namely, to foft iron; but the peculiar nature of iron in that refpect, or rather the paffage of the magnetic power, will be explained under the article Magnetism. We fhall now in an orderly manner ftate the various particulars which have been afcertained with refpect to the above-mentioned two claffes of bodies; *viz.* firft with refpect to electricity, and then with refpect to heat.

Conductors *of Electricity.* In endeavouring to point out the true nature of electrical conductors, it becomes neceffary to give a lift likewife of the non-conductors of that power, fince thefe two claffes of bodies gradually approach each other, in proportion as they are lefs perfect of their kind, as far as certain fubftances, which feem to ftand in an intermediate ftate between conductors and non-conductors, fo as to participate of both. Glafs, fealing-wax, amber,

 filk

ſilk, and ſeveral other bodies, which, by means of friction with a dry and clean hand, are capable of being excited, ſo as to exhibit electrical phenomena, are called *electrics;* and theſe identical bodies have been found to be non-conductors of electricity; hence *electrics* and *non-conductors* mean the very ſame claſs of bodies. In the ſame manner it has been found, that thoſe bodies, which will eaſily tranſmit the electric fluid through their ſubſtance, cannot be excited in the above-mentioned manner; hence *conductors* and *non-electrics* do alſo denote the ſame bodies.

Strictly ſpeaking, as we have already hinted above, there is no ſubſtance which may be called a perfect conductor or a perfect non-conductor of electricity; the electric power finding ſome reſiſtance in its paſſage through the beſt conductors, and being in ſome degree capable of paſſing through the beſt electrics, at leaſt under certain circumſtances. The following liſts contain the conductors and the electrics, or, which is the ſame thing, the non-electrics and the non-conductors. They are diſpoſed in the order of their perfection; that is, the beſt conductors and the beſt electrics are placed at the heads of their reſpective liſts; and thoſe which participate of both, meaning thoſe which are partly electrics and partly conductors, will be found towards the end of each liſt. In this, however, no great accuracy muſt be expected; firſt, becauſe a very accurate diſcrimination is impracticable when ſubſtances are expreſſed under general denominations; and, ſecondly, becauſe the preciſe degree of conducting or non-conducting power in moſt ſubſtances cannot be determined on account of their fluctuating nature.

Conductors.

Gold.
Silver.
Copper.
Platina.
Braſs.
Iron.
Tin.
Mercury.
Lead.
Semi-metals.
Metallic ores; of which the beſt are thoſe which contain a greater proportion of metallic parts, and neareſt to a reguline ſtate.
Charcoal, either of animal or vegetable ſubſtances. The conducting power of charcoal is very equivocal; for ſome pieces of it will hardly conduct at all, and others will ſuffer the paſſage of the electric fluid over their ſurface only, and not through their ſubſtance. The reaſon of this difference is not quite underſtood; but it ſeems owing to the degree of heat that is applied in the proceſs of making them. See Prieſtley's ſecond volume of Obſervations on different Kinds of Air, ſect. xiv.
Animal fluids.
Acids.
Saline ſubſtances.
Hot water.
Cold water.
Salt water.
All other liquids excepting oils.
Red-hot glaſs.
Melted reſin.
Flame, or the effluvia of flaming bodies.
Ice and ſnow; but not below a certain temperature; for Mr. Achard, at Berlin, in January 1776, obſerved that frozen water, or ice, at the temperature of 28° below 0° of Reaumur's ſcale (equal to —13 of Fahrenheit's) was become an electric. He tried his experiments in the open air, where he found that a rod of ice two feet in length, and two inches thick, was a very imperfect conductor at the temperature of 6° below 0° of Reaumur's thermometer, and that it would not conduct in the leaſt at 20° below 0°. By whirling a ſpheroid of ice in a proper machine, he even electrified the prime conductor, ſo as to attract, repel, give ſparks, &c., like any other electric.
Moſt ſaline ſubſtances, of which the metallic ſalts are the beſt.
Earthy and ſtony ſubſtances, of which the hardeſt are the worſt.
Glaſs filled with boiling water, as mentioned by Kinnerſley.
Smoke.
Vapour or ſteam of boiling water.
All compounds, in which different proportions of the above-mentioned ſubſtances enter, are conductors in different degrees.
An imperfect vacuum, or the abſence of air produced by the action of an air-pump. But a perfect Torricellian vacuum is not a conductor of electricity. Mr. Walſh, aſſiſted by Mr. De Luc, having made a double barometer, in which the mercury had been accurately boiled, ſo as to expel all the air from the tube, found that the vacuum in the arched part of this double barometer was not a conductor of electricity, nor any electric light could be ſeen in it. (Prieſtley's Experiments and Obſervations on Elaſtic Fluids, vol. i.) This remarkable diſcovery was afterwards confirmed by the experiments of Mr. Morgan. (Phil. Tranſ. vol. lxxv.)

Electrics.

Glaſs, and all vitrifications, even thoſe of metals.
All gems, of which the moſt tranſparent are generally the beſt.
All reſins and reſinous compounds.
Amber.
Sulphur.
Baked wood, if not ſuffered to imbibe moiſture.
All bituminous ſubſtances.
Wax.
Silk.
Cotton.
All dry and external animal ſubſtances, as feathers, wool, hair, &c.
Paper.
White ſugar and ſugar-candy.
Air, and other gaſes.
Oils.
Dry and complete metallic oxides.
The aſhes of animal and vegetable ſubſtances.
All dry vegetable ſubſtances.
All hard ſtones, of which the hardeſt are the beſt.
Soft ſtones when heated, according to Delaval.
Powders not metallic, according to Delaval.
Ice, at the temperature of —13° of Fahrenheit's thermometer, according to Achard.

According to Mr. Walſh's, and Mr. Morgan's experiments, the Torricellian vacuum ought to be placed at the head of the liſt; but the ſingular nature of a vacuum, though a non-conductor, will hardly entitle it to the name of an electric. We muſt, however, refer all farther obſervations, reſpecting *electrics,* to the article of that denomination; the

the above lift having been inferted in this place merely to elucidate the nature of conductors.

Thus far we have ftated the number of conductors, and their gradation, with refpect to common electricity; but that lately difcovered branch of this fcience, which is at prefent affiduoufly cultivated under the title of Galvanifm, has pointed out a peculiar arrangement of conductors with refpect to the order of their capability of conducting that power which affect the limbs of a prepared animal, and of conveying the power of a galvanic, or rather a Voltaic, battery. See the article GALVANISM. Concerning the former of thefe powers, we tranfcribe a lift, followed by a few remarks, from Cavallo's Treatife on Electricity, 4th ed. vol. iii. p. 20; and with refpect to the latter, we fubjoin an abridged extract from a paper of Erman, in the Annales de Chimié, Feb. 1807.

Conductors of Animal Electricity, according to Dr. Lind's and Mr. Cavallo's experiments, which however are arranged with diffidence by the latter, confidering the difficulty of making the arrangement, and that, in this branch of electricity, the metals do not feem to act merely as conductors—The lift begins with the beft.

"Malleable platina.
Silver.
Gold.
Quickfilver.
Copper.
Brafs.
Tin.
Lead.
Iron.
The human body.
Salt water.
Frefh water."

"The metallic ores are not fo good conductors as the purified metals themfelves, and their conducting power is various according to the nature of the ores, but even the metallic falts are tolerably good conductors.

"It is very remarkable, that the flame of tallow candle, which is a good conductor of common electricity, will not conduct the animal electricity, when placed in a fhort interruption made in the circuit of communication. Charcoal, placed in the fame fituation as the flame of the candle, was alfo found to be a non-conductor, except when it was actually burning, in which ftate it conducted tolerably well; but Mr. Volta fays that he has found fome pieces of charcoal that acted as well as the metals. Dr. Valli obferved, that human bodies are not all equally good conductors. Out of four perfons in a company, he found that when two of them formed the circuit of communication between the nerve and the mufcles of a frog, the motions took place very readily. When a third perfon formed the circuit, the motions were very weak; but that when the fourth perfon formed the communication no motion took place. This experiment, he adds, was often repeated with the fame fuccefs. The effect, however, may be owing to the different drynefs of the fkin. Vitriolic acid, and what is very remarkable, alcohol, appear to conduct this property rather better than water.

"The arteries and the veins are not fo good conductors as the nerves; for when a blood-veffel forms part of the circuit of communication, the contractions will take place only when nervous ramifications are adhering to it, and if thefe be carefully feparated, the motion will not take place. The fame thing may be faid of the tendons, the bones, and the membranes; for when either of thofe parts is feparated from the body, and is introduced in the circle of communication between the mufcles and nerves of a prepared frog, no motion will enfue, excepting, indeed, when thofe parts are full of moifture, and are in immediate contact with the nerve of a prepared frog. Dry nerves are not conductors of animal electricity. Dr. Valli found that the internal fubftance of a nerve conducts much better than its external, or coat."

Silver and zinc, profeffor Aldini fays, will produce contractions in the mufcles of a frog, many hours after it has become infenfible to the action of either of them, feparately ufed.

Mr. Erman, in his paper on two new claffes of galvanic conductors, fays that the bodies which may be applied to the poles of a galvanic pile are, I. *Non-conductors.* II. *Conductors.* The conductors are either *perfect* or *imperfect;* and the imperfect conductors are fo, either with refpect to *both poles*, or with refpect to *one of the poles* of a galvanic battery.

I. The *perfect non-conductors* prevent the communication of the power of both poles effectually; and fuch are glafs, refins, ice, and the vapour of water, fulphur and its flame, amber, but not its flame.

II. The *perfect conductors*, which difcharge both poles completely, are the metals, and all in the fame degree.

The *imperfect conductors of both poles.* Thefe, though capable of forming the galvanic circuit, exhibit in their extent effects of two different kinds. Fluid water and bodies impregnated with water are of this nature.

The *imperfect conductors of the pofitive pole only.* Thefe are incapable of forming the galvanic circuit; for when interpofed between the two poles of the pile, they infulate the negative power and conduct the pofitive; whence it follows, that the negative becomes charged, whereas the pofitive is conducted. The flame of hydrogen gas, and the flame of the hydrocarbonated bodies, have this property.

Laftly, *the imperfect conductors of the negative pole only* infulate the power of the pofitive, and conduct the power of the negative pole. Of this fort are the flame of phofphorus and of alkaline foaps.

There now remain two other particulars, which demand our examination with refpect to the conductors of electricity. Thefe are the method of afcertaining their peculiar degrees of conducting power, and their ufes. The fimpleft method of determining whether any given body be a conductor or not, is to affix an electrometer to the prime conductor of an electrical machine, and when the machine is in action, and of courfe the electrometer is diverging, to touch the prime conductor with one extremity of the given body, which the operator holds in his hand by the other extremity; for if, in fo doing, the electrometer collapfes, the body in queftion is a conductor; but if the electrometer continues to diverge, that body is a non-conductor. Its degree of conducting power may alfo be, in great meafure, eftimated from the quicknefs with which the electrometer lofes its divergency. In the performance of this experiment, the operator fhould take care that the electric fluid does not run over the furface of the body under trial to the hand that holds it, which generally takes place when the machine acts powerfully, and the body in queftion is not much extended. In this cafe, it becomes proper to ftop the revolution of the glafs globe or cylinder, when the body is to be put in contact with the prime conductor. But if the body be very fmall, it will be fufficient to ufe a fimple electrometer only, which may be eafily caufed to diverge by means of an excited ftick of fealing-wax, and may then be touched with the body in queftion. Yet all this is not

fufficient

fufficient to difcriminate the peculiar powers of fubftances that are of the fame clafs, fuch as the various metallic fubftances, the different ftones, &c. And for this purpofe various other means may be adopted, according to the nature of the bodies under examination. The beft way of determining the peculiar conducting powers of metallic fubftances, is to have wires of the different metals drawn through the fame hole, fo as to be precifely of the fame diameter, and then melt them by the difcharge of a battery; *viz.* take a wire, of about one-fiftieth of an inch in diameter, and connect it with the outfide of a battery, containing at leaft thirty fquare feet of coated furface, and connect the other extremity of the wire with one branch of the difcharging rod. Then, when the battery is charged, touch the wires which proceed from the infide of it with the other branch of the difcharging rod, which will force the explofion to pafs through the wire that has been interpofed between the battery and the difcharging rod, generally melting a greater or a fmaller part of it, according to the nature of the metal. Thus by repeating the experiment fucceffively with wires of the fame length and diameter, but of different metallic fubftances; charging the battery conftantly to the fame height, which may be eafily accomplifhed by means of a quadrant electrometer; and meafuring the length of each wire that has been melted by the explofion; their various conducting powers may be afcertained; obferving that the worft conductors are more eafily melted, and *vice verfâ.* Mr. Henley found that the fame charge melted 4 inches of gold wire, 6 of brafs, 8 of filvered copper, 10 of filver, and rather more than 10 of iron. In melting wires of a confiderable length, as for inftance two or three feet, it often happens that the force of the explofion barely renders it red hot, without actually melting it. In this cafe, it is curious to obferve that the rednefs appears firft on that extremity of the wire which communicates with the pofitive fide of the battery, and thence proceeds towards the other end of the wire, which fhews an ocular proof of the theory of a fingle electric fluid; the wire, however, is not rendered red hot at one extremity before the other, in confequence of the progreffive motion of the electric fluid through it, but becaufe that fluid lofes fome of its impetus in going through the wire, fo that the wire fuffers the greateft effect of the fhock on that end which the electric fluid enters; in confequence of which, that fame end will be rendered red hot much fooner, and in a greater degree, than thofe parts which are more remote from it.

When the conducting powers of different fluids are to be afcertained, the beft method of performing the experiment is to fill very narrow glafs tubes, fuch as are ufed for fpirit thermometers, with the fluids in queftion, introducing a pin at each end of the tubes; and to prefent them fucceffively to the prime conductor, after the manner already defcribed. For other kinds of bodies other methods may be adopted for afcertaining their conducting powers. Thefe, however, need not be particularly defcribed; firft, becaufe they may be eafily derived from thofe that have been defcribed above; and, fecondly, becaufe they muft be varied according to the nature of the bodies in queftion. After all, it muft be acknowledged, that the metals excepted, no very great degree of accuracy can be expected with other fubftances; fince the fluctuation of their conducting powers arifes from a variety of flight, and almoft imperceptible differences, fuch as the difference of temperature, of moifture, of admixture with other fubftances, &c. Thus, glafs itfelf becomes a conductor, when heated to a certain degree; and the very fame body will conduct more or lefs readily, even by being placed nearer to or farther from certain other bodies.

In confidering the conducting power of natural bodies, one may naturally afk, whence does that property arife; or how is it, that certain bodies will, whilft others will not, conduct the electric power? The prefent ftate of knowledge, however, does not afford a fatisfactory anfwer to this queftion. Various fuppofitions have been offered by the late Dr. Prieftley and others; but as they are infufficient for the explanation of the phenomena, we fhall not attempt to ftate them in this place.

The ufes of conductors are remarkable and extenfive, though they are not yet fully afcertained to the entire fatisfaction of the fpeculative philofopher. In the firft place, the fcience of electricity, or the exiftence of the electric power, would be abfolutely unknown, were it not for the difference of conducting and non-conducting bodies; for otherwife the electric fluid which is manifefted to us, and operates merely by its paffage from one body to another, could neither be confined nor accumulated in any place; in confequence of which, its uniform difperfion throughout the univerfe would remain inactive and unperceived. But the movements of conducting and non-conducting bodies in the world, their contact, or even their approach without any actual contact, condenfes the electric fluid in one place, and rarefies it in another; and this takes place between the clouds and the earth, &c. By the change of their ftates of exiftence, fome bodies abforb from other bodies; and others depofit upon other bodies confiderable quantities of electric fluid. Thus, a perpetual and ample circulation of that fluid is continually kept up amongft all the fubftances of the terraqueous globe, whence thunder and lightning, vaporization, and probably feveral other important operations of nature, are derived. In order to underftand the action of conductors when oppofed to each other, fee the nature of electric atmofpheres under the article Electricity.

The greateft advantage which mankind have derived from the knowledge of the prefent fubject, is the adoption of a conductor for the prefervation of buildings and veffels againft the dire effects of lightning. The identity of electricity and lightning proved by Dr. Franklin, and his fubfequent introduction of conductors for preferving buildings, form two of the grandeft difcoveries of the laft century. It was propofed by the above-mentioned philofopher to raife a metallic conductor fome feet above the higheft part of the building, to continue the fame down along the outfide of the wall, and below it, deep into the earth, or, which is preferable, to connect it with fome well or drain. By thefe means the houfe would have little to apprehend from a ftroke of lightning; for, fince an electrified body is well known to ftrike the neareft and beft conductors that may happen to be in its way, it is evident that the conductor fituated in the abovementioned manner, being of metal, and higher than any part of the building, would naturally be ftruck by the lightning in preference to any other part, and would conduct it to the ground, without any damage to the building.

This reafonable propofal was no fooner offered by the fagacious Franklin, than it was adopted in America, in Europe, and elfewhere. Numerous facts foon proved the ufefulnefs of fuch conductors, and extended its adoption; by fhewing that feveral houfes, which before had been repeatedly ftruck by the lightning, efcaped unhurt after the application of the conductor; that, in many places, the conductors of houfes were actually ftruck by the lightning, which melted them about their extremities, yet the houfes themfelves received no injury; and fo forth.

Though the conductors were inftantly adopted, yet their moft

moſt uſeful form, eſpecially with reſpect to their upper termination, has been much controverted; and it is but lately that the true ſtate of the queſtion has been elucidated. The queſtion was, whether the conductors ſhould terminate in a point, according to Dr. Franklin's original propoſal, or in a ball. Mr. B. Wilſon exhibited ſome experiments, in which a point was ſtruck at a greater diſtance than a ball; whence he concluded, that as the point would attract the lightning from a greater diſtance, a blunt termination ought to be preferred, ſince, in certain caſes, it would avoid a ſtroke of lightning, which the pointed termination would not. (Phil. Tranſ. for 1778). Mr. Nairne, on the other hand, ſhewed ſome experiments, in which a ball was ſtruck in preference to a point. And this indeed is confirmed by a great variety of other experiments. In ſhort, a pointed conductor will draw the electric fluid from an incomparably greater diſtance than a blunt one; but it will draw that fluid gradually, in a ſtream, or ſilent manner; whereas the blunt termination will receive it in a full ſpark, or at once; hence a pointed conductor will tend to diminiſh the quantity of electricity in a cloud, previous to its coming too near, and thus it may protect a greater extent of building than a conductor with a blunt termination, ſince the object of fixing a conductor to a houſe is to protect the houſe from the effects of lightning, and not the conductor from tranſmitting the matter of the lightning.

Upon the whole, conſidering the immenſe quantity of electricity in a thunder cloud, and the little difference between the action of a blunt or a ſharp conductor with reſpect to that quantity, the difference of thoſe terminations ſeems to be of leſs conſequence than it was apprehended in the fervour of the diſpute. After all the experiments and the diſcuſſions made for the purpoſe, "A conductor," Mr. Cavallo obſerves, "to guard a building, as it is now commonly uſed in conſequence of ſeveral conſiderations and experiments, ſhould conſiſt of one iron rod, (copper would do much better, it being a more perfect conductor of electricity, and at the ſame time not being ſubject to contract ruſt ſo ſoon as iron), about three quarters of an inch thick, faſtened to the wall of the building, not by iron cramps, but by wooden ones. If the conductor were quite detached from the building, and ſupported by wooden poſts at the diſtance of one or two feet from the wall, it would be much better for common edifices; but it is more particularly adviſable for powder-magazines, powder-mills, and all ſuch buildings as contain combuſtibles ready to take fire. The upper end of the conductor ſhould be terminated in a pyramidal form, with the edges, as well as the point very ſharp; and if the conductor be of iron, it ſhould be gilt or painted for the length of one or two feet. This ſharp end ſhould be elevated above the higheſt part of the building, (as above a ſtack of chimnies, to which it may be faſtened), at leaſt five or ſix feet. The lower end of the conductor ſhould be driven five or ſix feet into the ground, and in a direction leading from the foundations; or it would be better to connect it with the neareſt piece of water, if any be at hand. If this conductor, on account of the difficulty of adapting it to the form of the building, cannot conveniently be made of one rod, then care ſhould be taken, that where the pieces meet they be made to come in as perfect a contact with one another as poſſible; for the electricity finds conſiderable obſtruction where the conductor is interrupted. For an edifice of a moderate ſize, one conductor, in the manner already deſcribed, is perhaps ſufficient; but, in order to ſecure a large building from ſuſtaining any damage by lightning, there ſhould be two, three, or more conductors, in proportion to the extent of the building.

"In ſhips a chain has often been uſed for this purpoſe, which, on account of its pliableneſs, has been found very convenient, and eaſy to be managed among the rigging of the veſſel; but as the electricity finds a great obſtruction in going through the ſeveral links, for which reaſon chains have been actually broken by the lightning, ſo their uſe has now been almoſt entirely laid aſide; and in their ſtead, copper wires, a little thicker than a gooſe-quill, have been ſubſtituted, and have been found to anſwer very well. One of thoſe wires ſhould be elevated two or three feet above the higheſt maſt in the veſſel; this ſhould be continued down the maſt, as far as the deck, where, by bending, it ſhould be adapted to the ſurface of thoſe parts, over which it may moſt conveniently be placed, and, by continuing it down the ſide of the veſſel, it ſhould be always made to communicate with the water of the ſea."

Another precaution muſt be added to the above directions, which is, that a communication ſhould be made between the conductor, and all other pretty large pieces of metal in the building, ſuch as leaden ſpouts, large iron clamps, &c.; for otherwiſe a lateral exploſion may take place between thoſe detached pieces of metal, at the time that the lightning is conveyed by the conductor, and thence the building may receive ſome damage, though not in a very great degree, unleſs indeed in caſe of powder mills and powder-magazines. See Lateral explosion.

It is owing to this circumſtance, that ſome buildings furniſhed with a conductor or two, are ſaid to have been ſtruck and to have been damaged by a ſtroke of lightning. See Phil. Tranſ. vol. lxxii.

The ſize of the conductor, as recommended in the preceding paragraphs, has by ſome been thought too ſmall for the purpoſe; and an inſtance is recorded of a conductor of iron, four inches wide, and half an inch thick, which is ſaid to have been made red hot by a ſtroke of lightning. But with reſpect to this remark, we ſhall briefly obſerve, that ſhould any perſon think that the conductor, as directed above, is not large enough, the enlargement of its ſize is attended with no other inconvenience than an increaſe of expence. However, though a conductor be made red hot, and even melted by a ſtroke of lightning, yet it will effectually convey that ſtroke of lightning to the ground without any material injury to the building, as has been ſufficiently proved by experiments with artificial electricity, as well as with caſes of conductors partly melted by the lightning.

Conductors *of heat.* When a congeries of bodies remains long in a given degree of temperature, theſe bodies will all acquire the ſame apparent degree of heat; that is, the thermometer placed in contact with any of them, will riſe to the ſame degree; and in this caſe of equilibrium there is no reaſon to believe that any heat, or of caloric, paſſes from one body to another; but if a body, at a certain temperature, be placed amongſt bodies of a different temperature, the caloric will, in this caſe, be communicated from the former to the latter, or *vice verſâ;* according as the temperature of the former is higher or lower than that of the latter. This communication or paſſage of heat from one body to another, is made either by *contact* or by *radiation.*—*By contact,* when the bodies, which are contiguous to the hotter one, are progreſſively heated; *viz.* the neareſt firſt, and then thoſe which are farther off, without any interruption; as when a red-hot piece of iron is placed amongſt other pieces of colder iron, the heat is gradually communicated from the red hot one to the others.—*By radiation,* when the heat from a hot body paſſes through a vacuum, or through tranſparent bodies, which are not heated by it, yet it elevates the temperature of bodies placed at ſome diſtance. Thus, the ſolar heat radiates freely through air,

air, glafs, water, &c., and heats opaque bodies without fenfibly affecting the tranfparent bodies through which it paffes. Thus alfo, a thermometer fufpended under the exhaufted receiver of an air-pump, or in the Torricellian vacuum, continues to vary its temperature with that of the furrounding bodies.

In the communication of heat from one body to another, when a third body is interpofed, it has been obferved that the tranfition of heat is much quicker when certain bodies are interpofed, than when other bodies are placed between; but there are no bodies known which prevent that tranfition effectually; hence the bodies of the univerfe are diftinguifhed into more or lefs perfect conductors of heat, but they afford no inftance of a perfect non-conductor.

The tranfmiffion of heat from a folid at a higher degree of temperature, to another at a lower one, in a given time, is nearly proportional to the difference of their temperatures. But the velocity with which heat is propagated through the fubftance of different bodies, varies confiderably according to the nature of thofe bodies. In general, metallic bodies are the beft conductors of heat; ftones, or hard earthy bodies come next; then the vitreous fubftances, and the refinous. Dry animal parts, excepting bones, and efpecially dry and light vegetable bodies, are bad conductors of heat. The conducting power of liquids is of a particular nature, which will be mentioned prefently. But the different bodies of the fame clafs differ confiderably in conducting power. Thus the metals poffefs it in different degrees, and their proportional powers were thus eftimated by Dr. Ingenhoufz. He procured equal cylinders of feveral metallic fubftances, and having coated them with wax, he plunged their extremities in hot water, and judged of the conducting power of each, by the length of the wax-coating that was melted. The refult of thefe experiments is expreffed in the following lift, which commences with the beft conductors. Journ. de Phyf. 1789, p. 68.

Silver.
Gold.
Copper. } nearly equal.
Tin. }
Platina. }
Iron. }
Steel. } much inferior to the others.
Lead. }

In the fame paper, the proportional conducting powers of three fluids are ftated in the following manner:

	Equal bulks.	Equal weights.
Water - -	1.	1.
Mercury -	2.	4.8
Linfeed oil -	1.111	1.085

The conducting power of the fame body does not remain invariably the fame in all circumftances; but it differs, according as the body changes its ftate of exiftence, fo that the conducting power of a body in a folid ftate is different from that of the fame body in a fluid ftate. And at the time of changing its ftate of exiftence, the conducting power in moft cafes ceafes altogether. Thus, at the temperature of 60°, fulphur is a conductor; but when heated to 212°, at which point it melts and becomes volatile, it is no longer a conductor. Thus alfo, ice conducts at the temperature of 20°, or at any other temperature below the freezing point, which is 32°; but at that point it ceafes to be a conductor, becaufe the heat which may be communicated to it is abforbed as an ingredient neceffary to its fluid ftate, which it affumes at, or little above, that point.

Rarefaction or condenfation alters the conducting powers of feveral bodies. Yet the rarefaction of air is by no means accompanied with a proportionate diminution of its conducting power.

Profeffor Pictet fuppofes that heat afcends within folid bodies more readily than it defcends; *viz.* that in communicating heat to a folid body by the lateral application of a hotter body, the upper parts of the former are heated fooner than the lower. This effect, however, may with propriety be attributed to the afcending current of heated air which rifes along the furface of the body, and caufes colder air to approach the lower part of the body; hence the heat is continually carried upwards.

The conducting power of a body changes likewife, in confequence of an alteration of the furface; fo that polifh and figure are likewife concerned in the reception as well as in the propagation of heat. Thefe particulars, however, together with the reflection and refraction of heat, from the furface or through the fubftance of bodies, will, with more propriety, be explained under the article Heat.

Fluids are, upon the whole, very imperfect conductors of heat, and Count Rumford was led, by his experiments, to conclude that heat is not at all propagated through them by contact, as it is in folids. (See Rumford's paper on the Conducting Property of Fluid, &c. Phil. Tranf. 1805.). Whatever permits or promotes the motion of the particles of a fluid, contributes to the propagation of heat;—whatever obftructs that motion, retards the propagation of heat through them. The particles of air which come in contact with an heated body, being thereby heated and rarefied, become fpecifically lighter than the furrounding air, and of courfe afcend; other air then comes in contact with the heated body, and this alfo being heated is caufed to afcend, and fo forth. Thus is heat conveyed from the original hot body, by the air, to a diftance from it; but if that motion of the air be obftructed, as by the interpofition of partitions of paper, wool, cotton, furs, and the like, then the communication of heat is prevented more or lefs effectually. It is principally on this account, that furs, feathers, eider down, cotton, and other fimilar things, form warm coverings; *viz.* becaufe, by preventing in great meafure the motion of the air between their filaments, they prevent at the fame time the diffipation of heat.

The like obfervations are applicable to water, and perhaps to all other fluids. When a veffel full of water is fet upon the fire, the particles of water that are clofe to the bottom of the veffel are firft heated and rarefied; in confequence of which they afcend, and other colder particles take their place, which, being heated, likewife afcend, and fo on. If the fire be applied to the upper part of the water, the fluid will not be heated, or at moft it will in a very flight degree. Count Rumford (fee his 7th Effay) confined a piece of ice at the bottom of a pretty tall glafs veffel full of water nearly boiling, and noted the time it took up to melt the ice. The experiment then was repeated with this difference, *viz.* that a fimilar piece of ice was placed on the furface of the hot water, inftead of the bottom. It was found that the ice melted more than eight times quicker in this laft fituation than in the former. The refult of this remarkable experiment is explained in the following manner. When the ice fwims on the furface of the hot water, the particles of the latter, that are contiguous to the ice, being cooled by it, defcend, and other hot particles of water take their place, which depofit their heat upon the ice, and, being thereby rendered fpecifically heavier than the next particles of water alfo defcend, and fo forth. But when the ice is confined a,

 the

the bottom of the veſſel, the particles of hot water which come firſt in contact with it, are cooled, and are rendered ſpecifically heavier, in conſequence of which they remain in their place, and no motion will take place within the water; hence the ice is not melted nearly ſo readily as in the former ſituation. Now count Rumford contends that it is by means of the above-mentioned motion only that heat is propagated through fluids, and not otherwiſe. This concluſion was no ſooner publiſhed to the ſcientific world, than it was oppoſed in an able manner by very ſkilful philoſophers. See Dalton's paper. Nich. Journ. vol. iv. p. 75. Traill's paper, ibid. for 1805, p. 133: and Murray's paper, ibid. vol. i. From theſe papers we ſhall make the following abridged extracts, which ſeem neceſſary for the elucidation of the ſubject; and in the firſt place we ſhall ſtate Mr. Murray's experiments.

Into a glaſs cylindrical veſſel water was poured, till it covered the bulb of a thermometer; its temperature was 46°, which was likewiſe the temperature of the air of the room. One ounce of olive oil, heated to 140°, was poured on a ſmall piece of cord, ſuſpended on the ſurface of the water, and the cord was ſlowly withdrawn. Any motion of the water was thus avoided. In the courſe of a minute the thermometer began to riſe ſlowly; in five minutes from the commencement of the experiment, it had riſen 4°, in ten minutes 6½°, in fifteen minutes 8°. It then became ſtationary, and continued ſo for ſeven minutes, before it began to fail. Its deſcent was ſlow. This experiment was repeated with a hot metallic ball (inſtead of oil) immerſed in the water above the thermometer, and it was attended with a ſimilar effect.

From theſe reſults the concluſion might ſeem juſt, that the fluid muſt poſſeſs a conducting power. Yet this is rendered doubtful by the circumſtance, that in all experiments of this kind, a quantity of caloric muſt be conveyed by the ſides of the veſſel. In order to avoid this ſource of error, Mr. Murray employed a veſſel of ice. But water could not be uſed in this caſe, becauſe that fluid expands from 40° to 32°; therefore oil and mercury were uſed.

A quantity of almond oil was poured into the ice veſſel, ſo as to cover the bulb of the thermometer a quarter of an inch. A ſmall cylindrical iron cup, two inches in diameter, and having a flat bottom, capable of holding two ounces by meaſure, was ſuſpended ſo as merely to touch the ſurface of the oil, and was filled with boiling water. At the beginning of the experiment, the thermometer ſtood at 32°. In a minute and a half it had riſen to 32¾°, in three minutes to 34½°, in five minutes to 36¼°, in ſeven minutes to 37½°. At this point it became ſtationary, having riſen 5½° in ſeven minutes. The temperature of the water in the cup had in this time fallen to 96°. The thermometer, after remaining ſtationary at 37½° for ſix minutes, began to fall, and it continued to deſcend at the rate nearly of a degree in a minute and a half, till it returned to 32°. The experiment was repeated with this variation, *viz.* that the thermometer was placed lower, ſo that half an inch of oil ſtood over its bulb. It was alſo repeated with mercury inſtead of oil. But in both caſes the reſults were ſimilar to that of the firſt experiment.

"This riſe," Mr. Murray ſays, "it appears to me impoſſible to aſcribe to any other cauſe than to a power in the fluid to conduct caloric. Thus it is evident, that the ſides of the veſſel could not convey to the fluid in contact with the bulb of the thermometer any part of the caloric it received. Ice, in common with any other ſolid, may, at temperatures below its melting point, conduct caloric; but as it cannot poſſibly exiſt with a temperature above 32°, it cannot communicate any temperature above that to a fluid in contact with it, and conſequently it could not contribute in the above experiment to raiſe the thermometer above that temperature. Caloric does not radiate through tranſparent fluids, and it cannot even be ſuppoſed capable of paſſing by radiation through an opaque fluid as mercury.

If it be proved that oil and mercury are capable of conducting caloric, it will be admitted as ſufficiently probable, that other fluids may have a ſimilar power. Of theſe two, mercury, it is probable from theſe experiments, is the beſt conductor, as the riſe of the thermometer took place in it much more rapidly than in the oil."

Dr. Traill's experiments for aſcertaining the conducting powers of divers fluids, were performed in the following manner.

A cylindrical veſſel was turned out of wood, having its ſides half an inch thick, its height four inches and its diameter two. It has a moveable wooden top or cover, perforated with a hole in its centre, a little more than an inch in diameter, into which an iron cylinder, of one inch in diameter, could be eaſily introduced. This cylinder is ſupported by a ſlight flanch, or ſhoulder-piece, and can be taken up by means of a ſtring attached to its top. When the iron bar is in its place, its flat lower extremity is half an inch diſtant from the bulb of a delicate mercurial thermometer, which is fixed by wax in a hole perforating the cylinder near its bottom. This thermometer is bent to a right angle, ſo that its bulb and part of its ſtem lie in the axis of the wooden cylinder. This ſhape was preferred, becauſe the ſtem could be little affected by the caloric tranſmitted by the ſides of the veſſel, till after the bulb was acted on by the caloric of the iron bar.

A variety of experiments was performed with this apparatus in the following manner: The temperature of the room being ſteadily 67°, Fahren. therm.; during the trials, a kettle of water was kept boiling over the fire. Its temperature was between 211° and 212°, and in this the cylinder of iron was ſuffered to remain, at each experiment, for fifteen minutes. The liquid to be examined, and all the apparatus (but the iron bar) were at each experiment aſcertained to be at 67°. The liquid was poured into the wooden veſſel, till it could riſe $\frac{1}{10}$ of an inch on the ſide of the iron cylinder when in its place. The wooden top was put on, and the iron was drawn out of the kettle of boiling water by means of the attached ſtring, and inſtantly let down through the hole of the cover. The time the thermometer took to riſe through 3° (*viz.* from 67° to 70°) was accurately marked by means of a ſtop-watch, and the reſults of the experiments on ſeveral fluids, are exhibited in the following table.

Liquids.	Minutes.	Seconds.
Water	7	5
Cow-milk	8	25
Proof ſpirit	8 nearly	
Alcohol. Lond. Pharmac.	10	45
Tranſparent olive oil	9	50
Mercury	9	15
Solution of ſulphate of iron. Salt 1. Water 5.	8	
Saturated ſolution of ſulphate of alumine	9	40
Saturated ſolution of ſulphate of ſoda	6	30
Aqua potaſſ. pura. London Pharm.	8	15
Saturated ſolution of ſulphate of ſoda, but the liquid not touching the iron cylinder, by $\frac{1}{10}$ of an inch, or nearly ſo	19	20

"If I am not deceived," fays Dr. Traill, "we may conclude, from what I have above adduced, that liquids, as well as folids, are conductors of caloric; that the transmiffion of it through them follows a particular law depending on the properties of the particular liquid; but which is not in the exact ratio of any of their mechanical properties, though nearer that of their denfity, than any other."

A circumftance, deferving the attention of the fpeculative philofopher, refpecting the conductors of electricity and of heat, has been obferved; *viz.* that moft of thofe bodies which are good conductors of the one, are likewife good conductors of the other. This law, however, is not without exceptions. Thus, metallic bodies are good conductors of both; but charcoal is a good conductor of electricity, though a very bad conductor of heat.

The laft particular, which we fhall briefly notice, with refpect to the conductors of heat, is their ufe. This, on the leaft examination, will be found to be very extenfive. Nature and art avail themfelves of thefe peculiar properties of bodies, and without them both animal and vegetable life could not fubfift. The atmofpherical fluid which envelopes the earth, is a very bad conductor of heat, undoubtedly created for the purpofe of not diffipating the heat of the earth and terreftrial bodies. The coverings of animals, fuch as furs and feathers, being extremely bad conductors, confine the heat on the animal body. The bark and ligneous part of plants, in confequence of their imperfect conducting powers, tend to prevent the freezing of vegetable juices. The induftry of man has not omitted to ufe the worft conductors of heat for coverings, for the defence of his habitations, for the confinement of heat in certain furnaces, &c. In fhort, numerous and admirable effects are deduced by Providence, and feveral effential advantages are obtained by art, from a proper application of the various conducting powers of natural bodies.

Conductors, in the *Military Art*, are affiftants to the commiffary of ftores in conducting depots and magazines from one place to another. They take charge of the ammunition waggons in the field, make their reports to the commiffary, and are under his authority and command.

CONDUCTOS *ad proficifcendum*, in *Law*. See Capias.

CONDUIT, a canal, or pipe, for the conveyance of water, or other fluid matter.

In the earth are feveral fubterraneous conduits, through which the waters pafs that form fome Springs; and through which alfo pafs the vapours which form Metals and Minerals.

Artifical conduits for water are made of lead, ftone, caft iron, potter's earth, &c. See Plumbery.

In the province of New Mexico, there is faid to be a fubterraneous conduit, in form of a grotto, extending fix hundred miles in length. See Duct, Tube, &c.

CONDUITE *d'une Troupe.* A *troop* that marches has always an officer, who commands independently of the other officers that may accompany it.

CONDUSKEEG, in *Geography*, a fettlement of America, in the diftrict of Maine and Hancock county, containing 567 inhabitants.

CONDYLÆ, in *Ancient Geography*, a town of Arcadia, near Caphia, and N.W. of Orchomenæ. In this town was a temple of Diana, and near it a grove. Paufanias.

CONDYLE, in *Anatomy*, an appellation beftowed on feveral projections of the bones.

CONDYLOMA, from κόνδυλος, *digiti articulus*, in *Surgery*. By this term is underftood almoft every hard excrefcence or farcoma, that appears in the parts about the anus and the pudenda of both fexes; which is generally painful, or at leaft troublefome, and fometimes of a venereal origin. According to the different forms which fuch excrefcences affume, they are termed *condylomata*, *fici*, *cryftalli*, *verrucæ*, *framboefiæ*, *&c.*; however they do not materially differ, being all of the fame nature, and requiring the fame mode of treatment. They are diftinguifhed from the hæmorrhoids by their fituation, irregular form, the conftant preffure which they produce, their generally fungous texture, and the foul matter which is frequently difcharged from their furface, or by the venereal fymptoms with which they are accompanied. In fome cafes they are not harder than the parts upon which they are fituated; fometimes, however, they are harder than the moft complete fcirrhus. With refpect to their colour, they are, in fome cafes, of a pale white, in others more or lefs red. Sometimes they are found fingle; but generally the whole of the parts about the anus becomes covered with them. Frequently they are not larger than common warts; which, when the difeafe has proceeded to a great height, become more numerous, and adhere to or are in contact with each other. In other cafes, thefe excrefcences are from the beginning broad and flat, and frequently of the fize of a large bean fplit in half. Sometimes they hang, like figs, on a flender ftalk. Thefe excrefcences are in general more troublefome than dangerous; however, the fyphilitic virus by which they may have been produced is what is moft to be feared.

In the cure of thefe excrefcences, the principal object is to remove the caufe, efpecially when of a venereal kind; and they are either local affections, or, which is fometimes the cafe, effects of a depraved ftate of the body. After the appropriate internal remedies (fee Syphilis) have been adminiftered, they frequently dry up of themfelves, and when they remain, they muft be treated with topical corrofive applications. When thefe excrefcences are of a fofter confiftence, and their furface fore or ulcerated, we may mix Aq. calcis. with Spir. vin. Camph. and Tinct. myrrhæ, and apply this mixture feveral times a day to the excrefcences, by means of a hair-pencil, or cover them with compreffes dipped in it. Still greater effects are produced by the fine powder of favine fprinkled frequently upon them; this powder may alfo be mixed into an ointment with precipitate of mercury, and fpread upon the excrefcences. Or they may be fprinkled once or twice a day with the powder, and a faturnine cerate with opium afterwards applied. In various cafes, the following corrofive wafh of Mr. Plenk has been found the moft effectual remedy: ℞. Spir. Vin. rect. Acet. vin. concentrat. aā ℥fs. Merc. fubl. corrofiv. ʒj. Alum. crud. Camph. Cerufs. aā ʒfs. M. D. S. To be rubbed twice or thrice a day upon the excrefcences, which are to be covered during the intervals with Ungt. ex Hydrargyro.

Frequently the excrefcences difappear without fuppurating, and the found fkin is not injured. Mercurial fumigations with cinnabar are likewife recommended as powerful remedies. The aqua phagedænica has fometimes been found very effectual in removing very fmall venereal warts.

If the excrefcences do not yield to the ufe of any of thefe remedies, but remain hard, callous, and fungous, we may apply the following: Triturate Merc. fublim. corrofiv. ʒfs. in a marble mortar, and add gradually Spir. nitr. fumant. ℥fs. The application of this remedy, which is to be applied every day, or every other day, muft be performed with the utmoft caution, by means of a hair-pencil, with which it is to be rubbed upon the fummit of the excrefcence. We may alfo employ the *lunar cauftic*, alfo the *lap. infern.* or Butyr. antimon., which are likewife to be applied in a very cautious manner; and we ought particularly to take care

care not to let any part of them come into contact with the rectum, which would produce very dangerous consequences. The extirpation by means of ligatures may be employed when the number of the excrescences is but small, and they hang by small stalks to the surface; for otherwise it is a painful remedy. The most certain method of removing them is by means of the knife, only they frequently grow again within a short time; nor ought this remedy to be employed in venereal cases, till a sufficient quantity of mercury has been administered. In cutting them off, all the adjacent diseased parts must be taken away: and in order to prevent inflammation, the blood may be suffered to flow for some time, after which the parts may be covered with lint, and treated as a common wound.

CONDYLON, in *Ancient Geography*, a fortress of Greece, between Connas and Tempé, towards Thessaly.

CONE, in *Geometry*, a solid body, having a circle for its basis, and terminated at the top in a point, or vertex. See *Plate* I. *Conics*, *fig.* 4.

The cone is generated by the motion of a right line, KM, round an immoveable point, K, called its *vertex*, along the circumference of a plane, called its *base*, MN: or it may be conceived as generated by the revolution of the triangle, KLM, about the right line, KL, which is called the *axis* of the cone, and KM its latus or side. If the axis be perpendicular to the base, it is said to be a *right* cone: and if inclined, or oblique, an *oblique* or *scalenous* cone. *Scalenous* cones are again divided into *obtuse-angled*, and *acute-angled*.

An *equilateral* cone, is a right cone, whose side is equal to the diameter of the base.

Euclid defines a cone a solid figure, whose base is a circle, as CD (*fig* 5.), and is produced by the entire revolution of the plane of a right-angled triangle CAB, about the perpendicular leg AB.

If this leg, or axis, be greater than CB, half the base, the solid produced is an *acute-angled* cone; if less, it is an *obtuse angled* cone; and, if equal, a *right angled* cone.

But Euclid's definition only extends to a *right* cone; that is, to a cone whose axis is at right angles to the base; and not to oblique ones, whose axis is not at right angles to the base.

For a more general and comprehensive description of a cone, which may take in both right and oblique ones, suppose an immoveable point A (*fig.* 6.), without the plane of the circle BDEC; and suppose a right line, AE, drawn through that point, and produced infinitely both ways, to be moved quite about the circumference of the circle; the two superficies that will arise from this motion are each called *conic superficies*; but, taken conjunctly, they are called *superficies vertically opposite*, or only *opposite superficies*. The immoveable point, A, common to both the superficies, is called the *vertex*; the circle BDEC, the *base*; the right line AC, drawn through the vertex A, and C, the *centre of the base*, and if infinitely produced, the *axis*; and the solid, comprehended under the conical superficies and the base, is a *cone*.

CONE, *Properties of the*.—1. *The area or surface of every right* cone, *exclusive of its base, is equal to a triangle whose base is the periphery, and its height the slant side of the* cone.

Take the very small arc IK (*fig.* 7.), and draw AI, AK. Then the part of the surface AIK coincides with the small isosceles triangle AIK, whose base is IK, and height AI. In like manner, the whole surface of the cone may be supposed to consist of such triangles whose common height is AI, and bases so many KI's as are contained in the circumference of the base, all which triangles are equal to the triangle whose height is AI, and base, the sum of all the KI's, or the circumference BKDB. Hence, the curve surface of a right cone is equal to half the rectangle of the side AB, and circumference of the base, BKDB. For the half of that rectangle is equal to a triangle of the same base and height. Moreover, the curve surface of a right cone is equal to a circle, whose radius is a mean proportional between the side AB, and the radius of the base BC. For the conic surface is $= \frac{AB \times BKDB}{2}$, and the area of the base $BD = \frac{BC \times BKDB}{2}$ (see CIRCLE). Let the radius, R, represent the mean proportional between AB and BC, or let $R = \sqrt{AB \times BC}$; and the area of the circle whose radius is $R = A$. Then the conic surface : circle BD :: $\frac{AB \times BKDB}{2} : \frac{BC \times BKDB}{2}$ :: $AB : BC :: AB \times BC : BC^2$; and the circle BD : circle A :: $BC^2 : R^2$ or $AB \times BC$: consequently the conic surface : circle A :: $AB \times BC : AB \times BC$, which is a ratio of equality: therefore the conic surface = circle A, whose radius is $\sqrt{AB \times BC}$. Hence also, the curve superficies of a right cone is to the area of its circular base, as AC (*fig.* 5.), the length of the hypothenuse of the right-angled triangle describing it, is to CB, the base of the same triangle: that is, as the slant side of the cone, to the semidiameter of the base.

Hence also, the surface of a right cone is equal to a sector of a circle described on the slant side of the cone, as a radius, whose arc is equal to the periphery of the base of the cone: and has therefore the same proportion to its periphery, which the diameter of the base has to twice the side of the cone. *Hence we have a method of describing a rete or cage that shall just cover a* cone.—Thus, with the diameter of the base AB (*Plate*, *Conics*, *fig.* 8.), describe a circle, and produce the diameter to C, till AC be equal to the side of the cone. To 2 AC and AB, determined in numbers, and 360°, find a fourth proportional: and with the radius CA, on the centre C, describe an arc DE equal to the number of degrees found: the sector CDE with the circle AB will be a rete for the right cone.

If, then, the side of a truncated cone be set off from A to F, and an arc GH be described with the radius CF; by finding a fourth proportional to 360°, to the number of degrees of the arc GH, and to FC; and thence determining the diameter of the circle IF, we shall have a net or cover of the truncated cone.

For CDBAE is a net for the entire cone; CGFIH for the cone cut off; therefore, DBEHIG for the truncated cone.

2. *Cones and pyramids, having the same bases and altitudes, are equal to each other.*

Now, it is shewn, that every triangular prism may be divided into three equal pyramids; and therefore, that a triangular pyramid is one third of a prism, standing on the same base, and having the same altitude.

Hence, since every multangular body may be resolved into triangular ones, and every pyramid is a third part of a prism, having the same base and altitude; since a cone may be esteemed an infinite-angular pyramid, and a cylinder an infinite-angular prism; a cone is a third part of a cylinder, which has the same base and altitude. Hence, cones of equal bases are as their heights; cones, and also frustums of cones, of equal altitudes, are as the bases: cones are to one another in the compound ratio of the bases and heights: and in equal cones, the bases and heights are reciprocally proportional.

 Hence

Hence we have a method of meafuring the furface and folidity of a cone. Thus, *for the folidity:* find the folidity of a prifm, or cylinder, having the fame bafe with the cone, or pyramid, or, multiply the bafe by the altitude: then divide by 3: the quotient will be the folidity of a cone, or a pyramid. Thus, *v. gr.* if the folidity of a cylinder be 605592960, the folidity of the cone will be found 201864320.

For the furface; that of a right cone is had by multiplying the femi-periphery of the bafe into the fide, and adding the product to the bafe.

All cones, which have their altitudes and the diameters of their bafes reciprocally proportional, are in the triplicate ratio of their altitudes, being to each other in the fame proportion with prifms of equal bafe and altitude, of which they are like parts. See Prism.

Suppofe, *e. gr.* the diameter of the cone NM (*fig* 4.) 56, the periphery will be 175,9296, and the bafe 2463,0144. Suppofe the altitude or axis KL, 246; fince $LM = \frac{1}{2} NM = 28$, and $KM^2 = KL^2 + LM^2 = 60516 + 784 = 61300$, $KM = 247,5$, &c. Confequently the fuperficies of the cone, exclufive of the bafe, is 21771,288; and the whole together 24234,3024.

The folidity of an oblique cone is obtained in the fame manner with that of the right cone: but it is much more difficult to find its furface, fince it cannot be reduced to the meafure of a fector of a circle, becaufe all the lines drawn from the vertex to the bafe are not equal. See a Memoir on this fubject, by M. Euler, in the Nouv. Mem. de Peterfburgh, tom. i. Dr. Barrow has demonftrated, in his Lectiones Geometricæ, that the folidity of a cone with an elliptic bafe, forming part of a right cone, is equal to the product of its furface by a third part of one of the perpendiculars drawn from the point in which the axis of the right cone interfects the ellipfe; and that it is alfo equal to one third of the height of the cone multiplied by the elliptic bafe: and therefore that the perpendicular is to the height of the cone, as the elliptic bafe to the furface.

For the meafure of the furface, and folidity of a truncated cone, or *fruftum,* ABCD (*fig.* 8). Its altitude CH, and the diameters of its bafes AB and CD, being given, find their circumferences; to the fquare of the altitude CH, add the fquare of the difference of the radii AH, and from the aggregate extract the fquare root, which will give the fide AC: the femi-fum of the peripheries, multiplied by that fide, gives the fuperficies of the truncated cone or fruftum.

To find the folidity: as the difference of the femi-diameters AH, is to the altitude of the truncated cone or fruftum CH, fo is the greater femi-diameter AF to the altitude of the entire cone FE. This being found, fubtract the altitude of the truncated cone GF, which will leave that of the cone taken off, EG.

Find the folidity of the cone CED and AEB; fubtract the other from this; the remainder will be the folidity of the truncated cone or fruftum ACDB. Or, add into one fum the areas of the two ends of the fruftum and the mean proportional between them; multiply that fum by the perpendicular height, and $\frac{1}{3}^{d}$ of the product will be the folidity. For the method of finding the furface and folidity of a cone, &c. by fluxions; fee Superficies and Solidity.

Cone, *Ungula of.* See Ungula.

For the fections of the Cone, fee Conic *fection.*—*For the ratio of* Cones *and Cylinders,* See Cylinder.—*For the centres of gravity and of ofcillation of a* Cone, fee Center.

Cones *of the higher kinds,* are thofe whofe bafes are circles of the higher kinds; and are generated by fuppofing a right line fixed in a point, on high, though conceived capable of being extended more or lefs, on occafion; and moved or carried round the faid circle of the higher kind.

Cone *of rays,* in *Optics,* includes all the feveral rays which fall from any point of a radiant, on the furface of a glafs.

Cone, *double,* or *fpindle,* in *Mechanics,* is a folid formed of two equal cones joined at their bafes. If this be laid on the lower part of two rulers making an angle with one another, and elevated above the horizontal plane, it will move towards the raifed ends, and feem to afcend, though it really defcends. Let ABD (*Plate* XVI. *Mechanics, fig.* 7.) be the common bafe of the two cones, its centre C will be the centre of gravity of the whole folid: therefore, if DF reprefents one of the rulers elevated to an angle FDG, whofe fine FG is lefs than the femidiameter of the cone CD, it is plain that the centre of gravity C at the pofition of the cone in D, is more diftant from the centre of the earth, to which all heavy bodies tend, than in its pofition between the legs of the ruler at F; and therefore it will defcend, as on an inclined plane CFE, from C to F, where it will ftop, being fupported on the raifed ends of the rulers.

Cone, in *Affaying.* See Melting-*cone.*

Cone, in *Botany,* a hard dry feed-veffel of a conical figure, confifting of feveral woody parts; and is, for the moft part, fcaly, adhering clofely together, and feparating when ripe.

Cone-*ftone,* in *Natural Hiftory,* the name given by many to a fpecies of tubulus *marinus,* not known to us in its recent ftate, but frequently found foffile in the Swedifh ftones ufed in pavements.

Cone *and key.* Bracton, lib, ii. cap. 37. num. 3. fays, *Fæmina in tali ætate* (*i. e.* 14. *et* 15. *annorum*) *poteft difponere domui fuæ, et habere* cone *et* key.

The words come from the Saxon *colne,* i. e. *calculus,* and *key, clavis;* fo that a woman was then held to be of competent years when fhe was able to keep the accounts and keys of the houfe: and Glan. lib. vii. cap. 9. has fomewhat to the fame purpofe.

Cone, in *Conchology.* See Conus.

CONECTE, Thomas de, in *Biography,* a monk of the order of the Carmelites, born in Bretagne, towards the clofe of the fourteenth century, and diftinguifhed as the moft popular and impreffive preacher of his time. In his difcourfes he did not confine himfelf to fubjects of religion and morality, but he attacked with vehemence the reigning follies and fafhionable foibles of the age. The head drefs of the ladies in particular was the fubject of his repeated remonftrances. At this period, fays Bayle, "the head-dreffes were of fuch a prodigious height, that the higheft top-knots now are but dwarfs to them." Conecte reformed that excefs, and obliged the ladies to drefs themfelves modeftly and with a ftrict regard to decorum. It was not, however, fo much by the force of the reafons with which he reprefented the evangelical duties, as by exciting boys and the commonalty to infult thofe of the other fex, who would not introduce a reform into their drefs. Whether, however, he aimed at vice or folly, he was fo famed as an orator, that no churches were fufficiently fpacious to contain the crowds, that followed him wherever he went; he therefore chofe as theatres for the difplay of his eloquence, public fquares and other places where immenfe fcaffolds were erected, from which he could make himfelf heard by many thoufands

ſands at the ſame time. When he travelled from place to place, it was on a mule attended with many monks and prieſts on foot. As ſoon as he arrived in the vicinity of any town, the moſt conſiderable perſons for rank and property came out to meet him, in order to conduct him to the houſe provided for his lodging, which was commonly the beſt in the place. His labours were not confined to his own country; from France he proceeded to the Netherlands, and Italy, exciting every where the ſame attention which he experienced in his native land. At Venice he gained ſo much reputation, that the embaſſadors from that republic to the pope, invited him to accompany them to Rome. But the freedom and aſperity of his declamations againſt the corruption of the clergy and the court, rouſed the reſentment, and paſſions of the papal ſee; he was accordingly tried and condemned for hereſy, and burnt at Rome in the year 1434. His motives were queſtioned by ſome of his contemporaries, but the readineſs with which he ſubmitted to a cruel death, in defence of his conduct, rather than retract the charges which he had exhibited againſt the profligacy of the Romiſh hierarchy, was ſufficient evidence of his ſincerity in a good cauſe. Bayle.

CONEGLIANO, Gio Batista Cima, called *Il*, from the place of his nativity, a ſmall city in the ſtate of Venice, became, under the tuition of Giovanni Bellini, a painter of conſiderable eminence; and indeed ſo entirely did Conegliano poſſeſs himſelf of the ſtyle of Bellini, that the works of the ſcholar are frequently confounded with thoſe of the maſter; even by good judges. It was however much the cuſtom with the older Venetian painters to ſubſcribe their names to their works; many therefore of this artiſt are ſtill known, as well by the inſcription as by the mountainous view of the town of Conegliano with which he uſually enriched his back grounds. A juvenile performance of this maſter with the date 1493, is in the duomo of Conegliano: a more excellent picture by him is in the church of Santa Maria dell' Orto, at Venice. It repreſents St. Peter, St. Paul, St. Mark, and St. Jerome, with a magnificent architectural back-ground. But in the opinion of Lanzi, the chef-d'ouvre of Conegliano is an altar-piece in the duomo at Parma, the ſubject of which however he has neglected to mention. This maſter is ſuppoſed to have died ſhortly after 1517. Lanzi. Storia Pittorica. Zanetti, Pittura Veneziana.

CONEGOCHEAQUE Creek, in *Geography*, a creek of America, which riſes near Marierſburg, in Franklin county and ſtate of Pennſylvania, runs ſoutherly in a winding courſe, and after ſupplying a number of mills, diſcharges itſelf into the Potowmack at William Port, in Waſhington county, Maryland; 19 miles S.E. of Hancock, and 8 miles S. of the Pennſylvania line.

CONEI or Cowne, George, a native of North Britain, and a zealous catholic, went to reſide at Modena, in Italy, at an early age. He afterwards ſettled at Rome, and was celebrated, during the pontificate of pope Paul V., for his profound knowledge of the Greek and Latin languages. His own good character recommended him to the patronage of the cardinals Montalto and Barberini. The latter being nephew to pope Urban VIII., Conei ſoon obtained ſo much of the favour and confidence of the pontiff as to be entruſted with the office of nuncio to Maria Henrietta, queen of England, which he diſcharged completely to the ſatisfaction of the papal court. As a reward for his conduct he would have been raiſed to the dignity of cardinal, had not death cut off his proſpects. He died in 1640, at the age of forty-two; leaving behind him, among other works of merit, "The Life of Mary Stuart;" "De Inſtitutione principis;" "De Duplici Statu Religionis apud Scotos," &c. &c.

CONEMAUGH River, and *Little Conemaugh*, in *Geography*, are the head waters of Kiſkemanitas, in Pennſylvania. After paſſing through Laurel hill and Cheſnut ridge, Conemaugh takes that name, and diſcharges itſelf into the Alleghany, 29 miles N.E. of Pittſburgh. It is navigable for boats, and there is a portage of 18 miles between it and the Frankſtown branch of Juniata river.—Alſo, a town of Pennſylvania, 15 miles E. of fort Ligonier.

CONENTOS, Las, a city of La Plata or Paraguay, in South America, in the dioceſe of Buenos Ayres.

CONEPATL, in *Zoology*, an American animal of the weeſel kind mentioned by Hernand.; and alſo by Ray under the title of *Yzquipatl*. It is deſcribed as bearing a ſtrong reſemblance to the racoon in ſhape, but variegated with two long ſtreaks of white, one on each ſide of the ridge of the back, which run even into the tail. This animal is ſaid to be of a harmleſs diſpoſition, but of a ſtinking ſmell, and when purſued, or provoked, will diſcharge its excrements at the perſon who offends it to ſix or eight feet diſtance; theſe have a very bad ſmell and ſpoil peoples cloaths by leaving indelible yellow ſpots on them. Little more is known of this animal than is above related. It inhabits New Spain, and was placed by Linnæus in his Syſtema as the ſame ſpecies with his Viverra Memphitis, the memphitic weeſel, and chinche of Buffon. Gmelin conſiders it as a diſtinct ſpecies, and deſcribes it ſpecifically under the name of conepatl. This animal may prove to be a variety only of the ſtriated weeſel, or perhaps only of the memphitic weeſel to which Linnæus at firſt aſſigned it. See Viverra.

CONERFREIT, in *Geography*, a town of Germany, in the circle of Bavaria, and Upper Palatinate; 34 miles N.N.E. of Amberg.

CONESSI, or Conesti, in the *Materia Medica*, a bark brought from the Eaſt Indies. It is frequent in Ceylon, and Malabar, where the natives take it in diarrhœas, lienteries, and dyſenteries. We uſe it in powder for the ſame purpoſes, the doſe being from half a dram to a dram. It is proper to give a doſe of ipecacuanha before taking it.

This tree grows alſo on the Coromandel coaſt, in the Eaſt Indies, and is not unlike the *cadagopala* of the *hortus Malabaricus*. The bark ſhould be freſh powdered, and the electuary prepared with ſyrup of oranges every day or every other day. Med. Eſſ. vol. iii. art. 4.

CONESTEO, in *Geography*, a north-weſtern branch of Tioga river in the ſtate of New York, America.

CONESTOGA, a townſhip of America, in the county of Lancaſter and ſtate of Pennſylvania.

CONESUS, a ſmall lake of America, in the county of Geneſſee and ſtate of New York, which conveys its waters N.W. to Geneſſee river.

CONFARREATION, a ceremony among the ancient Romans, uſed in the marriage of perſons whoſe children were deſtined for the honour of the prieſthood.

Confarreation was the moſt ſacred of the three modes of contracting marriage among that people; and conſiſted, according to Servius, in this, that the *pontifex maximus* and *flamen dialis* joined and contracted the man and woman, by making them eat of the ſame cake of ſalted bread; whence the term, *far* ſignifying meal or flour.

Ulpian ſays, it conſiſted in the offering up of ſome pure wheaten bread; rehearſing, at the ſame time, a certain formula,

formula, in presence of ten witnesses. Dionysius Halicarnasseus adds, that the husband and wife did eat of the same wheaten bread, and threw part on the victims.

CONFECTION, in *Pharmacy*, a kind of compound remedy, of the consistence of a soft electary, or electuary.

Confections and electuaries are composed chiefly of powders, mixed up with syrups or honey, into such a consistence, that the powders may not separate by keeping. They are chiefly the milder medicines, and such as are not very ungrateful to the palate, that enter into the composition of the electuaries; for as they are taken somewhat " ad libitum," it would be unsafe to trust this mode of exhibition of the more active drugs. The lighter powders require about twice the weight of syrup to be brought to the proper consistence of an electuary. The ordinary dose is a piece about the bulk of a nutmeg. See ELECTUARY.

Several electuaries were formerly distinguished by the name of confections; some of which, in the medical language, are *corroborative*, and others *purgative*.

Of the number of the corroborative confections, were those of *alkermes*, of *hyacinth*, and the *anacardine*: a purgative one is the confection *Hamech*. The confection of *alkermes* has its name from the principal ingredients therein; which is the *kermes*, or *alkermes*, or scarlet-grain. The other ingredients were pearls, musk, cinnamon, ambergris, leaf-gold, juice of pippins, and rose water. It was ranked among the best cardiacs, and frequently used for the palpitation of the heart, or syncope; and sometimes in the small-pox and measles.

The confection of *hyacinth* was said to have nearly the same virtues with that of *alkermes*; but, besides, it was frequently used as an astringent. It consisted of nearly triple the number of drugs; whereof the precious stone, called the *hyacinth*, was esteemed the principal; the chief of the rest were, red coral, bole armoniac, terra sigillata, myrrh, the santals, burnt hartshorn, camphire, sapphire, emerald, topaz, and most of the ingredients of the confection of alkermes. The *anacardine* confection was composed chiefly of anacardiums; whence the name. The other drugs were long pepper, black pepper, most kinds of myrobalans, castoreum, &c. It was used to purge the blood, and deemed proper in cold diseases.

The confection *Hamech*, took its name from that of its inventor, an Arabian physician. Its ingredients were, polypody, myrobalans, agaric, senna, tamarinds, red roses, manna, colocynth, &c. It was applied as a drastic for the purging of the grosser humours and viscidities; it was also of some reputation in vertigoes and cancers. But all these, though we have thought it proper to mention them, are excluded from the modern dispensatories.

CONFECTIO *aromatica*. See the next article.

CONFECTIO *cardiaca*, a name given in the late London Dispensatory to the so much esteemed medicine commonly known by the name of the *confectio Raleighana*, and now denominated *confectio aromatica*. The composition is also altered, as well as the name, and is ordered now to be made in the following manner: Take zedoary, in coarse powder, and saffron, of each half a pound, and of distilled water, three pints. Macerate for twenty-four hours, and then press out and strain. Evaporate the strained liquor to a pound and a half, and add of compound powder of crabs-claws, sixteen ounces by weight; cinnamon and nutmeg, of each two ounces by weight; cloves, one ounce by weight; lesser cardamom, half an ounce by weight; and double refined sugar, two pounds.

Powder the spices together very finely, and adding the sugar, make a confection. This is an improvement of the *confectio cardiaca* of the former dispensatory. The essential oil of the cardamom appeared, on an experiment made at the Hall, to be lost in the evaporation of the tincture; and, therefore, the cardamom is now more properly added in powder.

CONFECTIO *Damocratis*. See MITHRIDATE.

CONFECTIO *Fracastorii*. See DIASCORDIUM.

CONFECTIO *Japonica*, was prepared of Japan earth, three ounces; tormentil root, nutmeg, and olibanum, of each two ounces; opium, dissolved in Lisbon wine, a dram and a half; simple syrup and conserve of roses, of each fourteen ounces. An electuary of these ingredients supplied the place of *diascordium*; and the dose was from a scruple to a dram.

CONFECTIO *Opiata*, confection of opium, is prepared in the following manner: Take of hard purified opium, powdered, six drams by weight; long pepper, ginger, and caraway, of each two ounces by weight; syrup of white poppy, boiled to the consistence of honey, three times the weight of the whole. Mix the purified opium with the heated syrup, and add the rest in powder.

CONFECTIO *Paulina*, a name given in the late London Dispensatory to the composition which used to be called *confectio archigenis*. It was ordered to be made in the following manner: Take costus or zedoary, cinnamon, long pepper, black pepper, strained storax, galbanum, opium, and Russia castor, of each two ounces; of simple syrup, boiled to the consistence of honey, an equal weight to thrice the species. Pemberton's London Pharm. p. 339.

CONFECTOR, among the *Ancient Romans*, a sort of gladiator, hired to fight in the amphitheatre against beasts; thence also denominated *bestiarius*. See GLADIATOR.

The confectores were thus called *à conficiendis bestiis*, from their dispatching and killing beasts.

The Greeks called them παραβολοι, q. d. *daring*, *rash*, *desperate*; whence the Latins borrowed the appellations *parabolani*, and *parabolarii*. The christians were sometimes condemned to this sort of combat.

CONFECTS, or CONFITS, a denomination given to fruits, flowers, herbs, roots, and juices, when boiled and prepared with sugar, or honey, to dispose them to keep, or render them more agreeable to the taste.

The ancients only confited with honey; at present, sugar is more frequently used. Confects half-sugared are those only covered with a little sugar, to leave more of the natural taste of the fruit.

Confects are reduced to eight kinds; viz. *liquid confects*, *marmalades*, *jellies*, *pastes*, *dry confects*, *conserves*, *candies*, and *dragees*, or *sugar-plums*.

Liquid confects are those whose fruits, either whole, in pieces, in seeds, or in clusters, are confited in a fluid transparent syrup, which takes its colour from that of the fruits boiled in it. There is a good deal of art in preparing these well; if they be too little sugared, they turn; and if too much, they candy. The most esteemed of the liquid confects are plums, especially those called mirabels, barberries, quinces, apricots, cherries, orange flowers, little green citrons from Madeira, green cassia from the Levant, myrobalans, ginger, cloves, &c.

Marmalades are a kind of pastes almost liquid, made of the pulp of fruits, or flowers, that have some consistence; such as apricots, apples, pears, plums, quinces, oranges and ginger. Marmalade of ginger is brought from the Indies by way of Holland: it is esteemed good to

to revive the natural heat in old men. See MARMALADE.

Jellies are juices of feveral fruits, wherein fugar has been diffolved, and the whole, by boiling, reduced into a pretty thick confiftence; fo as, upon cooling, to refemble a kind of thin tranfparent glue, or fize. Jellies are made of various kinds of fruits, efpecially goofeberries, currants, apples, and quinces: there are other jellies made of flefh, fifh, hartfhorn, &c. but they are not to be kept, being very fubject to corrupt. See JELLY.

Paftes are a kind of marmalades, thickened to that degree by a proper boiling, as to affume any form, when put into little moulds, and dried in the oven. The moft in ufe are thofe of goofeberries, quinces, apples, pears, and orange flowers: thofe of piftachoes are the moft efteemed; thofe of ginger are brought from the Indies.

Dry Confects are thofe whofe fruits, after having been boiled in the fyrup, are taken out again, and drained, and put to dry in an oven. Thefe are made of fo many kinds of fruits, that it would be hard to explain them all: the moft confiderable are citron and orange-peel, plums, pears, cherries, apricots, &c.

Conferves are a kind of dry confects, made with fugar, paftes of flowers or fruits, &c. The moft ufual among thefe, are thofe of rofes, mallows, rofemary; of heps, of orange flowers, violets, jeffamin, piftachoes, citrons, and floes.

Note. The apothecaries, under the title of *conferves*, comprehend all kinds of confects, both dry and liquid; whether of flowers, fruits, feeds, roots, barks, or leaves, prepared with fugar or honey, to preferve, &c. See CONSERVE.

Candies are ordinarily entire fruits, candied over with fugar, after having been boiled in the fyrup; which renders them like little rocks cryftallized; of various figures and colours, according to the fruits enclofed within them. The beft candies are brought from Italy. See CANDY.

Sugar-plums are a kind of little dry confects, made of fmall fruits or feeds, little pieces of bark, or odoriferous and aromatic roots, &c. incrufted and covered over with a very hard fugar, ordinarily very white. Of thefe there are various kinds, diftinguifhed by various names; fome made of rafberries, others of barberries, melon-feeds, piftachoes, filberds, almonds, cinnamon, orange-peel, corianders, anifeeds, caraways, &c.

CONFEDERACIES OF POLAND. See POLAND.

CONFEDERACY, Fr. *Confederation*, an alliance, compact, or league between different princes and ftates, for the fupport of a common caufe. See CONFEDERATION.

CONFEDERACY, in *Law*, is when two or more perfons combine to do any damage to another, or to commit any unlawful act.

Confederacy is punifhable, though nothing be put in execution: but then it muft have thefe four incidents; 1. That it be declared by fome matter of profecution; as by making of bonds or promifes to one another: 2. That it be malicious; as for unjuft revenge: 3. That it be falfe; *i. e.* againft the innocent: and, laftly, That it be out of court, voluntarily. See CONSPIRACY.

CONFEDERATE TROOPS, troops of different nations united together in one common caufe againft an enemy.

CONFEDERATION OF THE RHINE, in French *la Ligue du Rhin*, is the act by which feveral German ftates, fituated between the Rhine and the Mayne, feparated themfelves from the Germanic body, and affociated as confederated ftates of the Rhine, under the protection of the French empire. The inftrument of this confederation was figned at Paris, on the 12th of July 1806, and the ratifications were exchanged at Munich on the 25th of the fame month. The contracting parties were the emperor of the French, on the one part, and on the other, the kings of Bavaria and Wirtemberg, the archbifhop of Ratifbon as prince primate, the grand dukes of Baden, Berg, Heffe Darmftadt, Naffau Weilbourg, and Naffau Ufingen, the princes of Hohenzollern-Hechingen, and Seigmaringen, Salm Salm, Salm Kyrburg, Ifenburg Birftein and Lichtenftein, the duke of Ahremberg, and the prince of Leyn. They declared that they would admit other German princes and ftates in all cafes where their union with the confederation might be found confiftent with the general intereft, and thus virtually annihilated the inconfiderable part that was left of the German empire. This induced Francis II. laft emperor of Germany, and firft of Auftria, formally to abdicate the German empire, by his proclamation of the 6th of Auguft 1806. It was then expected that a fimilar confederation would be formed on the north of the Mayne under the protection of either Pruffia or Ruffia: but the king of Pruffia having declared war againft France, in October 1806, and having been completely overthrown at the battle of Jena, on the 14th of the fame month, feveral other German ftates haftened to join the confederation of the Rhine, as Lippe Detmold, Schaumburg Buckeburg, Saxe Weimar, Saxe Gotha, Saxe Cobourg, and the newly created kingdom of Saxony. By the peace of Tilfit, which erects the Pruffian provinces on the right bank of the Elbe, and the poffeffions of Heffe Caffel, Orange Fulda, and other petty German ftates into a new kingdom, to be called the kingdom of Weftphalia, the confederation of the Rhine is extended to the banks of the Elbe, and will probably receive confiderable modifications from fuch a large and important acceffion of new members. Its original ftipulations were that the confederated ftates,

Art. I. are for ever feparated from the Germanic body, and united by a particular confederation, under the defignation of the "Confederated States of the Rhine."

II. Renounce the laws; and

III. The titles of the empire.

IV. The elector arch-chancellor takes the title of prince primate and moft eminent highnefs, which title fhall convey no prerogative derogatory to the entire fovereignty which every one of the contracting parties fhall enjoy.

V. The elector of Baden, duke of Berg, and landgrave of Heffe Darmftadt, take the title of grand dukes; the chief of the houfe of Naffau that of duke; and the count of Leyn that of prince.

VI. The affairs of the confederation fhall be difcuffed in a congrefs at Frankfort on the Mayne; divided into two colleges, that of the kings and that of the princes.

VII. The members of the league muft be independent of every foreign power. They cannot enter into any other fervice but that of the ftates of the confederation and its allies. Thofe who have been in the fervice of a foreign power, and choofe to continue in the fame, muft abdicate their principality in favour of one of their children.

VIII. Should any prince be difpofed to alienate the whole or any part of his fovereignty, he can only do it in favour of a confederate.

IX. All difputes are fettled in the affembly at Frankfort, where

X. The prince primate prefides. But if the two colleges

deliberate feparately, he prefides in the college of kings, and the duke of Naffau in the college of princes.

XI. The fundamental ftatute is to be framed by the prince primate.

XII. The French emperor is protector of the confederation, and names the fucceffor of the prince primate.

XIII. to XXI. Enumerate the ceffions made by members of the league: thus, Naffau cedes to Berg the town of Deufs and its territory; Bavaria acquires the imperial city of Nuremberg and its territory: and

XXII. The prince primate receives Frankfort on the Mayne, and its territory, as his property.

XXIII. and XXIV. Enumerate the lordfhips over which the members of the confederation exercife the rights of fovereignty.

XXV. They alfo enjoy the fovereignty over the imperial knightdoms included within their boundaries.

XXVI. The rights of fovereignty confift in legiflation, adminiftration of juftice, military confcription or recruiting, and levying taxes.

XXVII. Regulates the patrimonial or private property of the fubordinate princes and counts. Their domains cannot be fold or given to any prince out of the confederation, without being firft offered to the prince under whofe fovereignty they are fituated.

XXVIII. Thefe fubordinate princes and counts preferve the privilege of being tried by their peers. Their fortune cannot be confifcated, but their revenues may be fequeftrated during the life-time of the criminal.

XXIX. and XXX. Regulate the payment of debts.

XXXI. The fubordinate princes or counts may take up their refidence where they choofe, and draw their rents or capitals without any referve.

XXXII. Public functionaries not retained by the new fovereign, receive a penfion proportionate to the fituation they held.

XXXIII. The fame takes place with refpect to religious orders lofing their income.

XXXIV. The confederates renounce all reciprocal claims, except the eventual right of fucceffion.

XXXV. Between the French emperor and the confederated ftates there fhall be federatively and individually an alliance, by virtue of which every continental war in which either is engaged fhall be common to all.

XXXVI. In the event of any power making preparations for war, the contracting parties, in order to prevent furprife, fhall, upon the requifition of the minifter of one of them at the affembly of the league, arm likewife. And as the contingent of the allies is fubdivided into four parts, the affembly fhall decide how many are to be called into activity. The armament, however, fhall only take place upon the fummons of the French emperor to each of the confederates.

XXXVII. The king of Bavaria binds himfelf to fortify Augfburgh and Lindau, and to form and maintain artillery and baking eftablifhments in the faid places.

XXXVIII. The contingent of each confederate is: France 200,000 men, Bavaria 30,000, Wirtemberg 12,000, Baden 8000, Berg 5000, Darmftadt 4000, Naffau, Hohenzollern, and others 4000.

XXXIX. Admits of the acceffion of other German princes; and,

XL., as the concluding article, ftipulates the exchange of the ratifications.

Of the two principal articles of the new conftitution of the confederation of the Rhine, one relates to the eftablifhment of a fuperior court of appeal, in which all caufes between the fovereigns and their fubjects fhall be finally decided. The other ftipulates that the manufactures of each ftate fhall be allowed to be freely imported into all the other ftates of the confederacy. Several new roads are to be made in order to facilitate commerce.

CONFERENCE, in its firft and primary fenfe, denotes mutual difcourfe, and more efpecially fuch difcourfe on ferious and important fubjects. It alfo denotes an appointed meeting for difcuffing fome point, by perfonal debate; of this kind was that held at Ratifbon, in 1601, at the joint defire of Maximilian, duke of Bavaria, and Philip Lewis, elector Palatine, between fome eminent Lutheran doctors on one fide, and three celebrated Jefuits on the other. The difpute turned upon the two great points, to which almoft all the contefts between the Proteftants and the Roman Catholics are reducible, *viz.* the rule of faith and the judge of controverfies. In 1615, another conference was held at Newberg between James Heilbronner, a learned Lutheran, and James Keller, a celebrated Jefuit, by the appointment of Wolfgang William, prince Palatine, who had a little before that time embraced the Romifh faith. But the moft famous of all thefe conferences was that held in the year 1645 at Thorn, by the exprefs order of Uladiflaus IV. king of Poland, between feveral eminent doctors of the Romifh, Lutheran, and reformed churches. As this meeting was intended to heal the divifions that prevailed among thefe churches, and to difcover fome method for healing their differences, and for effecting their reunion, it was on this account called the "Charitable conference." But the iffue of this conference was very far from being favourable to the projected union. Some time after this, Erneft, landgrave of Heffe, in order to give a plaufible colour to his apoftacy from the Proteftant religion, and make it appear to be the refult of examination and conviction, obliged Valerianus Magnus, a learned capuchin, to enter the lifts with Peter Habercorn, a reformed minifter, in the caftle of Rheinfield. Befides thefe public conferences on the continent, there were others of a more private nature held, during the 17th century, between the doctors of the contending churches. The moft remarkable of thefe was the famous difpute between John Claude, the moft learned of the Reformed divines in France, and Jaques Benigne de Boffuet, whofe genius and erudition placed him at the head of the Romifh doctors in that country. This difpute, held in the year 1683, terminated, like all the reft, in widening the breach inftead of healing it. Neither of the contending parties could be perfuaded to yield; but, on the contrary, they both returned from the field of controverfy more rivetted in their own opinions, and more averfe from thofe of their adverfaries. Another conference was held at Leipfic, in 1631, between three Saxon doctors on the one fide, and fome of the moft eminent divines of Heffe-Caffel and Brandenburgh on the other, with a view of reprefenting, with fidelity and precifion, their refpective doctrines, and for the purpofe of difcovering the obftacles which prevented the union of the Lutheran and Reformed churches. The conference, however, though amicably conducted, broke up without having contributed in any refpect to promote the falutary work of peace. The conference held at Caffel in 1661, by the order of William VI., landgrave of Heffe, between two profeffors at Rintelen, on the fide of the Lutherans, and two others of the univerfity of Marpurg on that of the Reformed, was attended with much greater fuccefs than that of Thorn above mentioned: for, though it did not bring about a perfect uniformity of opinion, it produced an effect, which was

was in reality, much better, a fpirit of Chriftian charity and forbearance.

The moft famous conferences of a fimilar kind, held in England, were thofe of *Hampton-Court* in 1604, and of the *Savoy* in 1661. The former was held by order of James I., on pretence of finding expedients, which might terminate the religious difputes between the church and the puritans, and reconcile both parties. The profeffed defign of this conference was to examine the objections of the puritans againft the doctrine, government, and difcipline of the eftablifhed church, and to rectify its abufes. But the progrefs and refult of it evidently fhew, that it was the defign of the king to make an oftentatious difplay of his learning, and to mortify the puritans, who had favourable expectations from James's education in Scotland, and his profeffed attachment to the church eftablifhed in that country, but who found, in the event, that he had conceived invincible prejudices againft them. The difputants on both fides were nominated by the king. For the church, there were nine bifhops, and about as many dignitaries; and for the puritans, there were only four minifters. This conference continued three days, *viz.* Jan. 14th, 16th, and 18th. The firft day's conference was with the bifhops and deans; the puritan minifters not being prefent; when the king made a fpeech in commendation of the hierarchy of the church of England, congratulated himfelf, that he was now come into the "promifed land," &c. &c.; and informed them, that the reafon of his confulting them by *themfelves* was to receive fatisfaction from them: 1. About fome things in the Common Prayer. 2. Concerning excommunication in the ecclefiaftical courts. 3. About providing fome well qualified minifters for Ireland; that if any thing fhould be found meet to be redreffed, it might be done without their being confronted by their opponents. After fome alterations of no great importance, agreed on between the king and the bifhops, with regard to the confirmation of children, the abfolution of the church, private baptifm, and baptifm by women, and excommunication for leffer crimes, his majefty's fcruples were fatisfied; and thus ended the firft day's conference. On the fecond day, Jan. 16th, the four minifters on the fide of the puritans, together with Patrick Galloway, minifter of Perth in Scotland, and two bifhops and fix or eight deans on the other fide, were convened. The king, feated in his chair, with his nobles and privy counfellors around him, informed the puritanical minifters that he was ready to hear their objections againft the eftablifhment. Upon which Dr. Raynolds, one of their number, in the name of his brethren, humbly requefted: 1. That the doctrine of the church might be preferved pure, according to God's word. 2. That good paftors might be planted in all churches, to preach in the fame. 3. That the book of Common Prayer might be fitted to more increafe of piety. 4. That church government might be fincerely miniftered according to God's word. In the difcuffion of thefe points, Bancroft and the king took an active part. At the clofe of this day's debate, his majefty highly incenfed at the complaints ftated by Dr. Raynolds, told the minifters, that he found they were aiming at a Scots prefbytery; "which, fays he, agrees with monarchy as well as God and the devil; there Jack and Tom and Will and Dick fhall meet and cenfure me and my council. Therefore I reiterate my former fpeech: "Le Roi s'avifera." Stay, I pray, for one feven years before you demand; and then, if you find me grow purfie and fat, I may perchance hearken unto you. For that government will keep me in breath, and give me work enough. I remember how they ufed the poor lady, my mother, in Scotland, and me in my minority." Then turning to the bifhops, he put his hand to his hat and faid "my lords, I may thank you that thefe puritans plead for my fupremacy; for if once you are out and they in place, I know what would become of my fupremacy, for *no bifhop, no king*." When Dr. Raynolds faid he had nothing more to offer, the king faid, "if this be all your party have to fay, I will make them conform, or I will hurry them out of this land, or elfe worfe." On the termination of this day's conference, fome afferted that the puritans had been grofsly infulted and ridiculed, and that they had not been allowed freedom of fpeech; but the bifhops and courtiers flattered the king's wifdom and learning, and called him the Solomon of the age. Bancroft fell upon his knees, and faid, "I proteft my heart melteth for joy, that Almighty God of his fingular mercy, has given us fuch a king, as fince Chrift's time has not been." Chancellor Egerton faid, "he had never feen the king and prieft fo fully united in one perfon." The king was no lefs fatisfied with his own conduct, and boafted of his victory over the puritans. At the third day's conference, Jan. 18, the bifhops and deans were firft called into the privy-chamber with the civilians, to fatisfy the king about the high commiffion and the oath ex officio; and when the king expreffed his fatisfaction with the latter, the old archbifhop (Whitgift) was fo tranfported as to exclaim, "undoubtedly your majefty fpeaks of the fpecial affiftance of God's fpirit." A committee of bifhops and privy-counfellors was then appointed to confider of leffening the charges in the high commiffion, for planting fchools and proper minifters in the kingdom of Ireland, and on the union of England and Scotland. After which Dr. Raynolds and his brethren were called in, not to difpute, but only to hear the few alterations or explanations in the Common Prayer Book, that had been adopted; but when they expreffed their wifh that fomething further might be done, or at leaft that the furplice and crofs might not be urged, the king replied with a ftern countenance, interrupting the bifhops who were about to anfwer, "We have taken pains here to conclude in a refolution for uniformity, and you will undo all by preferring the credit of a few private men to the peace of the church; this is the Scots way; but I will have none of this arguing; therefore let them conform, and that quickly too, or they fhall hear of it; the bifhops will give them fome time, but if any are of an obftinate and turbulent fpirit, I will have them enforced to conformity." Thus ended this conference, and the opportunity for conciliation and union was loft; and this was chiefly owing to the king's pedantry and love of adulation, to his high and arbitrary principles, and to his inveterate hatred of the Puritans.

The *Savoy* conference was held in purfuance of the declaration of Charles II. Oct. 25, 1660, concerning ecclefiaftical affairs, when 12 bifhops and nine affiftants were appointed on the part of the epifcopal church of England, and as many minifters on the fide of the prefbyterians, to affemble at the bifhop of London's lodgings at the Savoy; "to review the book of Common Prayer, comparing it with the moft ancient and pureft liturgies; and to take into their ferious and grave confideration the feveral directions and rules, forms of prayer, and things in the faid book of Common-Prayer contained; and to advife and confult upon the fame, and the feveral objections and exceptions which fhall be now raifed againft the fame; and if occafion be, to make fuch reafonable and neceffary alterations, corrections, and amendments, as fhall be agreed upon to be needful and expedient, for giving fatisfaction to tender confciences, and the reftoring and continuance of peace and unity in the churches under his majefty's government and direction."

 They

They were to continue four months from the 25th of March 1661, and then present the refult of their conferences to his majefty under their feveral hands. When the conference opened on the 15th of April, fome difficulties occurred about the proper mode of proceeding; fome of the prefbyterian party were for infifting only on a few matters of importance, judging that if thefe were gained, and an union followed, it might be more eafy to obtain the others afterwards. But the majority, by the influence of Mr. Baxter, were for extending their defires to the utmoft, and thought themfelves bound by the words of the commiffion, to offer every thing which they thought might conduce to the peace of the church; but when they were put in mind, that the king's commiffion gave them no power to alter the government of the church, nor to infift upon archbifhop Ufher's model, nor fo much as to claim the conceffion of his majefty's late declaration, they were much difcouraged; for they were now convinced that all they were to expect were a few amendments in the liturgy and Common-Prayer Book. They wifhed alfo to have confulted their abfent brethren, and to have received from them a commiffion in form; but this was denied. Inftead of drawing up a few fupplemental forms and making fome amendments to the old liturgy, Mr. Baxter compofed a new one, in the language of fcripture, which he called "The Reformed Liturgy;" not with a defign entirely to fet afide the old one, but to give men liberty to ufe either according to their own choice and approbation. This was prefented to the bifhops in the conference, together with exceptions to the "old liturgy." This gave great offence, partly becaufe a liturgy, compofed by a fingle perfon in fourteen days, was fet in competition with one which had been received in the church for a whole century; and partly, becaufe it was inconfiftent with the commiffion, and the bifhops' declaration of varying no further from the old ftandard than fhould appear to be neceffary; and, therefore, the reformed liturgy was rejected at once without examination. When the prefbyterians prefented their exceptions to the liturgy, they accompanied them with "a petition for peace," befeeching the bifhops to yield to their amendments; to free them from the fubfcriptions and oaths in his majefty's late declaration, and not to infift upon the re-ordination of thofe who had been ordained without a diocefan bifhop, nor upon the furplice, the crofs in baptifm, and other indifferent ceremonies, enforcing their petition by various arguments and motives. Thefe exceptions were canvaffed, and produced a variety of alternate objections and replies. The bifhops, however, would make no conceffion to the prejudices of the prefbyterians; upon which they fent them a large expoftulatory letter, in which, after having repeated their objections, they lay the wounds of the church at their door. The term for the treaty being almoft fpun out in a paper controverfy, about 10 days before the commiffion expired, a difputation was agreed on, to argue the neceffity of alterations in the prefent liturgy. Three of each party were chofen to manage the argument. The difpute, however, terminated without effect. From arguments the prefbyterian minifters defcended to intreaties, and befought the bifhops to compaffionate fcrupulous minds, and not to defpife their weaker brethren; to all which the bifhops replied, that they were only commiffioned to make fuch alterations in the liturgy as fhould be neceffary, and fuch as fhould be agreed upon. Mr. Baxter fays, that the bifhops would not abate the fmalleft ceremony, nor correct the groffeft error, for the peace of the church. Thus the king's commiffion expired July 25, and the conferences ended without any profpect of accommodation. It was agreed at the conclufion, that each party might reprefent to his majefty, that they were all agreed upon the ends of the conference, which were the welfare, unity, and peace of the church, but ftill difagreed as to the means of procuring them. The bifhops thought they had no occafion to reprefent their cafe in writing, but the prefbyterian commiffioners met by themfelves, and drew up an account of their proceedings, with a petition for that relief which they could not obtain from the bifhops. Hume's Hift. vol. vi. 10. 13., vol. vii. 369.

CONFERVA, in *Botany*, a name occurring in Pliny for a water plant, fuppofed to be C. rivularis of Linnæus, fo called, he fays, *a conferruminando*, becaufe it clofely adheres together, Linn. gen. 1207. Schreb. 1672. Juff. 6. Vent. 2, 32. Clafs and order, *cryptogamia algæ*. Nat. Ord. *Algæ*. Linn. Juff. Vent.

Gen. Char. Fibres fimple, uniform, capillary, filamentous." Linn. "Filaments capillary, fimple or branched, jointed; joints numerous, often unequal." Lam. Vent. "Seeds produced within the fubftance of the capillary or jointed frond, or in clofed tubercles united with it." Dr. Smith.

Species. I. *Simple.*

* *Immerfed.*

† *In falt water.*

1. C. *confervicola*. Conferva upon conferva. Dillw conf. 8. Dill. Mufc. 552. tab. 85. fig. 21. "Filaments fimple, minute, fomewhat crowded, acute; partitions obfcure; joints cylindrical, unequal in length." Dillw. *Filaments* rarely more than an eighth of an inch long, of a dark glaucous colour, tapering. Common in the lateft months of autumn on various fuci and confervæ. 2. C. *flacca*. Dillw. 49. "Filaments fimple, very flender, minute, flaccid; partitions tranfparent; joints very fhort." Growing in loofe patches of a green colour, about half or three-fourths of an inch long. *Joints* fcarcely half fo long as broad. Parafitical on confervæ, and the fmaller fuci in the neighbourhood of Swanfea. 3. C. *fucicola*. Velley Mar. Plant. Pl. 4. Dillw. 66. Wither. 4. 136. "Filaments cluftered, fimple, obtufe; partitions tranfparent, flightly contracted; joints rather long." Dillw. *Filaments* very numerous, thickly cluftered at the root, diverging while in the water, from four to fix lines long, of a dirty yellow or brown colour, fomewhat gloffy when dried. *Joints* about twice as long as broad, filled with minute granules. Parafitical on fucus veficulofus, and fometimes on nodofus. 4. C. *curta*. Dillw. 76. "Filaments cluftered, fimple, fomewhat cartilaginous or horny, erect, fhort, attenuated at both ends; partitions tranfparent, flightly contracted; joints rather fhort." *Filaments* feldom more than three or four lines long, of an olive-brown colour, obtufe, growing in roundifh ftiff tufts. *Joints* not much longer than thick. Parafitical on fuci. 5. C. *carnea*. Dillw. 84. "Filaments fimple, cluftered, fomewhat knotty, flefh-coloured; joints rather fhort, attenuated at both ends; juice collected into folitary globules." *Filaments* from a quarter to half an inch long, rather obtufe. *Partitions* dark-coloured. *Joints* fometimes about twice the length of the diameter, fometimes little more than the length; colourlefs, except where the juice is collected. Parafitical in loofe tufts on other confervæ. 6. C. *capillaris*. Linn. Sp. Pl. 14. Lam. 14. Dill. p. 25. tab. 5. fig. 25. A. Dillw. 9. (C. linum; Flor. Dan. 771. C. paluftris, five filum marinum Anglicum. Rai. Syn. p. 60. n. 16.) "Filaments fimple, cylindrical, rather rigid, curled, entangled, brittle; partitions tranfparent; joints cylindrical, fhort; capfules feffile." *Filaments* three or four feet long, about the thicknefs of large thread, pale yellowifh green, entangled, but never adhering together; perfectly flaccid after it has been expofed a few minutes to the

the air. *Partitions* quite tranſparent, with a thin blackiſh line on each ſide. *Joints*, when dry, generally appearing alternately compreſſed. Found in the ditches and ſtagnant pools of ſalt marſhes. 7. C. *tortuoſa*. Dillw. 46. "Filaments ſimple, rather rigid, entangled, ſlender; partitions tranſparent; joints cylindrical, rather long." Reſembling the preceding ſpecies in miniature. *Filaments* as fine as human hair, leſs brittle than thoſe of C. capillaris; joints nearly twice as long as broad. Found in ſalt-pools, and on rocks in the ſea. 8. C. *ærea*. Dillw. 80. "Filaments ſimple, rather rigid, nearly ſtraight; partitions glaſſy-tranſparent, contracted; joints oblong, ſhort." *Filaments* ſeveral from the ſame root, from ſix to fifteen inches long, ſometimes nearly the thickneſs of a crow quill, generally about that of large thread, dark or blueiſh green, brittle. *Joints* not ſo long as broad, rounded at each end. On ſtones in the ſea.

†† *In freſh water.*

9. C. *ſordida*. Dillw. 60. "Filaments ſimple, ſlender; partitions ring-like; joints rather long, tranſparent." *Filaments* very long, extremely ſlender, entangled. *Joints* about four times as long as thick. In ponds, pools, and ditches frequent. In ponds forming a ſemi-tranſparent cloud-like maſs round the graſs or reed on which it grows, of a yellowiſh green colour. In ſmall currents, floating, in denſer maſſes, on the ſurface. 10. C. *inflata*. Smith Eng. Bot. 1670. Conjugata inflata; Vaucher conf. 68. tab. 5. fig. 8. "Filaments ſimple; joints three times as long as broad; when fertile, ſwelling and elliptical." *Filaments* but the 700th part of an inch in diameter, tranſparent, almoſt colourleſs. *Joints* at firſt exactly cylindrical, marked with green colouring matter in ſpiral lines; afterwards ſwelling, elliptical, each protruding a lateral tube, ſo as to unite with ſimilar tubes of a neighbouring plant. The colouring matter of one joint paſſes into the other, its ſpiral appearance being entirely loſt. At length each joint which has received it ſwells ſtill more, growing quite elliptical, and filled with a ſolid green body, which M. Vaucher has proved to be a ſingle ſeed, producing in due time a ſolitary young plant. Theſe appearances cannot be perceived without the aid of a microſcope. Found by Mr. W. Boner at Henfield in Suſſex. 11. C. *punctalis*. Dillw. 51. "Filaments ſimple, ſlippery, very ſlender; partitions obſcure; joints rather ſhort, cylindrical; juice finally collected into ſolitary globules." *Filaments* from one to two inches long, ſo ſlender, as, when ſingle, ſcarcely to be diſtinguiſhed by the naked eye. In ditches and pools not unfrequent. 12. C. *bipunctata*. Dillw. 2. Smith Eng. Bot. 1610. Roth Cat. Bot. ii. p. 204. (C. ſtellina: Muller in Nov. Act. Pet. iii.) "Filaments ſlippery, yellowiſh, joints ſhort, cylindrical, with two ſpots." *Joints* remarkable in having each two dark ſpots, frequently furniſhed with a green longitudinal ſtreak running through them; theſe ſpots ſometimes fill nearly the whole, ſometimes only a ſmall portion of the joint, and, when verging upon decay, aſſume a ſtellated appearance; but are not viſible without the aid of a microſcope. 13. C. *nitida*. Dillw. 4. Flor. Dan. tab. 819. (C. rivularis; Hudſ. Flor. Ang. 1. β. C. fericea-craſſior & varie extenſa. Dill. p. 13. tab. 2. fig. 2. C. decimina; Mull. nov. act. Pet. iii. C. ſetiformis; Roth. Cat. Bot. Faſc. 1. p. 171. 2. p. 103. Byſſus paluſtris confervo des, Mich. Gen. tab. 89. fig. 6.) "Filaments ſimple, ſhining, ſlippery; joints rather long, cylindrical; granules of the fructification doubly ſpiral." *Filaments* a foot or more long, about the thickneſs of a human hair, dark green, growing at the bottom of the water in looſe irregular patches, not ſufficiently matted as to contain air bubbles, nor ſo much entangled as in many others. 14. C. *ſpiralis*. Dillw. 3. Smith Eng. Bot. 1656. Roth Cat. Bot. ii. p. 202 (C. quinina; Mull. act. nov. Pet. iii.) "Filaments ſimple, ſlippery; joints cylindrical; rather long; granules of the fructification, ſimply ſpiral." *Filaments* longer and more ſlender than thoſe of nitida, anaſtomiſing like thoſe of C. inflata. 15. C. *jugalis*. Dillw. 5. Flor. Dan. tab. 883. (C. ſcalaris; Roth. Cat. Bot. ii. p. 196.) "Filaments ſimple, flaccid, often conjugate by pairs; granules of the fructification doubly ſpiral; finally collected into globules." In pools and ditches. Mr. Dillwyn ſtrongly ſuſpects, that C. nitida (n. 13.), is only the preſent plant in an earlier period of its growth. 16. C. *genuflexa*. Dillw. 6. Roth. Cat. Bot. ii. p. 199. (C. ſerpentina; Mull. nov. act. Pet. iii.) "Filaments ſimple, very ſlender, brittle, here and there knee-bent and conjugate; joints rather long, cylindrical; granules collected into lines." Filaments as far as can be judged, conſidering their brittleneſs, not more than one or two inches long, anaſtomiſing occaſionally at very uncertain diſtances, and only where they are geniculate, not regularly paired as in C. jugalis, but connecting themſelves with any other that is near them, and manifeſting a ſtrong affinity to the next ſpecies. In pools and ditches. 17. C. *reticulata*. Linn. Sp. Pl. 11. Lam. 11. Smith Eng. Bot. 1687. Dill. p. 20. tab. 4. fig. 14. (Hydrodictyum; Vaucher Conf. 88. tab 9.) "Filaments united into the form of a tubular net." *Filaments* green, tubular, forming a very delicate net, open at both ends; meſhes generally with five ſides, ſometimes with four or ſix. M. Vaucher found the old plants in a ſtationary condition during winter; but in ſpring the joints ſwelled, and gave out ſimple cylindrical maſſes of green matter. Each maſs ſoon became a reticulated tube, which in two or three months grew to the full ſize of the parent plant. It grows looſely, floating in ſtill water: but not very common. 18. C. *rivularis*. Linn. Sp. Pl. 1. Lam. 1. Dillw. 39. Smith Eng. Bot. 1654. (C. compacta; Roth. Cat. Bot. i. p. 170. C. fluviatilis fericea, vulgaris & fluitans; Dill. p. 12. tab. 2. fig. 1. C. Plinii Rai. Syn. p. 58.) "Filaments ſimple, dark green, ſlender, very long, very denſely compact, frequently twiſted; joints rather ſhort." Filaments often two or three feet long. 19. C. *lucens*. Dillw. 47. Smith Eng. Bot. 1655. "Filaments ſimple, ſlender, glaucous, ſlippery; joints ſhortiſh; granules collected in faſciæ." Filaments ſeldom more than three inches long, tapering. On rocks and ſtones in clear rapid rivulets. 20 C. *diſſiliens*. Dillw. 63. "Filaments ſimple, ſtraight, brittle; partitions but little contracted, often looſe; joints ſhort, with a dark ſpot in the middle." Filaments from three to ſix inches long, leſs than a human hair in diameter, dark green, often breaking at the partitions and remaining connected at one extremity; joints about half as long as thick. In ditches on reeds and other aquatic vegetables. 21. C. *pectinalis*. Dillw. 24. Smith, Eng. Bot. 1611. Mull. nov. act. Pet. iii. (C. bronchialis; Roth. Cat. Bot. i. p. 186.) "Filaments ſimple, tranſparent, broken, acuminate; partitions often looſe; joints very ſhort, cryſtalline-tranſparent in the middle." *Filaments* ſeldom half an inch long, dirty green, to the naked eye reſembling decayed vegetable matter, when entire gradually tapering to a point, and bearing ſome reſemblance to the antennæ of a lobſter, frequently breaking at the partitions, and remaining connected at one extremity. *Joints* appearing coloured at each end by a green fluid, which, as the plant approaches to decay, collapſes, ſometimes forming into ſmall globular maſſes, and ſometimes diſappearing entirely. In rivers and ſtagnant waters, adhering to decaying wood and vegetables. 22. C. *flocculoſa*. Dillw. 28. Roth. Cat. Bot. p. 192. tab. 4. fig. 4. and tab. 5. fig. 6. "Filaments moſt commonly ſimple, minute; partitions looſe; joints priſmatic, alternately refracted." *Filaments* ſeldom more than a quarter of an inch long,

 varying

varying from a pale to a greenifh brown. *Joints* with a double line running through the middle, and frequently with fome tranfverfal bands; as they adhere to each other only in a fingle point, and always at alternate ends, they give the plant the appearance of a ftring of parallelograms, united at the corners. It might be taken for a much broken piece of C. pectinalis, but the joints cannot be fo difpofed as to form one regular line. In pools and flow ftreams, adhering to decaying vegetables and to other confervæ, efpecially to C. glomerata. 23. C. *fontinalis*. Linn. Sp. Pl. 2. Lam. 2. Flor. Dan. tab. 651. fig. 2. Dillw. 64. (C. minima byffi facie; Dill. p. 14. tab. 12. fig. 3.) "Filaments fimple, cylindrical, truncate, dark green, fafciated; partitions obfcure; joints very fhorts." *Filaments* without any apparent root, equally obtufe at both ends. Common in rivers, pools, and ditches, generally floating in irregular maffes on the furface. 24. C. *limofa*. Dillw. 20. (C. gelatinofa, omnium tenerrima et minima aquarum limo innafcens; Dill. p. 15.) "Filaments fimple, very flender, fhort, mucous, denfely compact, blueifh green, flippery; partitions indiftinct." Common on the muddy edges of rivers, ditches, and ponds, reprefenting to the naked eye, except at the margin, where it is fibrous, a widely expanded, thin, fhapelefs gelatinous mafs, fometimes floating at the top of the water. In either cafe the only mode to examine it, is to carry it home, without allowing it to dry, and to put it in a pan of water, where, in the fpace of a night, it will fhoot out an immenfe number of threads, vifible to the naked eye only from their number; thefe viewed through a microfcope appear obtufe at each end, and croffing each other without any regular order. Mr. Dillwyn is inclined to think that this is only the laft fpecies in a younger ftate; the principal difference is in the fize and colour; in C. fontinalis the filaments are much larger, browner, and not gloffy; the joints alfo are far more diftinct, and more regularly difpofed. 25. C. *violacea*. Hudf. Flor. Ang. p. 592. (C. confragofa; Lightf. Flor. Scot. p. 976. Dill. p. 15. tab. 2. fig. 4.) "Filaments fimple, equal, violet." *Filaments* about half an inch long, of a beautiful violet or indigo colour, of a flippery mucous fubftance, fo extremely fine as to be undiftinguifhable by the naked eye, and fo crowded together as to form, when moift, a gelatinous mafs, and when dry, a membranous lamina. Found by Lightfoot on the rocks in the waterfalls of the mountain of Goatfield in the Ifle of Arran, and faid by Dillenius to grow in Alpine rivulets near Llanberis. 26. C. *echinulata*. Smith Eng. Bot. 1378. "Glaucous, ftems fimple, fpreading every way from a centre, and forming a globe." Sent by the Rev. Mr. Davies from a lake in Anglefea. It covers the furface of the water in the months of June and July, and confifts of innumerable minute globules of a glaucous or verdigreafe green, all nearly of a fize. When examined with a microfcope each globule appears to be compofed of a number of fimple cylindrical fhort filaments apparently fpringing from a folid centre. Under a very high magnifier thefe filaments are found to be formed of fhort uniform joints, each of which is of an equal thicknefs throughout, but the upper ones gradually diminifh in fize. Mr. Dawfon Turner fuggefts that this minute vegetable ought probably to be referred to Roth's new genus rivularia, to which ulva incraffa and U. pruniformis of Englifh botany belong. Thofe fpecies are of a pulpy fubftance, cloathed with jointed filaments.

** *Not immerfed.*

27. C. *ericetorum*. Dillw. 1. Smith Eng. Bot. 1553. Roth Cat. Bot. ii. p. 206. "Filaments fimple, flender, proftrate, denfely entangled; partitions fcarcely contracted; joints about as long as they are broad." *Filaments* from half an inch to an inch long, of a dull purple colour, covering the moift fandy earth in large patches. Common on moift heaths. 28. C. *muralis*. Dillw. 6. Smith Eng. Bot. 1554. "Filaments fimple, very flender, proftrate, denfely entangled, fomewhat rigid; joints very fhort, flightly fwelled; partitions obfolete." *Filaments* about an inch long, fcarcely difcernible by the naked eye, covering the fubftances on which they grow with a fine clofe green mat. Common upon damp walls, ftones, and neglected fhady walks. 29. C. *decorticans*. Dillw. 26. "Filaments fimple, clofely interwoven, glaucous; partitions obfcure; joints fhort." *Filaments* growing in large patches fo intimately interwoven as to peel off in flakes, bearing a confiderable refemblance to a piece of filk or ribbon. It differs from C. muralis in its much greater tenacity and darker colour. Not unfrequent on damp walls and ftones.

II. *Compound.*

* *Immerfed.*

† *In falt-water.*

30. C. *polymorpha*. Linn. Sp. Pl. 17. Dillw. 44. (C. marina geniculata nigra palmata; Dill. p. 32. tab. 6. fig. 35. Ceramium faftigiatum. Roth Cat. Bot. ii. p. 175.) "Filaments dichotomous, faftigiate, fomewhat cartilaginous; joints fhort; capfules on the upper branchlets, egg-fhaped, feffile." *Filaments* about the thicknefs of horfe hair, repeatedly dichotomous, with rather acute angles, of a dark purple colour when young, afterwards becoming black. Common on the larger fuci, moft commonly on F. nodofus, in thick tufts, two or three inches long. 31. C. *lanuginofa*. Dillw. 45. "Filaments nearly fimple, very minute; of a rufty colour; joints rather long, pellucid in the middle; capfules feffile, unilateral." In the fea, adhering to other confervæ. 32. C. *nigra*. Hudf. Flor. Ang. p. 595. "Filaments equal, branched, very long; branches alternate, many-cleft, very fhort." *Filaments* five inches long, black, ftiffifh; branches fafciculated. On the Yorkfhire coaft. 33. C. *byffoides*. Dillw. 58. Eng. Bot. 547. "Filaments more than twice pinnated; branches and branchlets alternate; uppermoft ones extremely fhort, fomewhat fafciculate; partitions from the union of the veins; joints rather long; capfules egg-fhaped, feffile." *Filaments* extremely flaccid, zig-zag, tranfparent, beautifully ftriated by longitudinal veins, each of which arch over at or near the fame place, and appear to form the partition. Common on moft of our fhores, from three to five inches long, varying in colour from a reddifh brown to a light or purplifh red. 34. C. *parafitica*. Hudf. Flor. Ang. p. 604. Eng. Bot. 1429. "Filaments branched; branches doubly and alternately pinnated; capfules axillary, folitary, oblong." *Filaments* an inch long or more, purplifh, brown, flender, cylindrical, with the fame jointed and tubular ftructure as the preceding. Parafitic on fuci, found rarely on the coaft of Yorkfhire, Devonfhire, and Cornwal. Dr. Smith obferves that the laft two fpecies have the jointed ftructure of conferva, but agree better with the character of fuci in their fructification. The fame obfervation will apply to feveral of the following fpecies. 35. C. *nigrefcens*. Hudf. Fl. Ang. p. 602. Smith Eng. Bot. 1717. "Filaments much branched; branches alternate, elongated; ultimate ones fhort, crowded, awl-fhaped; joints rather broader than long, compound." *Filaments* from four to fix inches long, blackifh. *Joints* a little contracted, confifting of a circular double feries of numerous parallel tubes, fimilar to thofe of C. byffoides. Mr. Stackhoufe is faid to have found the fructification in fmall lateral nodules on the coaft of Scotland, Devonfhire, and Cornwal. 36. C. *fufca*. Hudf. 602. "Fila-

"Filaments much branched; branches and branchlets alternate, fimple." *Filaments* three or four inches long, dark brown or reddifh; branches long; branchlets fhort, diftant. *Fructifications* terminal and lateral, feffile, fmall, roundifh, cluftered. 37. C. *mertenfii.* Smith Eng. Bot. 999. "Filaments much branched; branches oppofite, pinnated; joints fhort; capfules minute, acorn-fhaped, on fhort peduncles." In habit refembling fucus wigii. *Filaments* about three inches long, pale yellow, pinnated from their very origin; pellucid; branches fhort, diftichous, horizontal, generally fimple. *Partitions* darker, and thence vifible. *Capfules* vifible only with a good glafs. Found on the beach near Yarmouth. Mr. Dawfon Turner. 38. C. *fucoides.* Hudf. Fl. Ang. p. 603.—Dillw. 75. Eng. Bot. 1743. "Filaments capillary, fomewhat cartilaginous, much branched; partitions from the union of the nerves; joints compound, fhortifh, ftriated; capfules folitary, egg-fhaped, feffile." *Filaments* from two or three inches to a foot long, reddifh-brown, becoming darker and almoft black with age, remarkably thick and bufhy in its growth, ultimate branches awl-fhaped, all alternate. *Joints* of the ftem and principal branches three times as long as broad; of the branchlets about as long as broad, each confifting of a fimple circular feries of numerous parallel tubes. *Capfules* terminal and lateral, fmall, obtufe, difcharging their feeds at the fummit. On rocks and ftones in the fea, frequent. 39. C. *atrorubefcens.* Dillw. 70. "Filaments branched, ftriated; branches elongated, generally alternate, branchlets fhort, awl-fhaped, fafciculated; capfules egg-fhaped, peduncled." *Filaments* from four to nine inches long, the thicknefs of fmall thread, growing feparately, varying from a light purple to a dufky red, and becoming black with age or by drying, ftriated under the microfcope by longitudinal fpiral veins, which arch over at or near the partitions, and at firft fight appear to form them. *Joints* in the principal branches often more than twice as long as broad, in the branchlets about equal in length and breadth. *Capfules* either lateral or terminal. In the fea, adhering to rocks, ftones, and fhells. 40. C. *rofea.* Smith Eng. Bot. 966. Dillw. 17. (Ceramium rofeum. Roth Cat. Bot. ii. p. 182.) "Filaments repeatedly branched; branches and branchlets alternate, approximate; partitions tranfparent, a little contracted; joints oblong; capfules unilateral, feffile, fomewhat globular." *Filaments* from an inch and a half to three inches long, in their thickeft parts nearly as fine as human hair, fo fine near their tips as to be fcarcely vifible, very flaccid, when floating in water refembling beautiful feathers, rofe-coloured. In the fea, on rocks, fuci, and other fubftances. 41. C. *coccinea.* Hudf. Flor. Ang. p. 603. Eng. Bot. 1055. Dillw. 36. (C. plumofa. Lightf. 996. Ellis Philof. Tranf. vol. lvii. 425. tab. 18. fig. c. c. d. D. Ceramium hirfutum. Roth Cat. Bot. ii. 169. tab. 4.) "Filaments fomewhat cartilaginous, much branched; main ftem rough with hairs; branches alternate, more than twice alternately pinnated; extreme branchlets fafciculated, pencil-fhaped; partitions obfcure; joints fhort; capfules egg-fhaped." *Main ftem* nearly as thick as common twine, folitary, moftly of a darker red than the branches. *Partitions* fcarcely perceptible in the main ftem and larger branches, but very apparent in the fmaller ones, dividing them into fhort tranfparent joints. *Capfules* bright red early in fpring, becoming gradually darker, and in May difcharging the feeds by an aperture at the tip. On rocks and ftones in the fea common. 42. C. *turneri.* Smith Eng. Bot. 1637. "Repeatedly branched, very flender, tufted; ultimate branches all pectinated on the upper fide; joints tranfparent, cylindrical; capfules globular, feffile between the teeth of the branches, unilateral." Pectinated *branchlets* oppofite. *Capfules* deep red, fcattering the feeds over the branches. *Seeds* large. In the fea, off the Ifle of Wight. 43. C. *plumula.* Ellis Phil. Tranf. vol. lvii. p. 426. Dillw. 50. "Filaments much branched; branches alternate, pinnated; pinnæ oppofite; ultimate branchlets unilateral; joints longifh; capfules fhort, pedicelled." Whole plant deep red, pellucid. *Partitions* dark. *Capfules* very numerous, unilateral on the ultimate branchlets, difcharging the feeds at the tip. In the fea, adhering to confervæ. 44. C. *tetrica.* Dillw. 81. "Filaments repeatedly pinnated; pinnæ and pinnulæ alternate; ultimate ones curved; joints rather long; capfules generally only one on each ultimate branchlet, globular, peduncled." *Stems* feveral from the fame callus, forming thick entangled tufts of a brownifh-red colour, fix or eight inches long, about the thicknefs of horfe hairs. On rocks and fuci in the fea. 45. C. *diaphana.* Lightf. Flor. Scot. 996. Hudf. Flor. Ang. 653. Dillw. 38. Smith Eng. Bot. 1742. (C. nodulofa. Hudf. Flor. Ang. 600. C. marina nodofa lubrica, ramofiffima et eleganter rubens. Dill. 35. tab. 7. 40.) β C. purpurafcens. Hudf. "Filaments capillary, repeatedly forked, divaricated; ultimate divifions like a pair of forceps; partitions obfolete; joints fhort, pellucid in the middle, deep red at each end; capfules lateral, folitary, globular." From two to fix inches high, prefenting to the naked eye the appearance of a feries of fmall beads, alternately coloured and pellucid. Common in the fea, on rocks, ftones, and fuci. 46. C. *rubra.* Hudf. Flor. Ang. 600. Smith Eng. Bot. 1166. Dillw. 34. (C. nodulofa. Lightf. Flor. Scot. 944. C. geniculata, ramofiffima lubrica longis fparfifve ramulis. Dill. 35. tab. 6. fig. 38. A. Ceramium virgatum. Roth Cat. Bot. i. 148. tab. 8. fig. 1.) "Filaments repeatedly branched, thread fhaped, thickly jointed; ultimate branches briftle-fhaped, forked; capfules fomewhat globular, feffile, folitary, lateral." Eighteen or twenty inches high, light red or purple, very liable to bleach. *Filaments* one or more from the fame callus, about the fize of fewing-filk; partitions dark red, more or lefs contracted; joints beautifully reticulated, pellucid towards the centre. Common on rocks and ftones in the fea. 47. C. *tetragona.* With. Bot. Arr. 34. 405. Dillw. 65. Eng. Bot. 1690. "Filaments much branched; branchlets fafciculated, fhort, generally fimple; joints ovate-cylindrical; capfules feffile, fomewhat globular." Seldom more than two inches long. *Stems* feveral from one callus, ftraight, branched on all fides, forming an irregular ovate general outline, of a light purplifh-red colour; branches fquare. Parafitical on fungi. 48. C. *elongata.* Hudf. Flor. Ang. 599. Dillw. 33. (Fucus diffufus. Hudf. Flor. Ang. 589.) "Filaments much branched, cartilaginous; branches and branchlets elongated, diffufe, briftle-fhaped veined; partitions obfcure; joints very fhort; capfules egg-fhaped, feffile." Exceeding in fize every other Britifh conferva. Main *ftem* as thick as common twine, purplifh-red; branchlets paler; partitions dark-coloured. *Capfules* fcattered fparingly on the ultimate branches. On rocks, oyfter-fhells, &c. 49. C. *littoralis.* Linn. Sp. Pl. 6. Lam. 6. Dillw. 31. (C. marina capillacea longa, ramofiffima, mollis. Dill. 23. tab. 4. fig. 19.) "Filaments much branched, very flender, zig-zag, thickly matted; branches and branchlets acuminate; partitions obfcure; joints cylindrical, fhort." *Filaments* from fix to nine inches long, of a dull olive-green colour; branches generally alternate, making an acute angle with the ftem. *Capfules* globular, fcattered irregularly on the branches, rarely found. On rocks and fuci, common. 50. C. *comoides.* Dillw. 27. Smith Eng. Bot. 1700. "Filaments capillary, zig-zag, branched; branches fcattered, fharp-pointed, but little fpreading; partitions fcarcely vifible." Nearly allied to the preceding. *Filaments* feldom more

more than an inch long, purple-brown, lying one over another, on the round pebbles in the sea, so as to have a striking resemblance to an infant's head. 51. C. *tomentosa*. Hudf. Flor. Ang. 594. Dillw. 56. (C. marina tomentosa, minus tenera et ferruginea. Dill. 19. tab. 3. fig. 13.) "Filaments much branched, very slender, thickly matted, divaricated, extreme branchlets simple; joints long." *Filaments* from three to five inches long, of a pale greenish or russet-brown colour; branches so slender as to be scarcely visible without a microscope, issuing at right angles. *Joints* at least three times as long as thick. *Partitions* dark brown. Frequent, generally parasitical on fucus vesiculosus. 52. C. *albida*. Hudf. Flor. Ang. 595. (C. marina tomentosa, tenerior et albicans. Dill. 19. tab. 3. fig. 12. C. tomentosa β. Roth.) "Filaments much branched, very slender, equal; branches simple, fasciculated, white." *Filaments* scarcely separately visible to the naked eye, pale green, soft, resembling cotton. Found in salt water, ditches, and pools in the island of Selsey in Sussex. 53. C. *setacea*. Hudf. Flor. Ang. 599. Smith Eng. Bot. 1689. Dillw. 82. (C. marina gelatinosa, corallinæ instar geniculata, tenuior. Dill. 33. tab. 6. fig. 37.) "Filaments alternately and repeatedly branched, taper-pointed, fasciculated, slippery; joints a little swelling, at least four times as long as broad; lateral shoots bearing tufts of filaments containing many globular seeds. Seldom exceeding four or five inches in length, of a rich crimson colour. On rocks and stones in the sea, not unfrequent at the latter end of summer and beginning of autumn. 54. C. *borreri*. Smith Eng. Bot. 1741. "Filaments capillary, repeatedly branched; branches alternate, spreading in two directions, zig-zag; ultimate ones fastigiate; joints cylindrical, about twice as long as broad." *Filaments* in tufts, about two inches long, of a delicate pink colour, turning orange when dry. *Fructification* unknown, but conjectured by Dr. Smith to resemble that of C. setacea. Gathered on Yarmouth beach by W. Borrer, esq. F. R. S. 55. C. *stricta*. Dillw. 40. "Filaments somewhat dichotomous, fasciculated, veined; joints long." *Filaments* in thick bundles, many from the same root, seldom more than three inches long, of a dull crimson colour, repeatedly divided. *Joints* about three times as long as broad. On rocks in the sea, at Dover and Swansea. 56. C. *rothii*. Turton's Syst. Nat. 6. 1806. Dillw. 73. Eng. Bot. 1702. (C. violacea. Roth. Cat. Bot. i. 190. tab. 4. fig. 1.) "Filaments erect, dichotomous, short, densely tufted, crimson; branches alternate; joints very short." *Filaments* very slender, from three to twelve lines long. *Joints* cylindrical, about twice as long as broad. On rocks by the sea-shore. 57. C. *corallinoides*. Linn. Sp. Pl. 15. (C. marina gelatinosa corallinæ instar geniculata crassior. Dill. 33. tab. 6. fig. 36) "Filaments dichotomous; joints thicker at the top." *Filaments* bright red or white, slippery, very tender, almost disappearing when dry. On stones on the sea-shore. 58. C. *tubulosa*. Hudf. Flor. Ang. 600. (C. marina fistulosa. Dill. 34. tab. 6. fig. 39. Ulva confervoides. Linn.) "Filaments much branched; joints oval, alternately compressed." *Filaments* from two to four inches long, yellowish green; branches knotted, hollow. On rocks, stones, and fuci. 59. C. *catenata*. Linn. Sp. Pl. 16. Lam. 16. (C. ramosa, geniculis longioribus cateniformibus. Dill. 27. tab. 5. fig. 27.) "Filaments branched, green; joints oblong, forming a kind of chain, with links alternately broader and narrower." On the coasts of Carolina, the Bahama islands, and the south of Europe. 60. C. *scoparia*. Linn. Sp. Pl. 9. Lam. 9. Smith Eng. Bot. 1552. Dillw. 52. (C. marina pennata. Dill. 24. tab. 4. fig. 23.) "Filaments much branched, rigid; branches fasciculated, ultimate divisions alternate, acuminate; partitions obscure; joints short." Whole plant of a brownish olive, changing when dry to a russet-brown colour. *Filaments* from two to six or nine inches long; upper branches longer and more clustered than the lower, giving the plant a brush-like appearance. *Joints* about as long as thick. Frequent on the sea coast on stones and pebbles. 61. C. *pennata*. Hudf. Flor. Ang. 604.—Dillw. 86. "Filaments branched; upper branches pinnated; pinnulæ nearly opposite, nearly horizontal, approximate, stiff and straight; partitions obscure; joints short; tubercles sessile, spherical." Often confounded by botanists with the preceding. *Filaments* in bushy tufts from half an inch to two inches long, olive green, brown when dry. On rocks, fuci, & corallines. 62. C. *verrucosa*. Smith Eng. Bot. 1688. "Branches irregularly scattered and subdivided, scarcely jointed, studded with rough warts." *Filaments* three or four inches long, pale reddish brown, capillary, but uneven, somewhat twisted, not perceptibly jointed, except in the youngest shoots, where an interruption of colour is sometimes perceived at intervals. Found on the coast of Hampshire and Cornwal. 63. C. *villosa*. Hudf. Flor. Ang. 603.—Smith Flor. Ang. 546.—Dillw. 37. "Filaments branched; branches and branchlets opposite, distant; joints very short: partitions obscure, villous." *Stem* from six inches to three feet high, greenish yellow, seldom more than thrice divided; hairs in whorls on about every fourth or fifth joint, extremely slender, brittle; partitions not readily discoverable except in the verticillated hairs. On submarine rocks and stones. 64. C. *ciliata*. Ellis in Philos. Trans. vol 57. p. 425. tab. 18 f. 4. H.—Dillw. 53. (C. pilosa; Roth Cat. Bot. 2. 225. tab. 5. fig. 2.) "Filaments dichotomous, incurved at the tips in a forceps-like manner; partitions beset with verticillated ciliæ, reddish at each end, pellucid in the middle; capsules somewhat globular, lateral." Filaments in bushy tufts, seldom more than two inches long, varying from a bright to a purplish red. On rocks, stones, and fuci, frequent. 65. C. *equisetifolia*. Lightf. Flor. Scot. 984.—Smith Eng. Bot. 1479.—Dillw. 54. (C. imbricata; Hudf. Flor. Ang. 603, and multifida. Hudf. 603, as appears from an authentic specimen communicated by Dr. Goodenough to Mr. D. Turner.) "Filaments much branched; branches acuminate, elongated; branchlets verticillated, short, dichotomous; joints of the branchlets long." From three to eight inches long, the thickness of a crow's quill, bright red when young, afterwards dull brown. *Stem* and branches every where cloathed with numerous whorled branchlets, which, being longer than the joints, are tiled upon each other, and give the plant a rough spongy appearance. On rocks and stones in the sea, not unfrequent. 66. C. *spongiosa*. Hudf. 596.—Dillw. 42. (Fucus hirsutus; Linn. Mant. 134.—Muscus marinus hirsutus; Moris. 3. 650. tab. 9. fig. 6.) "Filaments branched, branchlets very short, simple, imbricated on all sides; joints short; capsules oblong, pedicelled." Seldom more than three inches long, olive-coloured. *Branchlets* not whorled but disposed without any regular order, not dichotomous. *Capsules* small, on rather long pedicels, discharging the seeds at the summit. Rocks in the sea, not uncommon. 67. C. *verticillata*. Lightf. Flor. Scot. p. 984.—Smith Eng. Bot. 1718.—Dillw. 55. (C. Myriophyllum; Roth in Schraber's Journ 3. 335.) "Filaments cartilaginous, variously branched; branchlets at the partitions, verticillated, very short, incurved, frequently forked; joints about as broad as long." Four or five inches long, of a dull olive colour. On rocks and stones in the sea. 68. C. *arbuscula*. "Primary filaments thick, not jointed, naked near the bottom, much branched above; branchlets crowded, somewhat verticillated,

ſated, ſhort, branched, jointed; joints cylindrical, ſhort." About three or four inches long, of a beautiful deep-red brown colour when freſh, dull brown when dry without gloſs. On ſubmerſed calcareous rocks in the north of Ireland. 69. C. *cancellata.* Linn. Sp. Pl. 10. Lam. 10.—Hudſ. Flor. Ang. p. 596.—Dill. 24. tab. 4. fig. 22. "Filaments branched; branchlets ſhort, much divided, digitate." Three or four inches long, of a pale dirty colour, irregularly branched; branches an inch and half or two inches long; branchlets capillary, numerous, incurved, leaving a hollow ſpace between them and the branch. On ſtones and rocks in the ſea. 70. C. *repens.* Dillw. 18. Smith Eng. Bot. 1608. (C. fulva; Hudſ.?) "Filaments minute, creeping, denſely matted; partitions ſcarcely contracted; joints cylindrical, twice as long as they are broad." Seldom more than three or four lines long, the thickneſs of human hair, of a more or leſs vivid red colour, inveſting the larger fuci and confervæ in minute denſe tufts like velvet or pluſh; branches and branchlets generally unilateral. 71. C. *flexuoſa.* Dillw. 10. "Filaments dichotomous, rather rigid; branches zig-gag; branchlets generally ſimple, very ſlender, alternately unilateral, ſpreading; joints cylindrical; partitions obſolete." *Filaments* in cloſely entangled maſſes, from four to eight inches long, finer than human hair, pale yellowiſh green in the branchlets, very dark green in the main ſhoots. On the ſea coaſt and in ſalt-water pools at Yarmouth. 72. C. *læte virens.* Dillw. 48. "Filaments much branched, rather rigid, curved; branchlets twice alternately unilateral; partitions pellucid; joints long." *Filaments* from three to ſix inches long, light green, irregularly branched, growing in a buſhy manner. On rocks, fuci, and corallines on the Welſh coaſt. 73. C. *diffuſa.* Dillw. 21. Roth Cat. Bot. 2. 207. tab. 7. "Filaments branched, diffuſe; branches ſomewhat dichotomous, zig-zag, remote; branchlets ſhort, approximate, obtuſe; partitions pellucid; joints rather long." *Filaments* in looſely entangled bundles, from two to ſix inches long, pale green, more rigid than in moſt other ſpecies, not collapſing when drawn out of the water. On rocks in the ſea. 74. C. *rupeſtris.* Linn. Sp. Pl. 20. Lam. 20. Dillw. 23. Smith Eng. Bot. 1699. (C. glauca; Roth Cat. Bot. 2. 208. tab. 6. C. trichodes ramoſior. Dill. 28. tab. 5. fig. 29.) "Filaments much branched, faſciculated, rigid, ſtraight, obtuſe; joints long, even; partitions but little contracted, colourleſs." From three to ſix inches long, dull green, in denſe tufts upon rocks, pebbles, or dead ſhells. 75. C. *pellucida.* Hudſ. p. 601. Smith Eng. Bot. 1716. "Filaments erect, much branched; branches moſtly ternate, cylindrical; joints even, cylindrical, four times as long as broad." Filaments about ſix inches long, green, ſhining, pellucid, ſomewhat wiry and elaſtic to the touch, naked and ſtem-like towards the bottom. On the coaſt about Yarmouth. 76. C. *fœniculacea.* Hudſ. p. 594. Dill. 16. tab. 2. fig. 8. "Filaments ſquare, much branched; branches and branchlets very long, ſcattered." *Filaments* irregularly divided like the leaves of fennel, ſoft and greeniſh when young, browniſh and ſtiffer when old. On the ſhores of Cornwal and the Iſle of Man. 77. C. *æruginoſa.* Linn. Sp. Pl. 7. Lam. 7. (C. marina capillacea brevis, viridiſſima mollis; Dill. 23. tab. 4. fig. 20.) "Filaments branched, ſoft, ſhorter than the human finger, very green." *Filaments* numerous, very fine, ſhining and ſilky when dry, retaining their elegant cærulean green colour. On fuci, not very common. 78. C. *vagabunda.* Linn. Sp. Pl. 18. Lam. 18. (C. marina trichoides, lanæ inſtar expanſa; Dill. 30. tab. 5. fig. 32.) "Filaments zig zag, much branched; branchlets very ſhort, horizontal." Floating in the water without root, pale green, joints ſo ſmall towards the extremities, as ſcarcely to be ſeen with a common lens. In ſalt water marſhes and ditches. 79. C. *ſericea.* Hudſ. p. 601. (C. trichodes virgata ſericea; Dill. 31. tab. 4. fig. 33.) "Filaments much branched, elongated; branchlets crowded, very ſlender." From four to eight inches long, pale green in ſalt water, fine green, ſofter and ſmoother in freſh water. On ſubmarine rocks; alſo in the new river near London and other freſh water rivulets.

††*In freſh water.*

80. C. *dichotoma.* Linn. Sp. Pl. 8. Lam. 8. Smith Eng. Bot. 932. Dillw. 15. (C. dichotoma ſetis porcinis ſimilis; Dill. 17. tab. 3. fig. 9. Ceramium dichotomum. Roth Cat. Bot. i. 153;) "Filaments faſciculated, ſtraight, faſtigiate, dichotomous, hollow, ſomewhat jointed; partitions obſolete; joints very long, capſules elliptical, ſeſſile." *Filaments* in denſe maſſes, about two feet long, conſiderably thicker than horſe-hair, dark green, moſt dichotomous near the top; angles of the diviſions acute; partitions ſcarcely perceptible, except in the dried plant. *Capſules* ſcattered, ſometimes ſingle, ſometimes five or ſix together. In ditches common; alſo according to Dillenius in ditches, between Greenwich and Woolwich, filled every tide with the brackiſh water of the Thames. 81. C. *furcata.* Hudſ. Flor. Ang p. 592. (C. capillacea, filamentis bifidis et trifidis.) "Filaments branched at the extremity; branches ſimple." *Filaments* long, ſimple, the greateſt part of their length, once or twice branched at the end, of a dull pale colour, white when dry. 82. C. *fracta.* Flor. Dan. tab. 946. Dillw. 14. (C. divaricata; Roth Cat. Bot. i. 179. tab. 3. fig. 1.) "Filaments much branched, matted; branches and branchlets divaricated; older joints oblong; younger ones cylindrical; capſules ſeſſile, roundiſh." *Filaments* from one to four inches long, the thickneſs of human hair, dark green, rather rigid, generally floating, in denſely entangled maſſes, on the ſurface of ſtagnant water; branches abruptly terminated, ſo as to give the plant a broken appearance. 83. C. *vivipara.* Dillw. 59. "Filaments dichotomouſly branched; branches zig-zag, bulbiferous at the partitions; bulbs terminated by a long hair; joints long; capſules lateral, ſeſſile." *Filaments* in ſmall, ſlender, buſhy tufts, commonly not more than two lines long, never exceeding half an inch, yellowiſh green; joints five times as long as thick. *Capſules* at ſome of the partitions; bulbs at the others. In boggy rivulets on ſtones, moſs, and other ſubſtances. 84. C. *gelatinoſa.* Linn. Sp. Pl. 13. Lam. 13. Smith Eng. Bot. 689. Dillw. 32. (C. fontana nodoſa ſpermatis ranarum inſtar major et fuſca; Dill. 36. tab. 7. fig. 42. Chara batrachoſperma; Weis Gott. 33. tab. 1. Batrachoſpermum moniliforme; Roth Cat. Bot. 2. 187.) "Filaments much branched, beaded, ſlippery; branchlets very ſlender, pencil-ſhaped, ſomewhat verticillated, very compound, bearing the fruit; partitions obſcure, joints rather ſhort; capſules roundiſh with many ſeeds." From one to ſix inches long, reſembling frogs ſpawn, dark purple or yellowiſh green. β minor et viridis; Dill. 37. tab. 7. fig. 43. δ. Hudſ. C. filamentis nodoſis et cæruleis; Dill. fig. 43. But from ſome ſpecimens gathered in an alpine lake on Snowden, Mr. D. Turner is dubious whether it be not a diſtinct ſpecies, its ſtems being quite hard, and its moniliform appearance very faint. In clear ſprings and ſtreams. 85. C. *mutabilis.* Roth Cat. Bot. 1. 197. Dillw. 12. Smith Eng. Bot. 1740. (C. gelatinoſa γ Hudſ. C. ſtagnalis, globulis vireſcentibus mucoſis; Dill. 38. tab. 7. fig. 44.) "Filaments much branched, gelatinous, ſomewhat beaded; branchlets compound,

pound, tufted; partitions contracted; joints short." Varying in length from half an inch to three inches, and from a light to a dark green. Main stems remarkably pale and pellucid; branches darker; joints short. In pools and ditches, not uncommon. 86. C. *atra*. Hudf. p. 597. Smith Eng. Bot. 690. Dillw. 11. (C. fontana, nodosa, lubrica, filamentis tenuissimus nigris; Dill. 39. tab. 7. fig. 46.) "Filaments much branched, beaded, somewhat gelatinous; branchlets bristle-shaped; joints dilated towards the tip, ciliated; ciliæ verticillated, imbricated." Varying in colour, during different stages of its growth, from a pale to a dark green, and finally becoming black. In clear rivulets and springs, but rare. 87. C *fluviatilis*. Linn. Sp. Pl. 12. Lam. Pl. Dillw. 29. (C. lubrica, setosa, equiseti facie; Dill. 39. tab. 7. fig. 47. C. nodosa, fucum æmulans; Dill. 37. tab. 48. C. torulosa. Roth Cat. Bot. 1. 202.) "Filaments branched, rather rigid; branches and branchlets generally alternate, attenuated each way; partitions swollen, tubercled; joints long, dilated at both ends." *Filaments* six or eight inches long, dull olive or greenish purple; sometimes nearly simple, when they are shorter, thicker, and more rigid. Dill. 48. Dillwyn has seen these different filaments growing from one root. In rapid, rocky streams. 88. C. *lubrica*. Dillw. 57. "Filaments much branched, slender, very long, shining, slippery; branches thorn-like; joints rather short." *Filaments* from six inches to near a foot long, green, with a slight tinge of blue, branches scattered, forming an acute angle with the stem. In clear rivulets attached to stones and wood in large gelatinous masses. 89. C. *protensa*. Dillw. 67. "Filaments much branched; branches diffuse, much lengthened out, pellucid at the tip; joints rather long." *Filaments* from two lines to a half or three quarters of an inch long, light green. In rivulets and springs, on stones and aquatic plants. 90. C. *glomerata*. Linn. Sp. Pl 19. Lam. 19. Flor. Dan. tab. 651. fig. 2. Dillw. 13. (C. fontinalis ramosissima glomeratim congesta. Dill. 28. tab. 5. fig. 31. C. cristata; Roth Cat. Bot. 1. p. 193. 2. p. 220.) "Filaments much branched; branches alternate; branchlets unilateral, fasciculated, pencil-form; partitions pellucid; joints cylindrical, rather long." *Filaments* from two or three inches to a foot long, yellowish green. On stones and wood in clear rivers and streams. 91. C. *rigida*. Hudf. Flor. Ang. 594. (C. fluviatilis fibrillosa subrigida; Dill. 21. tab. 4. fig. 16.) "Filaments much branched, rather rigid; branchlets alternate, very short." *Filaments* several from the same base, so as to have a clustered appearance, and sometimes to cover the pebble to which they are attached, dull green, often inclining to brown. Somewhat hairy; branchlets most numerous near the summits of the filaments. In clear streams. 92. C. *canalicularis*. Linn. Sp. Pl. 4. Lam. 4. (C. rivulorum capillacea densissime congestis ramulis; Dill. 21. tab. 5. fig. 15.) "Filaments most branched near the base; branches long." *Filaments* one or two inches long, slender, deep green, simple or but little branched above the middle, of a spongy soft substance, densely matted together so as to resemble a piece of velvet, soft and herbaceous when fresh, but when dry blackish, and acquiring almost a stony hardness from the mud adhering to it. In pure streams and mill-pond water spouts. 93. C. *bullosa*. Linn. Sp. Pl. 3. Lam. 3. (C. palustris bombycina; Dill. 18. tab. 3. fig. 11. "Filaments branched, matted, inclosing air bubbles." *Filaments* from three to nine inches or a foot long, slender, dull yellowish green. In clear waters, soft, somewhat silky, and of a livelier green; in stagnant muddy waters, paler, tomentous, resembling dirty cotton. Professor Martens is of opinion that C. fracta is the plant intended by Linnæus, and since called C. bullosa; but Mr. Dillwyn observes that the specimen in Dillenius's herbarium, here described, is certainly another species, and agrees with Mr. D. Turner in thinking, that several distinct plants which have the property of retaining bubbles of air have been confounded by authors, and consequently that the confervæ bullosæ are a family and not a species. These confervæ when dried have been used as wadding for stuffing garments, and have been woven into coarse household linen. 94. C. *distorta*. Flor. Dan. tab. 820. Dillw. 22. "Filaments branched, jointed, fasciated with transverse lines; branches and branchlets distorted; partitions obsolete; joints short." *Filaments* about half an inch long, extremely slender, of a beautiful dark green colour varying to a lighter colour as they approach to decay; branches seldom numerous, but with a very peculiar twist at their ramifications. Parasitical in short thick tufts on decaying grass, attached to small pieces of which it frequently floats on the surface of the water. Hitherto found in Great Britain, only by Mr. Dillwyn, in a boggy pool on Sketty Burroughs, near Swansea. 95. C. *ægagropila*. Linn. Sp. Pl. 21. Lam. 21. Smith Eng. Bot. 1377. Dillw. 87. "Filaments much branched, clustered into a globe and divaricating from the centre; branches and branchlets nearly unilateral, straight, obtuse; joints long, cylindrical." From the size of a pea to three or four inches in diameter, always pretty exactly spherical, hollow within, without any solid body, or root, to which the filaments might originally have been attached. The specific name alludes to the hairy balls found in the stomach of goats. In lakes lying in great abundance at the bottom of the water. 96. C. *nana*. Dillw. 30. "Filaments branched, very minute; branches and branchlets generally alternate, acuminate; partitions pellucid; joints cylindrical." *Filaments* seldom much more than half a line long, of a pale brown colour tinged with brown, resembling C. littoralis in its ramification, and remarkably acuminate branches. Parasitical on decayed confervas, &c. in rocky rivers. 97. C. *typhloderma*. Dillw. 83. "Filaments nearly simple, densely matted; partitions obscure; joints short." The extreme tenuity and entangled growth of the filaments makes it impossible to ascertain their length; their colour is a dull olive green. Observed in a bottle which contained a solution of gum dragon in water, the surface of which was covered with a mass of filaments so densely interwoven as to form a film about two lines in thickness, bearing a considerable resemblance to the skin of a mole. 98. C. *ochracea*. Dillw. 62. Roth Cat. Bot. 1. 65. tab. 5. fig. 2. "Filaments much branched, very slender, very brittle, closely compact, constituting an ochraceous jelly, which at length breaks into fragments of separate filaments." The filaments are so extremely fragile that the slightest touch or any considerable agitation of the water breaks them into a thousand pieces, which at first remain suspended, and afterwards sink to the bottom in the form of an ochraceous powder. In this state only can the plant be examined, but the fragments are so small that it is impossible to ascertain their original length, and under the highest magnifiers their thickness scarcely seems equal to that of the human hair. In pools and ditches common, of a dull yellow colour. 99. C. *lactea*. Dillw. 79. Roth Cat. Bot. 1. p. 216. 3. p. 292. (C. pusilla; Roth Flor. Germ. 1. 524.) "Filaments much branched, gelatinous, slippery; branches rod-like, alternate from each partition; partitions contracted; joints very long, glassy-transparent." *Filaments* growing in gelatinous masses at the bottom of ditches and rivulets, from half an inch to three or four inches long, of a dirty white colour; branches clustered, so as to give them a brush-like appearance; partitions of a dusky colour. *Joints* at least ten times longer than

than thick. 100. C. *myochrous.* Dillw. 19. Smith Eng. Bot. 1555. "Filaments very denfely matted, branched; branchlets fimple, generally unilateral, in pairs, incurved." *Filaments* fometimes quite fimple, generally branched, feldom more than half an inch long, as fine as the fineft wool. On the rocky beds of torrents in the vale of Beddgelert, in Caernarvonfhire, matting the ftones with a velvety covering, three or four lines in diameter, of a dark gloffy brown colour, foft to the touch, which, when taken out of the water, might be compared to the fkin of a moufe. 101. C. *veficata.* Dillw. 74. Muller in Nov. Act. Pet. 3. "Filaments branched, fomewhat jointed, rigid: veficles innate, folitary, elliptical, broader than the filament; capfules generally in pairs, pear-fhaped on fhort peduncles." *Filaments* in bufhy maffes at the bottom of the water, fo extremely brittle that their length cannot eafily be afcertained, yellowifh green, cylindrical, filled with minute granules which iffue from them when broken; very rough to the touch; branches few, diftant, generally making an obtufe angle with the ftem. *Stems* and *branches* frequently fwollen, with bladder-like veficles, four or five times thicker than the filaments, refembling thofe of fucus nodofus. *Partitions* irregularly difpofed, always at a great diftance from each other. 102. C. *amphibia.* Linn. Sp. Pl. 5. Lam. 5. Dillw. 41. (C. amphibia fibrillofa et fpongiofa; Dill. 22. tab. 4. fig. 7. B and C). "Filaments fomewhat jointed, branched, denfely matted; branches fpreading, remote; branchlets, when not immerfed, collecting into fharp briftly points; partitions but little contracted; capfules feffile, fomewhat elliptical." β. branches elongated (C. furcata; β. Hudf. Ceramium coefpitofum; Roth Cat. Bot. 1. p. 154. 2. p. 186. C. paluftris filamentis brevioribus et craffioribus; Dill. 17. tab. 3. fig. 10.) Filaments very various in length, according to the fituation, bright green, becoming afh-coloured with age; α is the plant as it grows on the edges of ditches, and in fhallow water, where it is not wholly immerfed. In fuch fituations, it frequently occurs in maffes, fo denfely matted as to hold water like a fponge, with its furface befet by erect branches, which give it a briftly appearance. In floods, when the waters overflow the plant, the length of the filaments is gradually increafed, and forms Mr. Dillwyn's β; but when the waters fubfide, the filaments, again expofed to air, take of courfe an horizontal direction, and again throw out erect fpreading branchlets, which, on being dried, collapfe fo as to form rather ftiff points. In rivers, the branches are frequently carried out by the force of the ftream to a great length, and in that cafe do not affume a briftly appearance when expofed to air; probably owing to the lefs fpongy nature of the mafs, in confequence of which the water is not fo readily tranfmitted to the upper furface, as to enable it to make frefh fhoots. The plant has a mouldy ungrateful fmell, and is much ufed as a fhelter by aquatic infects.

* * *Not immerfed.*

103. C. *atro-virens.* Dillw. 25. "Filaments rather rigid, branched; branches divaricated, fomewhat unilateral, attenuated at both ends, rather obtufe; partitions pellucid; joints very fhort, marked with three points." *Filaments* from a quarter to half an inch long, growing in thick bufhy tufts, of a blackifh green colour, not unfrequently intermixed with mufci. On the wet rocks, forming the banks of the river Dylais, near Neath. 104. C. *frigida.* "Filaments not jointed, creeping, branched; Dillw. 16. (Ceramium Dillwynii; Roth.) "Filaments not jointed, creeping, branched; branches alternate; capfules feffile, round." *Filaments* about an inch long, a little finer than human hair, of a pale green colour, growing in loofe irregular patches, two or three inches in diameter, very flightly adhering to the foil. On the ground in moft fhady places, particularly in turnip fields, with a northern expofure, during the winter and early months of fpring. The frigida of Dr. Roth is a different plant, referred by him to Dill. tab. 4. fig. 17, A. 105. C. *umbrofa.* Dillw. 61. Roth Cat. Bot. 1. 191. tab. 4. fig. 3. (C. arenaria; Roth Cat. Bot. 2. 217?) "Filaments branched, creeping, fragile, fhort-obtufe; branches curved, fimple, fomewhat unilateral: joints long, fometimes cylindrical, fometimes inflated." Growing in fmaller patches, and of a darker colour, than C. frigida. *Filaments* fcarcely half an inch long; joints varying greatly in fhape and length. 106. C. *pallida.* Dillw. 78. "Filaments dichotomous, curved, zig-zag, faftigiate angles of the divifions roundifh; joints very long." *Filaments* confiderably finer than human hair, a light yellowifh brown, matted together into denfe leathery maffes, about an inch long, and the thicknefs of a fhilling; joints at leaft eight or ten times broader than thick. Found on fome yellow ochre, in a pot of ifinglafs fize. 107. C. *multicapfularis.* Dillw. 71. "Filaments minute, creeping, olive-coloured; branches erect, generally fimple, fhort, thickened towards the top, and bearing the capfules; capfules clustered, fpherical." *Filaments* very minute, thickly entangled, growing in fmall irregular patches. *Joints* in the creeping ftem very long; in the branches fhorteft at the bafe, and longeft towards the fummit. *Capfules* terminating the branches, difcharging the feeds at the orifice. On clayey banks, in high expofed fituations. 108. C. *ruliginofa.* Dillw. 72. Smith Eng. Bot. 1701. "Filaments creeping, branched, entangled, alternately bipinnate; branches divaricated, tapering, acute; joints elongated, cylindrical." *Filaments* creeping in loofe entangled maffes, among moffes, over dead ftalks and fticks, and along the ground, of a brown chefnut colour; branches from a quarter to half an inch long; pinnæ and pinnulæ varioufly curved, nearly at right angles with the ftem and branches; partitions almoft black; joints in the ftem and main branches three or four times longer than broad. On hedge banks. 109. C. *rubiginofa.* Dillw. 68. "Filaments much branched, rigid, rather erect; branches zig-zag, fpreading, matted together fo as to form nearly a folid mafs; joints long." *Filaments* very minute, growing in irregular patches, about an eighth of an inch in thicknefs, of a rufty brown colour, entirely deftitute of glofs. *Joints* vifible only under the higheft powers of the microfcope, about four times longer than broad. On rotten wood, fecluded from the light. 110. C. *velutina.* Dillw. 77. Smith Eng. Bot. 1556. "Filaments creeping, branched, matted; branches erect, alternate, or unilateral, curved, obtufe; joints flightly fwelling, at leaft twice as long as broad." Diftinguifhed by its fweet fcent. (See Byssus *velutina.*) Jointed ftructure firft difcovered by Mr. J. D. Sowerby. 111. C. *aurea.* Dillw. 35. "Filaments branched, gold-coloured, minute; branches long, fpreading, rather rigid, fomewhat incurved; partitions pellucid; joints longifh." (See Byssus *aurea.*) Jointed ftructure, firft difcovered by Mr. Dillwyn. 112. C. *purpurea.* Dillw. 43. "Filaments dichotomous, flexible, minute; dichotomous, branches approximate; partitions obfcure; joints longifh." (See Byssus *purpurea.*) 113. C. *lichenicola.* Smith Eng. Bot. 1609. "Filaments red, upright, crowded, alternately branched; roughifh; joints fwelling, about as long as broad." *Filaments* fcarcely a line long, forming thick tufts, and appearing to the naked eye like brick-duft. Parafitical on cruftaceous lichens.

lichens. 114. C. *muscicola.* Smith Eng. Bot. 1638. " Filaments rufty brown, upright, crowded, much and irregularly branched; joints cylindrical, twice as broad as long." *Filaments* two or three lines long, crooked, divaricated, of equal thicknefs throughout, gloffy, like human hair under a microfcope; branches afcending, obtufe, frequently unilateral. Parafitical on orthotricum ftriatum.

Obf. The term confervæ occurs, we believe, firft in the Natural Hiftory of Pliny, and was applied by him to a frefh water fpecies of the prefent genus. The name was extended to two or three fpecies by the elder modern botanifts. But this part of the fcience was not at all ftudied before the time of Dillenius, who, in his admirable " Hiftoria Mufcorum," has defcribed and figured forty-eight fpecies, partly marine, and partly growing in frefh water. Thefe he has diftributed under three *orders*, as he calls them, *viz.* 1. Equabili filo protenfæ feu non geniculatæ. 2. Geniculatæ; and, 3. Nodofæ; dividing the firft order into fimple and branched: fucceeding authors, for a confiderable time, feem to have fuppofed that Dillenius had exhaufted the fubject. Linnæus has given only twenty-one fpecies, adding only C. ægrapopila to thofe which are already defcribed by that great cryptogamift, omitting fuch as he was not able to identify, and confidering fome as mere varieties. La Marck, in Encyclopedie Methodique, has done nothing more than copy the Linnæan fpecies, in exactly the fame order. Hudfon, in the fecond edition of his " Flora Anglica," has introduced feveral fpecies, not known either to Dillenius or Linnæus. Lightfoot, in his " Flora Scotica," has alfo made one or two additions. But it is not more than fix or feven years fince rapid advances have begun to be made in the knowledge of confervæ. Mr. D. Turner and Mr. Dillwyn are now diligently employed in the inveftigation of the Britifh fpecies; feveral foreign botanifts, profeffor Roth in particular, are fuccefsfully engaged in the fame purfuit; and we are informed by Bofc, in " Nouveaux Dictionaire d'Hiftoire Naturelle," that profeffor Draparnaud of Montpellier is now bufy in preparing a Monographia Confervarum, and has already determined feveral hundred fpecies. We have been induced to confine ourfelves, with a fingle exception, to the Britifh fpecies; partly by our inability to procure all the works which are neceffary for a complete account of what has hitherto been done by foreign botanifts; but chiefly by the confideration, that the fpecies which belong to the Flora of the Britifh iflands, are the only ones acceffible to the greater part of our readers. Our knowledge of thefe plants is indeed ftill very imperfect, and no generic character has yet been formed, which is fufficiently difcriminating and comprehenfive. The jointed ftructure of the filaments has generally been confidered as an effential character; but we have been led by the high authority of Mr. Dillwyn to admit one fpecies (n. 104.) which has not this conformation. We have already feen that the fructification of feveral fpecies does not confift of *clofed tubercles*, as it is defcribed even in Dr. Smith's laft improved generic character, but of *capfules opening* at the apex, and difcharging the feeds in a manner fimilar to that obferved in many fuci. Thefe have been feparated by Dr. Roth into a diftinct genus which he calls ceramium; and it is probable that further refearches will prove the propriety of making other feparations. M. Vaucher of Geneva thinks, that he has difcovered five different modes of propagation in the plants ufually called confervæ; which has induced Decandolle to form them into fix genera. *Conferva.* Filaments cartilaginous or herbaceous, divided by partitions; feeds enclofed between the partitions, and not efcaping but by the deftruction of the tube itfelf. *Ceramium.* Filaments membranous, cartilaginous, without partitions; capfules monofpermous, adhering to the external furface of the filaments. *Vaucheria.* Filaments herbaceous, fimple or branched, without partitions; feeds attached to the exterior fide of the filaments, and generally peduncled. *Batrachofpermum.* Filaments knotty, jointed, gelatinous; knots formed of filaments, fimple or compound, between which are found feeds or fhoots (cayeux) detaching themfelves, and confifting of filaments already jointed. *Chantrania.* Filaments folid, knotty; knots feparating and becoming new plants, in the way of flips or cuttings. *Hydrodyctium.* Tube cylindrical, clofed at the two extremities, and anaftomifing into pentagonal mefhes; filaments of the pentagon fwelling at their extremities, feparating and becoming themfelves cylindrical tubes, clofed at the ends, and compofed of pentagon mefhes. The laft three genera, according to his ideas, have no proper feeds.

See fome curious experiments by Dr. Prieftley on a fpecies of conferva or water-mofs of a peculiar kind, the manner of its production, and its effect, by the concurring action of light upon it, in dephlogifticating or depurating the air to which it has accefs, and thereby increafing the quantity of it; in " Obfervations on Air," vol. iv. p. 335, &c. vol. v. § 2, 3, 4, 5. The feeds of this plant, fays Dr. Prieftley, float every where; in the air, on the earth, on the fea, on the Alps, in the plains, under the poles and the equator, in fummer and winter, and in all feafons; and they are received into the water, infinuating themfelves into veffels of water through the fmalleft apertures, where they germinate. Dr. Ingenhoufz made a variety of experiments on this fingular fubftance; from which he concludes, that the water itfelf, or fome fubftance in the water, is converted into this kind of vegetation. It is a real tranfmutation, which may appear incomprehenfible to the philofopher, but which, in reality, is not more extraordinary than the change of grafs and other vegetables into greafe in the bodies of granivorous animals, and the change of the aqueous juice of the olive into oil. Dr. Prieftley, however, obferves, that the change of water into an organized plant is a thing of a very different nature from thefe, and tends to revive the long exploded doctrine of equivocal or fpontaneous generation. Dr. Girtanner of Gottingen (fee Annales de Chemie, No. 100.) traces its formation from azot, which is a conftituent principle of bodies, in the following manner. When water is expofed to the fun the light decompofes it, and difengages the oxygen in a large quantity. The hydrogen then retains the laft portions of the oxygen; azot is formed, and announces itfelf by its green colour; the water is more and more decompofed; more of the oxygen, which, in the opinion of this writer, is the principle of life and irritability in organized nature, becomes fixed; and this azot, produced from water by means of the fun, is an organized body, the " conferva fontinalis;" a plant which lives, expands, and perpetuates its fpecies. The influence of the folar light is, he conceives, abfolutely neceffary for this converfion of water into a plant or organized azot. No degree of heat can fupply its place. Mr. Senger of Reek, in Weftphalia, has lately difcovered, that the conferva affords next to fage, one of the fitteft materials for the making of paper; in confequence of which he obtained the honour of a gratuity from the court of Berlin, and alfo a patent for the manufacture of paper from this fubftance. From his experiments it likewife appears, that the conferva, after a previous preparation, might be made a fubftitute for cotton-wool, and a fuccedaneum for feathers in beds.

CONFESS *and avoid*, in *Law*, a ſpecies of REPLICATION, in which the plaintiff introduces ſome new matter or diſtinction, conſiſtent with his former declaration; as, in an action of treſpaſs upon lands of which the plaintiff is ſeiſed; if the defendant ſhews a title to the land by deſcent, the plaintiff may either deny the fact, or *confeſs and avoid* it, by replying, that ſuch deſcent happened, but that the defendant hath ſince demiſed the lands to the plaintiff for the term of life. Blackſt. Com. vol. iii. p. 310.

CONFESSION, CONFESSIO, in *Rhetoric*, the ſame with what is otherwiſe called PARHOMOLOGY.

CONFESSION, in a *Civil Senſe*, a declaration or acknowledgment of ſome truth, though it be againſt the intereſt of the party who makes it; whether it be in a court of juſtice, or out of it. It is a maxim, that in civil matters, the confeſſion is never to be divided, but always taken entire; and that a criminal is never condemned on his ſimple confeſſion, without other collateral proofs; nor is a voluntary extra-judicial confeſſion admitted as any proof. A perſon is not admitted to accuſe himſelf, according to that rule in law, *non auditer perire volens*.

CONFESSION *of Action*, in *Law*, is a ſpecies of plea to the action, in which the merits of the complaint are anſwered, by confeſſing either wholly, or, which is moſt common, in part. A confeſſion of the whole complaint is not very uſual, for then the defendant would probably end the matter ſooner; or not plead at all, but ſuffer judgment to go by default. Yet ſometimes, after tender and refuſal of a debt, if the creditor haraſſes his debtor with an action, it then becomes neceſſary for the defendant to acknowledge the debt, and plead the tender; adding that he has always been ready, "tout temps priſt," and ſtill is ready, "uncore priſt" to diſcharge it: for a tender by the debtor, and refuſed by the creditor, will, in all caſes, diſcharge the coſts, (1 Ventr. 21.) but not the debt itſelf; though in ſome particular caſes the creditor will totally loſe his money. (Litt. § 338. Co. Litt. 209.) But frequently the defendant confeſſes one part of the complaint (by a "cognovit actionem" in reſpect of it,) and traverſes or denies the reſt; in order to avoid the expence of carrying that part to a formal trial, which he has no ground to litigate. A ſpecies of this ſort of confeſſion is "the payment of money into court;" which is for the moſt part neceſſary upon pleading a tender, and is itſelf a kind of tender to the plaintiff; by paying into the hands of the proper officer of the court as much as the defendant acknowledges to be due, together with the coſts hitherto incurred, in order to prevent the expence of any farther proceedings. This may be done upon what is called a "motion;" which is an occaſional application to the court by their parties or their counſel, in order to obtain ſome rule or order of court, which becomes neceſſary in the progreſs of a cauſe; and it is uſually grounded upon an "affidavit" (the perfect tenſe of the verb "affido") being a voluntary oath before ſome judge or officer of the court, to evince the truth of certain facts, upon which the motion is grounded: though no ſuch affidavit is neceſſary for payment of money into court. If, after the money paid in, the plaintiff proceeds in his ſuit, it is at his own peril; for, if he does not prove more due than is ſo paid into court, he ſhall be non-ſuited and pay the defendant's coſts; but he ſhall ſtill have the money ſo paid in, for that the defendant has acknowledged his due. Blackſt. Com. vol. iii.

CONFESSION *of Indictment*, is a priſoner's acknowledgment of the offence, when he is brought to the bar to be arraigned: upon a ſimple and plain confeſſion, which the court is backward in receiving and recording, nothing remains but to award judgment. This confeſſion is made before the judge; in conſequence of which, the priſoner ſubmits to the legal penalty annexed to his crime; or the priſoner, by confeſſion, becomes an approver, or accuſer of others. See APPROVEMENT.

There was alſo a third ſort of confeſſion, formerly made by an offender in felony, not in court before the judge, but before the coroner in a church, or other privileged place, upon which the offender, by the ancient law of the land, was to abjure the realm. 3 Inſt. 192. See ABJURATION.

There is alſo a confeſſion indirectly implied, as well as directly expreſſed, in criminal caſes; as if the defendant, in a caſe not capital, doth not directly own himſelf guilty of the crime, but by ſubmitting to a fine owns his guilt; upon which the judge may accept of his ſubmiſſion to the king's mercy. (Lamb. lib. iv. c. 9.) By this indirect confeſſion, the defendant ſhall not be barred to plead "Not guilty" to an action, &c. for the ſame fact; the entry of it is, that the defendant "puts himſelf on the king's mercy;" and of the direct confeſſion, "that he acknowledges the indictment." This laſt confeſſion carries with it ſo ſtrong a preſumption of guilt, that being entered on record, on indictment of treſpaſs, it ſtops the defendant to plead "Not guilty" to an action brought afterwards againſt him for the ſame matter: but ſuch entry of a confeſſion of an indictment of a capital crime, it is ſaid, will not ſtop a defendant to plead "Not guilty" to an APPEAL, it being in caſe of life. And where a perſon upon his arraignment actually confeſſes himſelf guilty, or unadviſedly diſcloſes the ſpecial manner of the fact, ſuppoſing that it doth not amount to felony, where it doth; the judges, upon probable circumſtances, that ſuch confeſſion may proceed from fear, weakneſs, or ignorance, may refuſe it, and ſuffer the party to plead "Not guilty". 2 Hawk. P. C. c. 31. § 2.

A confeſſion may be received, and the plea of "Not guilty" be withdrawn, though recorded. (Kel. 11.) The confeſſion of the defendant, whether taken upon an examination before juſtices of peace, in purſuance of the 1 and 2 P. & M. c. 13. or 2 and 3 P. & M. c. 10. upon an offender's being bailed or committed for felony; or taken by the common law, upon an examination before a ſecretary of ſtate, or other magiſtrate, for treaſon or other crimes, is allowed to be given in evidence againſt the party confeſſing; but not againſt others. Alſo two witneſſes of a confeſſion of high treaſon, upon an examination before a juſtice of peace, were ſufficient to convict the perſon ſo confeſſing, within the meaning of 1 Ed. VI. c. 12. and 5 & 6 Ed. VI. c. 11. which required two witneſſes in high treaſon; unleſs the offender ſhould willingly confeſs, &c. But the ſtat. 7 W. c. 3. requires two witneſſes, except the party ſhall *willingly*, without violence, confeſs, &c. *in open court*. 2 Hawk. P. C. c. 41. § 3.

A demurrer amounts to a confeſſion of the indictment as laid, ſo far, that if the indictment be good, judgment and execution ſhall go againſt the priſoner. (Bro. 86. S. P. C. 150. H. P. C. 246.) And in criminal caſes, not capital, if the defendant demurs to an indictment, &c. whether in abatement, or otherwiſe, the court will not give judgment againſt him to anſwer over, but final judgment. (2 Hawk. c. 32. § 7.) See ABATEMENT. Where a priſoner confeſſes the fact, the court has nothing more to do than to proceed to judgment againſt him. "Confeſſus in judicio pro judicato habetur." 11 Rep. 30. 4 Inſt. 66. 2 Hawk. P. C. c. 32.

CONFESSION, in *Theology*, denotes the verbal acknowledgment which a penitent makes of his ſins to God: in a

more partial and reftricted fenfe, it is a declaration of a perfon's fins, made to a prieft, in order to obtain abfolution for the fame. The Romifh church makes confeffion a part of the facrament of penance.

Confeffion was anciently public and general, in the face of the church; though the Romanifts have fince altered it, and made it private and auricular.

Confeffions are to be buried in eternal filence, under pain of the greateft punifhment to the prieft who reveals them. Bellarmin, Valentia, and fome other Romifh controverfial writers, endeavour to trace up auricular confeffion to the earlieft ages; and thus contend for a point given up by the reft. M. Fleury owns, that the firft inftance of auricular confeffion he can meet with, is that of St. Eloi, who, being grown old, made a confeffion to a prieft of all his fins from his youth upwards.

Secret confeffion was firft decreed and eftablifhed in the 4th council of Lateran, under Innocent III., in 1215, cap. 21. And the decree of this council was afterwards confirmed and enlarged in the council of Florence, and in that of Trent (feff. 14. cap. 5.), which exprefsly ordains, that confeffion was inftituted by Chrift, and that by the law of God it is neceffary to falvation; and that it has been always practifed in the Catholic church. Hard. Concil. tom. vii. p. 35. and tom. x. p. 92. See Popery.

The Indians, according to Tavernier, have a kind of confeffion; and the fame may be faid of the Jews: thefe laft have formulas for thofe who are not capable of making a detail of all their fins: the ordinary form is in alphabetical order, each letter containing a capital fin. This they ufually rehearfe on Mondays and Thurfdays, and on faft-days, and other occafions; fome every night and morning. When any of them find themfelves near death, they fend for ten perfons, more or lefs, one of them a rabbin; and in their prefence recite the confeffion. See Leo de Modena.

Confesssion *of faith*, denotes a lift, or enumeration and declaration of the feveral articles of belief, in a church. See Articles *of faith*.

In the council of Rimini, the Catholic bifhops found fault with dates in a confeffion of faith, and obferved that the church never ufed to date them.

Confession, *Augfburg* or *Auguftan*. See Augustan *Confeffion*.

CONFESSIONAL, or Confessionary, in *Church Hiftory*, a place in churches, ufually under the main altar, wherein were depofited the bodies of deceafed faints, martyrs, and confeffors.

Confessional is alfo ufed in the Romifh church for a little box, or defk in the church, where the confeffor takes the confeffions of the penitent.

CONFESSO, *Pro*-Confesso. See Pro-Confesso.

CONFESSOR, a Chriftian, who has made a folemn, and refolute profeffion of the faith, and has endured torments in its defence. A mere faint is called a confeffor, to diftinguifh him from the roll of dignified faints; fuch as *apoftles*, *martyrs*, &c.

The title of confeffors was given in the early ages of the church, and particularly towards the commencement of the firft century of the Chriftian æra, to thofe, who, in the face of death, and at the expence of honour, fortune, and all the other advantages of the world, had confeffed with fortitude, before the Roman tribunals, their firm attachment to the religion of Jefus.

In ecclefiaftical hiftory we frequently find the word confeffors ufed for martyrs; in after-times, it was confined to thofe who, after having been tormented by the tyrants, were permitted to live and die in peace. And at laft it was alfo ufed for thofe who, after having lived a good life, died under an opinion of fanctity. According to St. Cyprian, he who prefented himfelf to torture, or even to martyrdom, without being called to it, was not called a *confeffor*, but a *profeffor:* and if any out of a want of courage abandoned his country, and became a voluntary exile for the fake of the faith, he was called *exterris*.

The veneration that was paid to both martyrs and confeffors in the early ages of the Chriftian church is hardly credible. The diftinguifhing honours and privileges they enjoyed, the authority with which their counfels and decifions were attended, would furnifh ample matter for an interefting hiftory. Without doubt it was both wife and juft to treat with refpect, and to inveft with extraordinary privileges, thofe Chriftian heroes, fince nothing was more adapted to encourage others to fuffer with chearfulnefs in the caufe of Chrift. Neverthelefs, as the beft and wifeft inftitutions were generally perverted by the weaknefs or corruption of men, from their original purpofe; fo the authority and privileges granted, in the beginning, to martyrs and confeffors, became, in procefs of time, a fupport to fuperftition, an incentive to enthufiafm, and a fource of innumerable evils and abufes. See Martyr.

Confessor is alfo a prieft, in the Romifh church, who has a power to hear finners in the facrament of penance, and to give them abfolution. See Shrove-tide.

The church calls him in Latin *confeffarius*, to diftinguifh him from *confeffor*, which is a name confecrated to faints. The confeffors of the kings of France, from the time of Henry IV. have been conftantly Jefuits: before him the Dominicans and Cordeliers fhared the office between them. The confeffors of the houfe of Auftria have alfo, ordinarily, been Dominicans and Cordeliers; but the latter emperors have all taken Jefuits.

Confessor *to his Majefty*. See Clerk *of the clofet*.

CONFIDENCE, in *Military Language*, denotes a firm reliance on the fkill, courage, conduct, &c. of an individual. It is of the firft importance for the commander of an army to have the entire confidence of the officers and foldiers under his command. This was remarkably the cafe with Hannibal, Julius Cæfar, &c. among the ancients, and with the marfhal de Turenne, John duke of Marlborough, &c. among the moderns. A general, in whom his troops have confidence, may gain a victory without employing much military fkill; and on the other hand, the moft fkilful general may lofe one, who has loft the confidence of his army.

CONFIGURATION, the exterior furface, that bounds bodies, and gives them their particular figure.

That which makes the fpecific difference between bodies, is the different configuration, and the different fituation of their parts. A fhort, or a long fight, depend on the different configuration of the cryftalline.

Configuration *of the planets*, in *Aftronomy* and *Aftrology*, is a certain diftance or fituation of the planets in the zodiac, whereby they are fuppofed to aid, or oppofe each other. See Aspect and Satellites.

Configurations *of falts*, a term ufed by fome to exprefs the combinations of the particles of the falts of plants, and other fubftances, into certain figures, on evaporating the water in which they had been diffolved, fo haftily as not to admit of their fhooting into their own regular cryftals. See Crystallization.

CONFINEMENT *to the realm*. See Ne *exeat regnum*.

CONFIRMATION, in a general fenfe, the act of ratifying or rendering a title, claim, pretenfion, report, or the like, more fure and indifputable.

Confirmation,

CONFIRMATION, in *Law*, denotes the conveyance of an eftate, or right *in effe*, which a perfon hath in or to lands, &c. from one man to another that hath the poffeffion or fome eftate in it, whereby a voidable eftate is made fure and unavoidable, or a particular eftate is increafed, or poffeffion made perfect: and it is particularly ufed for the ftrengthening or homologating an eftate of one already in poffeffion of it by a voidable title. Thus, if a bifhop grant his chancellorfhip by patent, for term of the patentee's life; this is no void grant: yet it is avoidable by the bifhop's death, except it be ftrengthened alfo by the confirmation of the dean and chapter. 1 Inft. 295.

CONFIRMATION is alfo defined to be the approbation or affent to an eftate already created: which as far as it is in the power of the confirmer, makes it good and valid; fo that the confirmation doth not regularly *create an eftate*, yet fuch words may be blended in the confirmation as may create and enlarge an eftate; but this takes place by the force of fuch words as are foreign to the bufinefs of confirmation, and by their own force and power, tend to create the eftate. Gilb. Ten. 75. A confirmation, fays judge Blackftone, is of a nature nearly allied to a releafe; and the words of making it are thefe "have given, granted, ratified, approved, and confirmed." (Litt. § 515. 531.) An inftance of the firft branch of the above definition is, if tenant for life leafeth for 40 years, and dieth during that time; here the leafe for years is voidable by him in reverfion; yet, if he hath confirmed the eftate of the leffee for years, before the death of the tenant for life, it is no longer voidable but fure. (Litt. § 516.) The latter branch, or that which tends to the increafe of a particular eftate, is the fame in all refpects with that fpecies of releafe, which operates by way of enlargement.

Madox fays, that moft ancient confirmations, made after the conqueft, often run like feoffments; and are diftinguifhable from them, chiefly by fome words inferting a former feoffment or grant. In former times, when feoffees were frequently diffeifed of their lands upon fome fuggeftion or other, charters of confirmation feem to have been in great requeft. Poffeffors of lands, &c. feemed not to have thought themfelves fecure againft the king, or the great lords who were their feoffors, or in whofe lands their fees lay, unlefs they had repeated confirmations from them, their heirs or fucceffors. And thefe ancient confirmations feem to have been fometimes made, either by precept or writ from the king, or other lords, to put the feoffees, or their heirs or fucceffors into feifin, after they had been diffeifed, or to keep them in their feifin undifturbed, or elfe by charter of exprefs confirmation. Confirmation is "*perficiens, crefcens*, or *diminuens*:" *perficiens*, as if feoffee upon condition make a feoffment, and the feoffor confirm the eftate of the fecond feoffee;—*crefcens*, which always enlarges the eftate of a tenant; as tenant for years to hold for life, &c.;—and *diminuens*, as when the lord of whom the land is holden, confirms the eftate of his tenant, to hold by a lefs rent. 9 Rep. 142.

The lord may diminifh the fervices of his tenant by confirmation; but not referve new fervices, fo long as the former eftate in the tenancy continues; and therefore if he confirm to the tenant, to yield him a hawk, &c. yearly, it is void. (Litt. § 539. 1 Co. Inft. 296.) Leafes for years may be confirmed for part of the term, or for part of the land, &c.; but an eftate of freehold, being entire, cannot be confirmed for part of the eftate. (5 Rep. 81.) There may be a confirmation implied by law, as well as exprefs by deed; where the law by conftruction confirms a grant made to another purpofe: and a confirmation may enlarge an eftate, from an eftate held at will to term of years, or a greater eftate, from an eftate for years to an eftate for life; from an eftate for life, to an eftate in tail, or in fee; and from an eftate in tail to an eftate in fee-fimple. (1 Inft. 305. 9 Rep. 142. Dyer. 263.) But if the confirmation be made to leffee for life or years, of his term or eftate, and not of the land, this doth not increafe the eftate; though if the leffee confirm the land, to have and to hold to the leffee and his heirs, this will enlarge the eftate, and fo of the reft. Co. Litt. 299. Plowd. 40.

In every good confirmation, there may be a precedent rightful or wrongful eftate in him to whom made, or he muft have the poffeffion of the thing as a foundation on which the confirmation is to be eftablifhed; the confirmer muft have fuch an eftate and property in the land, that he may thereby be enabled to confirm the eftate of the confirmee; the precedent eftate muft continue till the confirmation come, fo that the eftate to be increafed comes into it; and it is required that both thefe eftates be lawful. Co. Litt. 296. 1 Rep. 146. Dyer. 109. 5 Rep. 15. If tenant for life make a leafe for years to one perfon, and afterwards leafe the land to another perfon for years; and he in reverfion confirms the laft leafe, and after that the firft leafe, this is not good; the fecond leffee hath an intereft before by the confirmation of him in reverfion. But in a like cafe, confirmation of the firft leafe, after the fecond was confirmed, has been held good; for the leafe takes no intereft by the confirmation, but only to make it durable and effectual. Moor. c. 180. 1 Inft. 296. Plowd. 10. If a diffeifee confirm the land to the diffeifor but for one hour, one week, a year, or for life, &c. it is a good confirmation of the eftate for ever; and if he confirm the eftate of the diffeifor without any word of heirs, he hath a fee-fimple; and if a diffeifee make a gift in tail, and the diffeifee doth confirm the eftate of the donee, it fhall enure to the whole eftate. (Co. Litt. 291, 297, 299.) But where the eftate is divided it is otherwife; and if there be an eftate for life, the remainder over, there the confirmation may be of either of the eftates; and if the leffee of a diffeifor of a leafe for 20 years, make a leafe for 10 years, the diffeifee may confirm to one of them and not to the other. (1 Cro. 472. 5 Rep. 81.) The tenant in tail of land hath a reverfion in fee expectant; in this cafe, the confirmation of the eftate tail will not extend to the reverfion: &c. (Co. Litt. 297, 298.) If leffee for years, without impeachment for wafte, accept a confirmation of his eftate for life, he hath by this loft the privilege annexed to his eftate for years. (8 Rep. 76.) Acceptance of rent in fome cafes makes a confirmation of a leafe. (2 Danv. 128, 129.) What a perfon may defeat by his entry, he may make good by his confirmation. (Co. Litt. 300.) But none can confirm, unlefs he hath a right at the time of the grant: he who hath but a right in reverfion cannot enlarge the eftate of a leffee. (2 Danv. 140, 141.) As confirmation is to bind the right of him who makes it, but not alter the nature of the eftate to him to whom made, it fhall not difcharge a condition. (Poph. 51. 1 Rep. 147.) A confirmation will take away a condition annexed by law; and by confirmation, a condition after broken in a deed of feoffment is extinguifhed. (1 Co. Rep. 146.) Confirmations may make a defeafible eftate good; but cannot work upon an eftate that is void in law. (Co. Litt. 295.)

A confirmation of letters patent, which are void as they are againft law, is a void confirmation. (1 Lil. Abr. 295.)

Grants and leafes of bifhops, not warranted by the ftat. 32 Hen. VIII. c. 28. muft be confirmed by dean and chapter;

chapter: and grants and leafes of parfons, &c. by patron and ordinary. (1 Inft. 247, 300, 301.) Bifhops may grant leafes of their church-lands for 3 lives, or 21 years, having the qualities required by the fore-cited act, and concurrent leafes for 21 years, with confirmation of dean and chapter. (See 1 Eliz. c. 4, 19.) If a prebend leafes parcel of his prebendary, and the bifhop, who is patron, confirms it; this fhall not bind the fucceeding bifhop, without confirmation of dean and chapter, becaufe the patronage is parcel of the poffeffions of the bifhopric; but it fhall bind the prefent bifhop, &c. (2 Danv. 139.) If a parfon grants a rent, the confirmation of the patron and bifhop is fufficient without the dean and chapter, and fhall be good againft the fucceeding bifhop. (Ibid. 140.) The dean of Wells may pafs his poffeffions, with the affent of the chapter, without any confirmation of the bifhop. (Ibid. 135.) See Lease.

To the grants of a "fole corporation," as parfon, prebendary, vicar, and the like, the patron muft give his confent; becaufe fuch a fole corporation has not the abfolute fee; but a "corporation aggregate," as dean and chapter, mafter, fellows and fcholars of a college, &c. or any fole corporation that has the abfolute fee, as a bifhop with confent of the dean and chapter, may by the common law make any grant of their poffeffions without their founder or patron. (1 Inft. 300 *b*.)

A confirmation, as we have already obferved, is in nature of a releafe, and in fome things of a greater force: and in this deed, it is good to recite the eftate of the tenant, as alfo of him that is to confirm it, and to mention the confideration; the words *ratify* and *confirm*, are commonly ufed; but the words *give*, *grant*, *demife*, &c. by implication of law, may enure as a confirmation. (1 Inft. 295. Weft. Symb. 1. p. 457.)

Confirmation, in *Rhetoric*, is, according to Quintilian, the third part, but according to Cicero, the fourth, of an oration, wherein the orator undertakes to prove, by laws, reafons, authorities, and other arguments, the truth of the propofitions advanced in his narration. Cicero, De Invent. lib. i. cap. 14. 24. Quint. Inft. Orat. l. iii. c. 9.

Confirmation is either *direct*, or *indirect*: the firft confirms what the orator has to urge for ftrengthening his own caufe: the fecond, properly called *confutation*, refels the oppofite arguing of the adverfaries. The two parts together are fometimes placed under the head or title of Contention.

As to the forms of reafoning ufed by orators, for the purpofe of confirmation, the Greek writers diftribute them under four heads; *viz.* *Syllogifm*, *Enthymeme*, *Induction*, and *Example*. (See each article, and alfo Argument and Argumentation.) Cicero reduces the rhetorical modes of reafoning to two, which he calls *ratiocination* and *induction*, comprifing both fyllogifm and enthymeme under ratiocination, and example under induction; fo that the difference lies in their manner of dividing them. As to the ufe of thefe modes of reafoning, it is proper to vary them in a difcourfe, and not to adhere too clofely to the fame form; for want of variety in this, as well as in other cafes, will foon create difguft. With regard to the difpofition of arguments, or the order of placing them, fome advife to put the weaker, which cannot wholly be omitted, in the middle; and fuch as are ftronger, partly in the beginning, to gain the efteem of the hearers, and render them more attentive; and partly at the end, becaufe what is laft heard, is likely to be retained longeft; and if there are but two arguments, to place the ftronger firft, and then the weaker; and after that to return again to the former, and infift principally upon that. But this muft be left to the prudence of the fpeaker, and the nature of the fubject. Neverthelefs, it can never be proper to begin with the ftrongeft and fo gradually defcend to the weakeft; for this would be a kind of anticlimax in reafoning, which would be likely to deftroy its effect. Arguments ought not to be crowded too clofe upon one another; for then their force would be weakened, and the attention of the hearers would be fo diftracted, that they could not have fufficient time duly to confider them. Befides, more arguments than are neceffary fhould not be ufed, becaufe the fewer they are, the more eafily they are remembered. In this refpect the obfervation of a great mafter of eloquence is very juft, that "arguments ought rather to be weighed than numbered." Cic. de Orat. lib. ii. c. 76.

The confirmation is, as it were, the life and foul of the oration: in this the main ftrefs of the argumentation lies. Whence Ariftotle, properly enough, calls it πιςις, *fides*.

Confirmation of *Bifhops*. See Bishop.

Confirmation, in *Theology*, the ceremony of laying on of hands, for the conveyance of the Holy Ghoft. When the apoftles at Jerufalem heard that many of the inhabitants of Samaria had embraced the Gofpel, and had been baptized, they fent thither Peter and John, who laid their hands on thefe new converts, and prayed that they might receive the Holy Ghoft, and the Holy Ghoft defcended upon them. (Acts, viii. 14, &c.) And when the men of Ephefus had been baptized, "Paul laid his hands upon them, and the Holy Ghoft came upon them." (Acts, xix. 6.) And St. Paul, in his epiftle to the Hebrews, (vi. 2.) mentions the doctrine of the laying on of hands immediately after the doctrine of baptifm. Upon thefe authorities was founded the practice, which prevailed in the primitive church, of perfons receiving from the bifhop immediately after baptifm, a folemn benediction, accompanied with impofition of hands, unction upon the forehead with the holy chrifm (made of oil and balfam), the fign of the Crofs, and a prayer for the defcent of the Holy Ghoft.

Among the ancients it was conferred immediately after baptifm; and was efteemed, in fome meafure, to be a part thereof: whence the fathers call it the *accomplifhment* of baptifm. The ground of the practice was an opinion of the imperfection of baptifm, which in their apprehenfion only prepared perfons for the reception of the graces of the Holy Spirit, which were actually conferred in confirmation. To this purpofe Tertullian fays, "when we come out of the water, we are anointed with a bleffed ointment, according to that ancient rite by which men ufed to be anointed for the prieft's office with oil out of a horn, ever fince the time that Aaron was anointed by Mofes; fo that Chrift himfelf had his name from chrifm. (See Chrism.) Then we have the impofition of hands on us, which calls down and invites the Holy Ghoft." (Tertull. de Baptifm. c. 7. King's Hift. of the Prim. Church, chap. v. p. 80, &c.) This ceremony was called confirmation, as it completed the admiffion of the perfon into the Chriftian church, and qualified him to partake of the Lord's Supper. It was not confined to adults, but infants alfo received confirmation as foon as they were baptized, and an opportunity offered of prefenting them to the bifhop.

Among the Greeks, and throughout the Eaft, it ftill accompanies baptifm; but the Romanifts make it a diftinct independent facrament. The firft exprefs inftitution of this ceremony as a facrament occurs in the decree of pope Eugenius in 1439, in which he fays, "the fecond facrament is confirmation, the matter of which is chrifm bleffed by the bifhop, and though the prieft may give the other unction, the bifhop only can confer this." Peter Lombard, however, who lived in the 12th century, feems to have been the firft who

who reckons feven facraments, and mentions confirmation as one of them. Although this ceremony was generally performed by bifhops, yet in fome countries, and at fome periods, it was performed by prefbyters; but in that cafe it was neceffary that the chrifm fhould have been previoufly confecrated by the bifhop. St. Cyprian, and many of the fathers, fpeak of it in fuch terms as to imply, that the adminiftration of it was confined to the bifhop alone. Jerome tells us, that in his time, confirmation was always performed in the Latin church by bifhops, as it had been in earlier times; and fome have fuppofed that the cuftom of receiving the impofition of hands after baptifm, to be performed by the bifhop alone, commenced in the time of this father; though he himfelf did not think that the Holy Spirit was given by the impofition of the hands of the bifhop only: and he fays, they are not to be lamented, who, being baptized by prefbyters or deacons in little villages, and caftles, have died before they were vifited by bifhops. Hilary fays, that in Egypt the prefbyters confirmed in the abfence of the bifhop: the fame was alfo determined by the council of Orange; and this was the practice of the Greek church, which did not allow confirmation to be a facrament. From one of the canons of the council of Illiberis we learn, that, in the time of Cyprian and of Auguftine, confirmation was performed by bifhops. Hence Fleury, and many of the moderns, lay it down as a diftinguifhing character between the offices of a prieft or deacon, and that of a bifhop, that the former might baptize, but the latter alone might anoint and confirm; by virtue of their fucceffion to the apoftles, to whom it originally belonged. But from fome paffages in St. Gregory, &c. others gather, that the priefts, on occafion, had likewife the power of confirming.

It has been alleged, that, as confirmation always fucceeded baptifm, and made a neceffary part of it, and feveral of the primitive Chriftians efteemed both neceffary to falvation, it muft have been performed by prefbyters as well as by bifhops; becaufe the bifhop of a church might be abfent for a very confiderable time, as was the cafe with Cyprian, or the fee might be vacant: and as prefbyters baptized, it is reafonable to conclude that they alfo confirmed. Lord King has fhewn that confirmation and abfolution were the fame thing; and that prefbyters, fometimes with the bifhop, and fometimes without the bifhop, did abfolve by impofition of hands: and he has cited feveral ancient authorities in order to prove, that confirmation was frequently repeated with refpect to the fame perfons. (Hift. Prim. Church, p. 91, &c.)

It is certain, among the Greeks, the prieft who baptizes, alfo confirms: which practice, Lucas Holftenius fhews, is of fo old a ftanding among them, that it is now generally looked on as belonging properly, and of right, to the prieft: though fome will have it to have been borrowed by them from the bifhops. Hence, fome of the Latin divines acknowledge, that though the bifhop be the ordinary minifter of confirmation, yet, that the prieft, in his abfence, may alfo confer it, in quality of minifter extraordinary.

The council of Rouen, held in 1072, decrees that confirmation muft be conferred fafting, both on the fide of the giver, and that of the receiver.

The ancients, and in this refpect they are followed by the moderns, did not think this rite of confirmation fo abfolutely neceffary, that the want of it would exclude from the kingdom of heaven thofe who had already been baptized; but they attributed to it fo much importance, that they punifhed the neglect of it with marks of difgrace and public cenfure; and denied the privilege of ecclefiaftical promotion and holy orders to fuch perfons as had voluntarily and carelefsly omitted it.

"After this example of the primitive Chriftians," fays Dr. Tomline, the bifhop of Lincoln, "our church requires all who have been baptized to appear publicly in the congregation, and renew their baptifmal vow according to the form prefcribed in our liturgy." The order of confirmation requires, "that none fhall be confirmed but fuch as can fay the Creed, the Lord's Prayer, and the Ten Commandments, and can alfo anfwer to fuch other queftions as in the Short Catechifm are contained, &c." The bifhop then queftions them, whether they renew the folemn promife and vow that was made in their name at their baptifm; ratifying and confirming the fame in their own perfons, and acknowledging themfelves bound to believe and to do all thofe things which their god-fathers and god-mothers then undertook for them? The bifhop in his general prayer declares before God that he hath vouchfafed to regenerate thefe his fervants by water and the Holy Ghoft, and hath given unto them forgivenefs of all their fins; and then laying his hand upon the head of every one feverally, offers a prayer for each individual. Moreover, in the collect which forms a part of this fervice, he prays for thofe that are confirmed, faying, "upon whom, (after the example of thy holy apoftles), we have now laid our hands, to certify them (by this fign) of thy favour and gracious goodnefs towards them." The order forbids any to be admitted to the holy communion, but thofe who have been confirmed, or who are ready and defirous to be confirmed. This order of confirmation does not mention the proper age of the perfon to be confirmed.

This ceremony, fays the bifhop, "falls within the authority of the church, and may be confidered as included in the general precept of doing all things "in order and unto edifying;" efpecially fince the now univerfal practice of infant baptifm makes confirmation more neceffary than it was in the primitive church, when chiefly adults were baptized. It feems highly reafonable that they, who, at the time of their baptifm, were incapable of making any engagement, fhould, when they arrive at a proper age, ratify and confirm thofe promifes which were made in their name. And to give this ordinance the greater folemnity, it is performed only by the higher orders of the church, the archbifhops and bifhops. Thus far our church receives confirmation, confining it to prayer and impofition of hands, without the chrifm, or the fign of the crofs, and believes it to be derived from the practice of the apoftles. But as it is not a regular conftitution of Chrift and his apoftles, like baptifm and the Lord's fupper, with a written command that it fhould be continued in future ages, and a promife that it will be attended with inward grace, we reject it as a facrament. There is, indeed, not a fingle precept upon the fubject in the New Teftament; nor is there any fcriptural authority for the ufe of the chrifm or the fign of the crofs; and Bingham thinks that the chrifm made no part of confirmation before the latter end of the fecond century; though other writers attribute an earlier date to it. It muft be admitted by all, that impofition of hands was not peculiar to confirmation (fee Matt. xix. 13. Mark, x. 16. Luke, iv. 40); and that no feparate efficacy is afcribed to it diftinct from the prayers which accompanied it; and prayer and impofition of hands are not fufficient to conftitute a facrament: we, therefore, confider confirmation as nothing more than a folemn manner of perfons' taking upon themfelves their baptifmal vow; and as fuch, it is a ceremony of high importance, calculated to imprefs youthful minds with a juft fenfe of the great obligations of the Chriftian profeffion, and to excite

excite in them an earneft endeavour "faithfully to obferve fuch things as they, by their own confeffion, have affented unto." Elements of Chriftian Theology, vol. ii. p. 416.

It has been urged, however, that this ceremony, with refpect to the real importance and utility of it, was peculiar to the days of the apoftles: and though it is retained among Proteftants, it is doubted whether it be a neceffary inftrument of grace.

Some have thought it a remnant of the popifh facrament of confirmation; and that there is no more authority for retaining this remnant, than for any thing that is omitted in the ceremony. It has been faid that the texts of fcripture, repeatedly alleged in favour of this rite, have no weight. To this purpofe it has been argued, that Peter's and John's going down to Samaria to pray, and to lay their hands on thofe whom Philip had baptized, furnifhes no precedent, no direction, no inftitution, nor command for our bifhops, to do likewife. The end for which the apoftles did it, as it is exprefsly faid (Acts, viii. 15. 17.), was, "that they might receive the Holy Ghoft," *i. e.* its miraculous gifts, fuch as prophefying, fpeaking with tongues, &c. neceffary for forming them into a church; in proof of which it is urged, that they were fomething vifible and obvious to fenfe; fomething which excited the wonder and ambition of the wicked forcerer; for it is faid, "When Simon faw that through laying on of the apoftles' hands the Holy Ghoft was given, he offered them money." Befides, Dr. Whitby has obferved, that if they laid not their hands on *all* who were baptized, it makes nothing for confirmation; if they did, then Simon Magus alfo was confirmed, and received the Holy Ghoft; which is not admiffible. Our bifhops, it has been faid, difclaim the powers exercifed by the apoftles. As for the open and folemn renewal of the baptifmal covenant before God, which baptized perfons ought to make, when they come to years of difcretion, this, it is faid, is done in the facrament of the Lord's fupper, which Chrift himfelf has appointed, and which is the *only* inftitution his wifdom has thought fit to appoint for this purpofe. It has alfo been alleged that the ceremony of confirmation, however folemnly practifed, has a tendency, the more from the folemnity of its adminiftration, to cherifh in men's minds a prefumptuous and falfe hope, and to delude them into wrong notions as to the fafety of their ftate, and as to the terms of acceptance and favour with God. What warrant, it has been afked, has the bifhop to pronounce a man's "fins all forgiven," and himfelf "regenerated by the Holy Ghoft," upon no other grounds than his being able to repeat the Lord's Prayer, Creed, and Ten Commandments, and the anfwers of the Short Catechifm? Can it be faid, that this is the Chriftian doctrine concerning the terms of acceptance and favour with God? Are good vows and refolutions, declared in the church, infallible or proper proofs of a regeneration by the Holy Ghoft? Is a man's profeffing that he repents, and promifing that he will live a godly life, that actual repentance and amendment of life, which *alone* can enfure the divine pardon and favour? The multitudes, it is further faid, who come to be confirmed, are taught to confider the bifhop, in the exercife of that part of his office, as an ambaffador of Chrift, a fucceffor of the apoftles, and a fpecial minifter of God; and therefore, when they hear this facred perfon, folemnly declaring that they are fully juftified, pardoned, and regenerated by the Holy Ghoft, can they be blamed if they believe it, and reft fatisfied with regard to the fafety and happinefs of their ftate? And as full remiffion of fins, and the favour of God are to be had on fuch eafy terms, is it matter of wonder, that thoufands fhould eagerly flock from all quarters to accept it? Or that perfons of very vile and profligate characters fhould too often thruft themfelves in to partake of this benefit, and be feen receiving upon their knees epifcopal abfolution, and folemn affurances of God's favour and peace?

It has been further argued by thofe who object to the continued practice of this ceremony of confirmation in the Chriftian church, that Tertullian is the moft ancient author who has mentioned it, and that in his time, a great variety of fuperftitions, and ridiculous and foolifh rites, had been introduced and actually fubfifted in the Chriftian church. Confirmation was then always performed, as we have already mentioned, (not as it is with us, but) immediately after baptifm. The expreffion in our order of confirmation, by which the bifhop declares to God, "that he hath vouchfafed to regenerate thefe his fervants by water and the Holy Ghoft, and to give them the forgivenefs of all their fins," was probably taken from fome ancient liturgy, and was fuitable and well adapted to the practice of thofe times, but is incongruous and unfuitable to ours. Then, as Dr. Cave obferves, (Primitive Chriftianity, pt. 1. p. 194, 208.) "although infants were undoubtedly taken into the church by baptifm, yet the main body of the baptized were adult perfons; who, flocking over daily in great numbers to the faith of Chrift, were received in at this door. Ufually they were for fome confiderable time catechized, and trained up in the principles of the Chriftian faith; till having given teftimony of their proficiency in knowledge, and of a fober and regular converfation, they became candidates for baptifm," or, as lord King fays, (Inquiry into the Conftitution, &c. pt. i. p. 102.) "the catechumens enjoyed not the privileges of the faithful, till they had, in a fenfe, merited them, which was when, through a confiderable time of trial, they had evidenced the fincerity of their hearts, by the fanctity and purity of their lives. And then, as Origen fays, *we initiate them in our myfteries, when they have made a proficiency in holinefs, and according to the utmoft of their power have reformed their converfation.* When they had changed their manners, and rectified their irregular carriage, then they were wafhed with the *water of baptifm, and* NOT BEFORE. For, as Tertullian obferves, we are not baptized *that we may ceafe to fin;* but *becaufe we have already ceafed.*" In thefe circumftances, it is faid, the bifhop or the prefbyter might ufe an expreffion fimilar to that already cited with propriety; but the cafe is different, fay the objectors to the permanent ufe of this rite, with the multitudes who flock to modern confirmations. Pierce's Vindiciæ Frat. Diff. Towgood's Diffent juftified.

CONFISCATE, in *Law*, is applied to goods forfeited to the exchequer, or public treafury.

The word is derived from *fifcus, a hamper, panier,* or *bafket,* wherein the emperor's money ufed to be kept.

The title to goods, which are not claimed by any other, is given by law to the king. If a man, indicted for ftealing the goods of another, in which cafe they become, in effect, the proper goods of him indicted, be afked about them in court, and difclaim them; he thereby lofes the goods, though he be afterwards acquitted of the theft; and the king fhall have them as confifcate; but otherwife, if he had not difclaimed them. Thus alfo, when goods are found in the poffeffion of a felon, if he difavows them and afterwards is attainted for other goods, and not for them, the goods which he difavows are confifcate to the king; but if he had been attainted for the fame goods, they would have been faid to be "forfeited and not confifcated." So if an appeal of robbery be brought, and the plaintiff leaves out fome of his goods, he fhall not be allowed to enlarge his appeal; and becaufe there is none to receive the goods fo left out, the

king ſhall have them as confiſcate, according to the rule, "Quod non capit chriſtus, capit fiſcus." Staundf. P. C. l. 3. c. 24. See FORFEITURE.

CONFISCATION, a legal adjudication of goods or effects to the fiſc, or treaſury.

Thus, the bodies and effects of criminals, traitors, &c. and merchandizes that are contraband, prohibited, or brought aboard or aſhore, without paying the duties, when ſeized, are confiſcated.

It is an axiom in law, that he who confiſcates the body, confiſcates alſo the effects, to the profit of the king, or the lord of the fee, *i. e.* he who is condemned to loſe his life, muſt alſo loſe his goods; yet the widows of criminals do not loſe their dowries, nor their ſhare in the goods of the community, by the forfeiture of their huſbands. See FORFEITURE.

CONFLAGRATION, a general burning of a city, or other conſiderable place. In which ſenſe, Nero is ſaid to have procured the Chriſtians to be accuſed of the conflagration of Rome, which was done by his own order.

But the word is more ordinarily reſtrained to that grand period, or cataſtrophe of our world, wherein the face of nature is expected to be changed by a deluge of fire, as it was anciently by that of water. The ancient Chaldæans, Pythagoreans, Platoniſts, Epicureans, Stoics, Celts, and Etrurians, appear to have had a notion of the conflagration; though whence they ſhould derive it, unleſs from the ſacred books, it is difficult to conceive; except perhaps, from the Phœnicians, who themſelves had it from the Jews.

The Celts, whoſe opinions reſembled thoſe of the eaſtern nations, held, that after the burning of the world, a new period of exiſtence would commence. The ancient Etrurians, or Tuſcans, alſo concurred with other weſtern and northern nations of Celtic origin, as well as with the Stoics, in aſſerting the entire renovation of nature after a long period, or great year, when a ſimilar ſucceſſion of events would again take place. The coſmogony of an ancient Etrurian, preſerved by Suidas, limits the duration of the univerſe to a period of 12,000 years, 6000 of which paſſed in the production of the viſible world, before the formation of man. The Stoics alſo maintained, that the world is liable to deſtruction from the prevalence of moiſture, or of drought; the former producing an univerſal inundation, and the latter an univerſal conflagration. Theſe, they ſay, ſucceed each other in nature, as regularly as winter and ſummer. When the univerſal inundation takes place, the whole ſurface of the earth is covered with water, and all animal life is deſtroyed; after which nature is renewed, and ſubſiſts as before, till the element of fire, prevailing in its turn, dries up all the moiſture, converts every ſubſtance into its own nature, and at laſt, by an univerſal conflagration, reduces the world to its priſtine ſtate. At this period all material forms are loſt in one chaotic maſs, all animated nature is reunited to the Deity, and nature again exiſts in its original form, as one whole, conſiſting of God and matter. From this chaotic ſtate, however, it again emerges, by the energy of the efficient principle; and gods and men, and all the forms of regulated nature are renewed, to be diſſolved and renewed in endleſs ſucceſſion. The doctrine of conflagration is a natural conſequence of the general ſyſtem of Stoiciſm. For, ſince, according to this ſyſtem, the whole proceſs of nature is carried on in a neceſſary ſeries of cauſes and effects, when that operative fire which at firſt, burſting from chaos, gave form to all things, and which has ſince pervaded and animated all nature, ſhall have conſumed its nutriment, that is, when the vapours, which are the food of the celeſtial fires, ſhall be exhauſted, a deficiency of moiſture muſt produce an univerſal conflagration. This grand revolution in nature is, after the doctrine of the Stoics, thus elegantly deſcribed by Ovid, (Metam. l. i. v. 256):

> "Eſſe quoque in fatis reminiſcitur affore tempus
> Quo mare, quo tellus, correptaque regio cœli
> Ardeat, et mundi moles operoſa laboret:"

or, as Dryden has tranſlated the paſſage,

> "Rememb'ring in the fates a time when fire
> Should to the battlements of heaven aſpire,
> When all his blazing worlds above ſhould burn,
> And all th' inferior globe to cinders turn."

Seneca, ſpeaking of the ſame event, (Ad Murciam, c. ult.) ſays expreſsly, "Tempus advenerit quo ſidera ſideribus incurrent, et omni flagrante materia uno igne, quicquid nunc ex depoſito lucet, ardebit," &c. *i. e.* the time will come when the world will be conſumed, that it may be again renewed, when the powers of nature will be turned againſt herſelf; when ſtars will ruſh upon ſtars, and the whole material world, which now appears reſplendent with beauty and harmony, will be deſtroyed in one general conflagration. In this grand cataſtrophe of nature, all animated beings (excepting the univerſal intelligence), men, heroes, demons, and gods, ſhall periſh together. Seneca, the tragedian, who was of the ſame ſchool with the philoſopher, writes to the ſame purpoſe, (Herc. Oct. iii. 1112.)

> "Cœli regia concidens
> Ortus atque obitus trahet,
> Atque omnes pariter deos
> Perdet mors aliqua, et chaos."

> *i. e.* "The mighty palace of the ſky,
> In ruin fall'n is doom'd to lie,
> And all the gods, its wreck beneath,
> Shall ſink in chaos and in death."

During the courſe of this vaſt conflagration, the Stoics conceived that the world would expand, and in its chaotic ſtate continue to fill a much larger portion of infinite ſpace than it had required, or would again require, in a ſtate of orderly arrangement. After an interval of reſt, ſays Seneca, (Epiſt. 9. Qu. Nat. c. ult.) in which the Deity will be intent upon his own conceptions, the world will be entirely renewed; every animal will be reproduced; and a race of men, free from guilt, and born under happier ſtars, will repeople the earth. Degeneracy and corruption, will, however, again creep into the world; for it is only while the human race is young, that innocence remains upon the earth. The grand courſe of things, from the birth to the deſtruction of the world, which, according to the Stoics, is to be repeated in endleſs ſucceſſion, is accompliſhed within a certain period. This period, or fated round of nature, is probably what the ancients meant by the "Great Year."

From this brief account of the doctrine of the Stoics concerning the final conflagration, it evidently appears, that it differs in ſeveral eſſential particulars from the Chriſtian doctrine on this head. It is the work of fate, performed by natural and mechanical laws, and repeated eternally at certain periods, without any good reaſon, ſince with every revolution the ſame diſorders and vices return. Philo juſtly ridicules this dogma; remarking, that the Stoics make their deities act like children, who raiſe up piles of ſand only for the

the pleafure of beating them down. Several of the Stoics themfelves were aware of the abfurdity of this fyftem, and rejected it; particularly Boethius, Pofidonius, Diogenes the Babylonian, and Panætius. This general diffolution the Stoics call εκπυρωσις, *ecpyrofis*. The Pythagoreans alfo maintained the dogma of conflagration. To this purpofe Hippafus, of Metapontum, taught that the univerfe is finite, is always changing, and undergoes a periodical conflagration. Philolaus, who flourifhed in the time of Plato, maintained that the world is liable to deftruction, both by fire and water.

Mention of the conflagration is alfo feveral times made in the books of the Sibyls, Sophocles, Hyftafpes, Lucan, &c.

Dr. Burnet, after F. Tachard, and others, relates, that the Siamefe believe, that the earth will at laft be parched up with heat; the mountains melted down; and the earth's whole furface reduced to a level, and then confumed with fire. And the Bramins of Siam do not only hold, that the world fhall be deftroyed by fire; but, alfo, that a new earth fhall be made out of the cinders of the old.

The facred fcriptures announce this event in a variety of paffages; fome of which, however, have been applied by Dr. Hammond, and others, to the deftruction of Jerufalem; but others are univerfally allowed to refer to this awful cataftrophe. See 2 Pet. iii. 10—13, referred by Dr. Hammond to the deftruction of Jerufalem, and the diffolution of the Jewifh ftate, but generally, and, with juft reafon, applied to the end of the world. (See Ray's Difcourfes, p. 311, &c.) 2 Theff. i. 7, 8. Rev. vi. 12, 13, 14. Rev. x. 6. Rev. xxi. 1. Heb. xii. 26, 27. All thefe paffages, and others, which more immediately relate to the time of this event, are applied by Dr. Hammond to the deftruction of the city, temple, and polity of the Jews: and, indeed, he leaves only one place in the New Teftament, as a proof of the general conflagration of the world; *viz.* 2 Pet. vii. 7. Other paffages have been cited from the Old Teftament that feem to indicate and foretel the diffolution of the prefent globe: fuch are Job. xiv. 12. Pf. cii. 5, 6. Ifai. li. 6. Joel, ii. 31. Malachi, iv. 1. Deut. xxxii. 12. But it muft be allowed that the prophetic books abound with figurative expreffions, the precife object of which cannot be fo fatisfactorily afcertained. The ancient fathers of the church, and Chriftian writers, in fucceffive periods of its duration, have frequently referred to this event, and teftified their belief of its advent. Some of the firft Chriftians apprehended it to be near at hand; and many of the ancients conceived that it would take place at the end of 6000 years. In this number we may clafs Juftin Martyr, Irenæus, Lactantius, Euftathius, &c.; but their opinion, with regard to the precife time of this event, is propofed by them not as an undoubted truth, but only as a modeft conjecture. It was the general opinion of the ancient Chriftians, that this world fhall not be annihilated or deftroyed, but merely renewed and purified. To this purpofe we might cite the teftimonies of Eufebius, Cyril, Oecumenius, Jerome, and others.

Various are the fentiments of authors on the fubject of the conflagration; the caufe whence it is to arife, and the effects it is to produce. Divines ordinarily account for it metaphyfically; and will have it take its rife from a miracle, as a fire from heaven. Philofophers contend for its being produced from natural caufes; and will have it effected according to the laws of mechanics: fome think an eruption of a central fire fufficient for the purpofe; and add, that this may be occafioned feveral ways; *viz.* either by having its intenfity increafed; which, again, may be effected either by being driven into lefs fpace by the encroachments of the fuperficial cold, or by an increafe of the inflammability of the fuel whereon it is fed: or by having the refiftance of imprifoning earth weakened; which may happen, either from the diminution of its matter, by the confumption of its central parts; or by weakening the cohefion of the conftituent parts of the mafs, by the excefs or the defect of moifture.

Others look for the caufe of the conflagration in the atmofphere; and fuppofe, that fome of the meteors there engendered in unufual quantities, and exploded with unufual vehemence, from the concurrency of various circumftances, may be made to effect it, without feeking any further.

The aftrologers account for it from a conjunction of all the planets in the fign Cancer; as the deluge, fay they, was occafioned by their conjunction in Capricorn. This was an opinion adopted by the ancient Chaldæans.

Laftly: others have recourfe to a ftill more effectual and flaming machine; and conclude the world is to undergo its conflagration from the near approach of a comet, in its return from the fun. Thofe wandering bodies do indeed feem to menace us a little; being able, both by their tranfverfe motion acrofs the earth's way, by the hugenefs of their fize, and the intenfe fire wherewith they glow in their recefs from the perihelion, to produce the moft fignal changes and revolutions in the fyftem of things.

Mr. Whifton has fhewn, that they are extremely well fitted to produce the phenomena of the deluge; and has gone a good way towards proving, that the comet of 1680, was the very body to which that event was owing; as being then in its approach towards the fun, and its atmofphere crowded with the watery vapours, which it had gathered in thofe inconceivably cold regions, into which it had fled off in its aphelion.

This fame comet, fir Ifaac Newton has calculated, when in its perihelion, December the 8th, was heated, by the vicinity of the fun, to a degree two thoufand times more hot than red-hot iron: he fhews, likewife, that it would fcarce be cool again in fifty thoufand years.

This fame comet, Dr. Halley obferved November the 11th, was not above a femidiameter of the earth from the earth's way: fo that had the earth, at that time, been in that part of its orbit, fomething very extraordinary might have been apprehended; but whether in the way of fire, or water, may, perhaps, to fome, leave room to doubt. But it is fcarcely conceivable, that the comet fhould bring any vehement degree of heat, out of thofe regions it comes from, whatever heat it might carry thither. See Comet. See on the fubject of this article *Theory of the* Earth.

CONFLANS, in *Geography*, a fmall town of France, in the department of Mont-blanc, and chief place of a canton in the diftrict of Moutiers, 18 miles N.E. from Moutiers. The place contains 1313, and the canton 5512 inhabitants: the territory includes $182\frac{1}{2}$ kiliometres and 10 communes.—Alfo, a fmall town of France, in the department of Mofelle, and chief place of a canton in the diftrict of Briey, fituated at the confluence of the Iron and Orn, 15 miles E. from Metz. This place contains but 347, and the canton 7145 inhabitants, and 31 communes, upon a territorial extent of 240 kiliometres.—Alfo, a town of France, in the department of the Upper Saone, in the diftrict of Lure; 4 leagues N. of Vefoul, and $2\frac{1}{2}$ W. of Luxeuil.—Alfo, a town of Savoy, near the conflux of the Ifere and Doron; 18 miles E. of Chambery.

Conflans, or *Conflaut*, was, before the revolution, the name of a valley of France, in Rouffillon, furrounded by the Pyrenées, and watered by the river Tet. Villefranche fur le Tet was its capital.

Conflans *St. Honorine*, a town of France, in the department of the Seine and Oise; 5 leagues S.W. of Paris.

CONFLICT. See Combat.

CONFLUENCE, Conflux, the place where two rivers join, and mix their waters.

CONFLUENT, in *Medicine*, literally *flowing together*, is a term applied to cutaneous eruptions, which, though confifting, on their firft appearance, of feparate and diftinct fpots, form themfelves fubfequently into extenfive patches, by the fpreading of the individual fpots, which coalefce with each other. This epithet is moft frequently applied to the fmall pox, which, when confluent, becomes a very formidable and fatal difeafe, and requires a treatment in its latter ftages, different from that which is beneficial in the mild form of the difeafe, when the puftules are few and diftinct. See Small-Pox.

CONFLUENTA, in *Ancient Geography*, a town of Spain, belonging to the Vaccæans, S.E. of Pallentia.

CONFLUENTES. See Coblentz.

CONFOLENS, in *Geography*, a town of France, in the department of Charente, and chief place of a diftrict, fituated on the river Vienne, 30 miles N.W. from Limoges, and 36 N.E. from Angoulême. It has a fub-prefect, a court of juftice, and a regifter-office. It is divided into north and fouth, and has a population of 2025 inhabitants. Its northern canton comprifes 7391, and the fouthern 11,385 inhabitants, diftributed in 18 communes, upon a territorial extent of 342½ kiliometres. The diftrict reckons 58,503 inhabitants and 70 communes, on a territorial extent of 1432½ kiliometres. Its foil in general is a barren heath, except on the banks of the Vienne, which afford fome good corn land and excellent paftures. Corn and cattle are the principal articles of commerce. N. lat. 46° 2′. E. long. 0° 34′.

CONFORMATION, the particular texture and confiftence of the parts of any body, and their difpofition to make a whole.

We fay, light of different colours is reflected from bodies, according to their different conformation; in oppofition to the Cartefians, who pretend, that reflected light becomes of different colours, according to the different conformation of the bodies that reflect it. The conformation of the members of an embryo is not perfect enough to allow of diffection.

CONFORMITY, in the *Schools*, is the congruency, or relation of agreement between one thing and another: as between the meafure, and the thing meafured: the object, and the underftanding; the thing, and the conception; the thing, and the divifion thereof, &c.

Conformity, *Non*. See Non-conformity.

Conformity, *Occafional*. See Occasional Conformity.

CONFRERES, from *con*, and *frere*, *brother*; denote brethren in a religious houfe, or the fellows of one and the fame fociety. 32 Hen. VIII. c. 24.

CONFRONTATION, the act of bringing two perfons, in prefence of each other, to difcover the truth of fome fact, which they relate differently.

The word is chiefly ufed in criminal matters; where the witneffes are confronted with the accufed; the accufed with one another, or the witneffes with one another.

CONFUCIUS, or Kong-fu-tse, in *Biography*, the moft celebrated ancient philofopher of China, defcended from the imperial family of the dynafty of Shang, was born in the reign of the emperor Lu, about four centuries and a half before Chrift. He was accordingly a contemporary with Pythagoras, and flourifhed at a period prior to that in which Socrates rofe to celebrity. At fifteen years of age, he engaged in the ftudy of the ancient learning of his country; and, before he had arrived at the years of manhood, he had made aftonifhing proficiency in the doctrines attributed to the legiflators Yao and Chun, which the Chinefe confider as the fource of all their fcience and morality. The reputation which Confucius acquired, and the uncommon wifdom which he difcovered, were the means of advancing him, while he was yet but a youth, to the office of minifter of ftate. The duties of this, and of other pofts affigned to him, he performed with honour to himfelf, and fignal benefit to the kingdom. The rank which he held in public life, enabled him to form an accurate judgment of the ftate of morals among his countrymen. He devifed a plan for a general reformation, which he endeavoured to carry into execution, as well by inculcating a ftrict and pure morality, as by ufing the influence of his authority in recommending it. His efforts were crowned with fo much fuccefs, that the whole nation became, at firft, a pattern of order, decorum, and ftrict juftice. This reformation was not, however, permanent; the bufinefs of the ftate was abandoned to men of licentious habits, and in a fhort time an univerfal effeminacy and diffolutenefs of manners prevailed. Confucius exerted all his powers to ftem the torrent of vice; and when he found that his endeavours were fruitlefs, he refolved to quit his ftation and country, and feek an afylum in fome other kingdom where his efforts in the caufe of virtue might be more availing. He, at length, devoted himfelf to the tafk of private inftruction in philofophy and morality. His great celebrity, and his perfonal virtues, foon procured him many fcholars; and he is faid to have had feveral thoufand difciples to whom he taught morals, the art of reafoning, and the principles of policy. From thefe he felected feventy-two, who were diftinguifhed from the others on account of their fuperior attainments. Thefe were divided into claffes, deftined for different purpofes. The bufinefs of the firft clafs was the ftudy of morals; of the fecond, that of reafoning and eloquence; of the third, that of the rules of good government; and the immediate province of the fourth was fomething fimilar to our public preaching. The exertions of Confucius in the caufe of virtue, were too great for the frame of body with which he was endued; his natural ftrength became impaired, and his mental powers failed. During his laft ficknefs, he declared that his heart was overpowered with grief, on beholding the diforders which prevailed in the empire, and which he had in vain endeavoured to fupprefs: "The kings," faid he, "will not follow my maxims; I am no longer ufeful on earth; it is, therefore, time that I quit it." This exclamation was followed by a lethargy from which he never recovered. He died in his feventy-third year. B. C. about 479, (Blair.) By his fage counfels, his moral doctrine, and his exemplary conduct, he obtained an immortal name as a reformer of his country. After his death, his name was held in the higheft veneration, and his doctrine is ftill regarded among the Chinefe, as the bafis of all moral and political wifdom. His natural temper was excellent, and his conduct irreproachable and exemplary. He was particularly praifed for his humility, fincerity, temperance, difintereftednefs, and contempt of riches.

Confucius feemed defigned by heaven to reform, both by his doctrines and example, the corruptions which prevailed, as well in the civil, as in the religious eftablifhments of China. He condemned the idolatry which he found exifting among his countrymen, and endeavoured to introduce a purer form of religion. He did not attempt to dive into the impenetrable fecrets of nature, nor bewilder himfelf in abftrufe refearches on the effence of a firft caufe, the origin of good

and evil, and other fubjects which feem beyond the limits of the human mind. He maintained that the Deity was the moft pure and perfect principle, and fountain of all things; that he is independent and almighty, and watches over the government of the univerfe, fo that no event can happen but by his command; that our moft fecret thoughts are open to his view; that he is holy without partiality, and of fuch boundlefs goodnefs and juftice, that he cannot poffibly permit virtue to go unrewarded, or vice unpunifhed.

So high is the refpect paid to the memory of this great man, even in the prefent day, that his defcendants enjoy, by inheritance, the title and office of mandarins, and are allowed the privilege in common with the princes of the blood, of exemption from the payment of all taxes to the emperor. The works which Confucius compofed for the ufe of his difciples, and the prefervation of his philofophy, are looked upon by the Chinefe as of the firft authority, next to the claffical books, ftyled by way of eminence, "the Five Volumes;" and to thefe, indeed, he declares himfelf indebted for the information and wifdom which his own are calculated to convey. Moreri. Hift. Univer. D'Anquetil. Enfield's Hift. of Philofophy.

CONFUSED *Notion* and *Vifion*. See the fubftantives.

CONFUSION, in a general fenfe, is oppofed to order; in a perturbation whereof, confufion confifts: *e. gr.* when things prior in nature do not precede; or pofterior do not follow, &c.

In a logical fenfe, confufion is oppofed to diftinctnefs, or perfpicuity; and may happen, either in words, as when mifconftrued or mifapplied; or in ideas, as when the idea of any thing prefents fomething along with it, which does not properly belong to that thing.

In a phyfical fenfe, confufion is a fort of union, or mixture by mere contiguity. Such is that between fluids of contrary natures; as oil and vinegar, &c.

CONFUSION, *property by*, in *Law*, denotes the intermixture of the goods of two perfons in fuch a manner, that their refpective portions cannot be afcertained. If this be by confent, they have a common intereft, both by the Englifh and civil law, in proportion to their fhares. But, if one wilfully intermixes his money, corn, or hay, with that of another perfon, without his approbation or knowledge, or cafts gold in like manner into another's pot or crucible, the civil law, though it gives the fole property of the whole to him who has not interfered in the mixture, yet allows a fatisfaction to the other for what he has fo improvidently loft. (Inft. 2. 1, 28). But our law, to guard againft fraud, gives the entire property, without any account, to him, whofe original dominion is invaded, and endeavoured to be rendered uncertain, without his own confent. Poph. 38. 2 Bulftr. 325. 1 Hal. P. C. 513. 2 Vern. 516. Bl. Comm. ii. 405.

CONFUSION *of tongues*, in the *Hiftory of the World*, is a memorable event, which happened in the one hundred and firft year, according to the Hebrew chronology, after the flood, B. C. 2247, at the overthrow of Babel; and which was providentially brought about, in order to facilitate the difperfion of mankind, and the population of the earth. Until this period, there had been one common language, which formed a bond of union, that prevented the feparation of mankind into diftinct nations; and fome have fuppofed, that the tower of Babel was erected as a kind of fortrefs, by which the people intended to defend themfelves againft that feparation, which Noah had projected.

There has been a confiderable difference of opinion, as to the nature of this confufion, and the manner in which it was effected. Some learned men, prepoffeffed with the notion that all the different idioms now in the world did at firft arife from one original language, to which they may be reduced, and that the variety among them is no more than muft naturally have happened in a long courfe of time by the mere feparation of the builders of Babel, have maintained, that there were no new languages formed at the confufion; but that this event was accomplifhed by creating a mifunderftanding and variance among the builders, without any immediate influence on their language. But this opinion, advanced by Le Clerc, &c. feems to be directly contrary to the obvious meaning of the word שפה, *fhapha, lip*, ufed by the facred hiftorian; which, in other parts of fcripture, fignifies *fpeech*. (See Pf. lxxxi. 5. If. xxviii. 11. xxxiii. 19. Ezek. iii. 5.) It has been juftly remarked, that unanimity of fentiment, and identity of language, are particularly diftinguifhed from each other in the hiftory; "the people is one, and they have all one language." (Gen. xi. 6.) It has been alfo fuggefted, that if difagreement in opinion and counfel were the whole that was intended, it would have had a contrary effect; they would not have defifted from their project, but ftrenuoufly have maintained their refpective opinions, till the greater number of them had compelled the minority either to fly or to fubmit. Others have imagined, that this was brought about by a temporary confufion of their fpeech, or rather of their apprehenfions, caufing them, whilft they continued together and fpoke the fame language, to underftand the words differently: Scaliger is of this opinion. Others again account for this event, by the privation of all language, and by fuppofing that mankind were under a neceffity of affociating together, and of impofing new names on things by common confent. Another opinion afcribes the confufion to fuch an indiftinct remembrance of the original language which they fpoke before, as made them fpeak it very differently; fo that by the various inflections, terminations, and pronunciations of divers dialects, they could no more underftand one another, than they who underftand Latin can underftand thofe who fpeak French, Italian, or Spanifh, though all thefe languages arife out of it. This opinion is adopted by Caufabon, and by bifhop Patrick in his Commentary in loc. and is certainly much more probable than either of the former: and Mr. Shuckford maintains, that the confufion arofe from fmall beginnings, by the invention of new words in either of the three families of Shem, Ham, and Japhet, which might contribute to feparate them from one another; and that in each family new differences of fpeech might gradually arife, fo that each of thefe families went on to divide and fubdivide among themfelves. Others, again, as Mr. Jof. Mede and Dr. Wotton, &c. not fatisfied with either of the foregoing methods of accounting for the diverfity of languages among mankind, have recourfe to an extraordinary interpofition of divine power, by which new languages were framed and communicated to different families by a fupernatural infufion or infpiration; which languages have been the roots and originals from which the feveral dialects that are, or have been, or will be fpoken, as long as this earth fhall laft, have arifen, and to which they may with eafe be reduced. This opinion is adopted and vindicated by Dr. Hartley, in his "Obfervations on Man," p. 179, who fays, that it feems impoffible to explain how the human languages fhould arife from one ftock. Upon the whole, we may obferve, that there evidently feems to have been fomething miraculous in the tranfaction; and if it be fuppofed that nothing more was meant than a confufion of defigns, counfels, and opinions; fo that they could not agree

agree together in the execution of their ſcheme (which, as we have ſhewn, is not very probable); this would be ſufficient to anſwer the purpoſe of Divine Providence, which was to prevent the children of Noah from preſerving their union in one body, and to ſpread them over the face of the earth, that it might be peopled and cultivated. If the confuſion of tongues was an actual change of languages, it was probably accompliſhed by degrees; nor does it appear to be ſo fundamental and radical an alteration as ſome have imagined. In proof of this, we may allege the free intercourſe which ſubſiſted in early times between perſons of different ages and countries; the uniformity of the Eaſtern languages, which plainly ſhews that they have one common radix; and the manifeſt derivation of the Greek and Latin from the ſame ſource.

As to the number of languages thus introduced, many opinions have been adopted. If there were no more than there were nations or heads of nations, then the number would be ſeven for Japhet, four for Ham, and five for Shem; but if there were as many as there were families, which is the more probable opinion, their number cannot be certainly aſſigned. However, the Hebrews fancy they were ſeventy, becauſe the deſcendants from the ſons of Noah, enumerated Geneſis x., were juſt ſo many. Allowing then the languages of the chief families to have been fundamentally different from each other, the ſub-languages and dialects within each branch would probably have had a mutual affinity, greater or leſs, as they ſettled nearer or farther from each other. But whichſoever of theſe hypotheſes is adopted, the primary object of the confuſion at Babel was the ſeparation and diſperſion of mankind. Cleric. Com. in Gen. x. i. Scaliger Exerc. in Cardan. § i. Caſaubon. Diatrib. de Ling. Heb. Mede's Works, vol. i. p. 276. Wotton's Diſc. and Brett's Eſſ. on the Confuſion of Languages. Univerſ. Hiſt. vol. i. part i. chap. 2. § 5. Shuckf. Conn. vol. i. p. 146.

The ingenious and learned Dr. Bryant has, in the third volume of his "Analyſis of Ancient Mythology," advanced a new and ſingular hypotheſis, both with reſpect to the confuſion of tongues and the diſperſion. He ſuppoſes that the confuſion of language was local and partial, and limited to Babel only. By כל־הארץ, Gen. xi. 1 and 8, which our tranſlators render the *whole earth*, he underſtands *every region:* and by the ſame words in ver. 9, the *whole region*, or province. This confuſion was occaſioned, as he ſuppoſes, by a labial failure; ſo that the people could not articulate. Thus their ſpeech was confounded, but not altered; for as ſoon as they ſeparated, they recovered their true tenor of pronunciation, and the language of the earth continued for ſome ages nearly the ſame. The interviews between the Hebrews and other nations, recorded in Scripture, were conducted without an interpreter; and he farther obſerves, that the various languages which ſubſiſt at this day retain ſufficient relation to ſhew, that they were once dialects from the ſame matrix, and that their variety was the effect of time. See Disperſion.

CONFUTATION, in *Rhetoric*, &c. a part of an oration, wherein the orator ſeconds his own arguments, and ſtrengthens his cauſe, by refelling and deſtroying the oppoſite arguments of the antagoniſt. This is done by denying what is apparently falſe, by detecting ſome flaw in the reaſoning of the adverſe party, by granting their argument, and ſhewing its invalidity, or retorting it upon the adverſary.

Confutation makes a branch of what we call *confirmation*. The confirmation and confutation are ſometimes called *contention*.

Rhetoricians generally place confutation after confirmation, which ſeems agreeable to the natural method of thinking on any ſubject. For perſons firſt endeavour to find out ſuch arguments as are proper to maintain that ſide of a queſtion which they eſpouſe, before they conſider what objections may be offered againſt it: although in ſpeaking it may be neceſſary to vary the order, according to the nature of the diſcourſe. The method preſcribed by Quintilian (Inſt. Orat. l. v. c. 13.) is this, that, "if we bring a charge, we ſhould firſt prove it, and then anſwer objections; but if we ſtand upon the defence, we ought to begin with confutation." The forms of reaſoning are the ſame here as thoſe that occur under *confirmation.* But it is of importance to know the different modes of confutation practiſed by orators, which is often the more difficult taſk; becauſe he, who is to prove a thing, comes uſually prepared; but he, who is to confute it, is frequently left to a ſudden anſwer. Hence Quintilian ſays, that, in judicial caſes, "it is as much eaſier to accuſe than to defend; as it is to make a wound than to heal it." In all diſputes it is of the greateſt conſequence to obſerve, where the ſtreſs of the controverſy lies; and in confutation, what the adverſary has advanced ought carefully to be conſidered, and in what manner he has expreſſed himſelf. Thoſe things, which relate to the merits of the cauſe, may be confuted either by contradicting them, or by ſhewing ſome miſtake in the reaſoning, or their invalidity when granted. There are various ways in which things may be contradicted; what is apparently falſe may be expreſsly denied; and things which the adverſary cannot prove may be likewiſe denied. A thing may be alſo contradicted by ſhewing that the adverſary himſelf maintained the contrary. When you can fix contradictions on an adverſary, you effectually ſilence him; for this is ſtabbing him with his own weapon. Sometimes a thing is not in expreſs terms denied, but repreſented to be utterly incredible; and this method expoſes the adverſary more than a bare denial. There is, likewiſe, an ironical way of contradicting a thing, by retorting that and other things of the like nature upon the adverſe party. A ſecond mode of confutation is by obſerving ſome flaw in the reaſoning of the adverſe party. The laſt method of confutation is, when the orator does in ſome ſenſe grant the adverſary his argument, and at the ſame time ſhews its invalidity. This may be done in a variety of ways, according to the different nature of the ſubject. Sometimes he allows that what was ſaid may be true, but pleads, that what he contends for is neceſſary. At other times the orator pleads, that although the contrary opinion may ſeem to be attended with advantage, yet that his own is more juſt and honourable. Another way of confutation is by retorting upon the adverſary his own argument. The orator takes this advantage, when an argument proves too much, that is, more than the perſon deſigned it for, who made uſe of it. See Inversion. Sometimes orators in confutation raiſe ſuch objections themſelves to what they have ſaid, as they imagine may be made by others; which they afterwards anſwer the better to induce their hearers to think, that nothing conſiderable can be offered againſt what they have advanced, but what will admit of an eaſy reply. See Prolepsis. See the ſeveral modes of confutation above recited illuſtrated by appoſite citations from Cicero's Orations in Ward's Oratory, vol. i. lect. 17.

As to the order and diſpoſition of the arguments, proper to be uſed in confutation; whether to follow the adverſe party, or alter his method, and range them in a different

manner, as likewife whether to attack the weakeft or ftrongeft arguments firft; thefe things muft be left to the difcretion of the fpeakers.

CONG, in *Geography*, a village of the county of Mayo, Ireland, fituated in the neck of land between the Loughs, Mafk, and Corrib. Large caverns and fubterraneous waters are frequent in the neighbourhood.; efpecially at the back of the village, a very broad river rufhes at once from beneath a gently floping bank, and after a rapid courfe of about a mile lofes itfelf in Lough Corrib. It is fuppofed to be the outlet of a fubterraneous channel, through which the fuperfluous waters of Loughs Mafk and Carrah are difcharged into Corrib. Cong is about 108 miles weft from Dublin, and 20 fouth from Caftlebar.

Cong, a town of China of the third rank, in the province of Honan; 15 miles fouth of Hoai-king.—Alfo, a town of China of the third rank, in the province of Se-tchuen; 25 miles fouth of Soui-tcheou.

CONGA, a town of Perfia, in the province of Irak-Agemi; 100 miles N. W. of Ifpahan.

CONGAREE, a confiderable river of America, in the ftate of S. Carolina, formed by the confluence of Saluda and Broad rivers. The union of the waters of Congaree and Wateree forms the Santee.

CONGAUTATA, in *Ancient Geography*, a ftation on the line of Severus's wall in Britain, mentioned in the Notitia Imperii, and fuppofed to be at Stanwix.

CONGE, Apophyge, Gr. *Scapus*, Lat. in *Architecture*. The extremities of the fhaft of a column when they are worked circularly to unite gradually with the fillets of the bafe and capital are thus named.

Conge, in the *French Law*, a licence, or permiffion, granted by a fuperior to an inferior, which gives him a difpenfation from fome duty to which he was before obliged. The word is French: Menage derives it from the Latin *commiatus*, ufed for *commeatus*, and *commeare*, often feen among ancient writers: the Italians fay, *congedo*.

A monk cannot go out of his convent, without the conge of his fuperiors.

Conge *d'accorder*, i. e. *leave to accord*, or *agree*, is ufed in the ftatute of fines, anno 18 Edw. I. to the following purpofe. "When the original is delivered, in prefence of the parties before juftices, a pleader fhall fay this: fir, juftice, *conge d'accorder;* and the juftice fhall fay to him, What faith fir R. and fhall name one of the parties, &c."

Conge *d'elire*, is the king's permiffion royal to a dean and chapter, in time of a vacancy, to choofe a bifhop. See Bishop, Canon, and Collation.

Gwyn obferves, that the king of England, as fovereign patron of all bifhoprics and other benefices, had anciently the free appointment of all ecclefiaftical dignities; invefting, firft, *per baculum & annulum;* and afterwards by letters patent: but that, in procefs of time, he made the election over to others, under certain forms and conditions; as, that they fhould at every vacancy, before they chofe, demand of the king *congé d'elire*, *i. e.* leave to proceed to election; and after election to crave his royal affent, &c. He adds, that king John was the firft who granted this; which was afterwards confirmed by ftat. Weftm. 3 Edw. I. cap. 1. and again in the Articuli Cleri, 25 Edw. III. cap. 1.

Conge, in *Military Language*, leave of abfence granted to an officer or foldier from his corps, from the army or altogether from the fervice. The old fervice of France admitted of two kinds; namely, the *congé limité*, a fpecific or limited leave, and the *congé abfolu*, or an abfolute difcharge. In the latter cafe there was delivered to the foldier a *cartouche*, with all the fignatures on it neceffary for the good order and regularity of the fervice, and for the tranquillity of the perfon, who obtained it. The *congé abfolu* was always fufpended in time of war.

CONGEABLE, from the French *congé* (i. e. *leave, licence*, or *permiffion*), fignifies as much as lawful, or lawfully done, or done with leave or permiffion; as, *then entry of the diffeifee is* congeable.

CONGELATION (from the Latin *congelo*), means the tranfition of a liquid into a folid ftate, in confequence of the abftraction of heat; thus metals, butter, oils, water, &c. are faid to *congeal*, when, from a fluid ftate, they pafs into that of a folid.

Congelation and freezing mean, in fact, the fame effect; yet the term congelation is indifcriminately applied to all the above-mentioned tranfitions; whereas the word freezing is more commonly ufed for denoting the congelation of water, of vinegar, of brandy, of mercury, and in fhort of all thofe fubftances which, in order to become folid, muft be cooled below 32° of Fahrenheit's thermometer. We fhall, however, in this work, divide the fubject of congelation under the two above-mentioned denominations; ftating, under the prefent article, whatever relates to natural congelation, and under the article Freezing, whatever relates to the artificial methods of freezing.

Another important procefs, much connected with congelation, has been improperly feparated from it. And this is *cryftallization*, or the arrangement of certain fubftances into regular figures, in their tranfitions from the fluid into the folid ftate; but water and feveral other bodies likewife cryftallize in congealing, which fhews that the two proceffes can hardly be feparated; and this is rendered ftill more evident by a due confideration of other phenomena that accompany both proceffes. Allowing therefore that cryftallization and congelation are effentially of the fame clafs, a flight difcrimination may be formed by applying the term cryftallization to the formation of thofe regular forms or cryftals, which are of a compound nature, and which, when once formed, generally require a much greater degree of heat for their liquefaction, than that in which they were formed.

By far the greater number of liquids we are acquainted with, have been found capable of congelation in a proper temperature; and on the other hand moft of thofe folids which are fuch in the ufual temperature of the atmofphere may be rendered fluid by the application of certain appropriate degrees of heat; hence we are led by analogy to fuppofe, that every fluid might be congealed, if it were poffible to cool it fufficiently; or that fluidity is the effect or confequence of heat. Every particular kind of fubftance requires a different degree of temperature for its congelation; hence it appears why certain fubftances remain always fluid, whilft others remain always folid, in the ordinary temperature of the atmofphere, and why certain other fubftances are fometimes fluid, and at other times folid, according to the viciffitudes of the weather, the difference of feafons, and the variety of climates.

Heat, or fenfible caloric, continually tends to pafs from thofe bodies which have more of it than their proper fhare, to thofe contiguous bodies which have lefs of it than their proper fhare; hence, when a body is placed amongft other bodies of a lower temperature, its heat gradually paffes to thofe other bodies, until the whole acquires the fame temperature; and this tranfition proceeds regularly, excepting, however, when the body is in the act of affuming the folid ftate; for at that moment a fudden extrication of heat is obfervable. Place a thermometer in a glafs full of water,

and place the glafs in a freezing mixture of broken ice, and common falt, the thermometer will be found to defcend gradually as low as 30, or 28 degrees of Fahrenheit's thermometer, and fometimes even much lower, whilft the water remains fluid; but, at laft, the water begins to freeze, and at that very moment the thermometer rifes fuddenly to 32°, and it remains at that point until the whole of the water is congealed. If then the application of the freezing mixture be continued, the thermometer will fink gradually feveral degrees below 32°, according to the activity of the freezing mixture. We may, Dr. Black obferves, eafily fatisfy ourfelves, that the water, while congealing, is continually imparting heat to the furrounding air; for, if we fufpend a delicate thermometer immediately above the water, we fhall find the inftrument affected by an afcending ftream of air, lefs cold than the air around.

Not only pure water, but all aqueous fluids, may be cooled down 7, or 8, or 10 degrees without freezing; but if in that ftate they be affected with a tremulous motion, or if they be touched with a flender piece of ice, they will inftantly fhoot into beautiful fpiculæ, the thermometer in it rifing at the fame time. This ftriking phenomenon of the fudden rifing of the thermometer at the moment of congelation, which has alfo been remarked in wax, fpermaceti, and other fubftances, has not yet been fully or fatisfactorily explained. It is true that ice has not fo great a capacity for containing heat as water has; (fee the capacities of bodies under the article Caloric and Heat); but why fhould water fo reluctantly part with that fuperfluous quantity of heat as to fuffer itfelf fometimes to be cooled feveral degrees below 32, before it will affume the folid form?

Since water, when it has once begun to congeal, remains at the apparent temperature of 32° until the whole of it is congealed; and fince water cannot remain congealed in a temperature higher than 32°; therefore the congealed point of water has been fixed at 32°. of Fah.

The congealing points of feveral other fubftances have alfo been afcertained with confiderable accuracy. In fome, however, it is not the congealing, but the melting, point that has been afcertained. Thefe two points, if they be not quite the fame, may naturally be fuppofed not to differ more than about a degree or two; hence from the latter the former may be eafily deduced. In the following table, however, we fhall fet down the one or the other of thofe points, according as either of them has been more accurately determined.

Table of the congealing, or melting points of different fubftances, expreffed in degrees of Fahrenheit's fcale; the high degrees of which have been eftimated by the equivalent degrees of Wedgwood's thermometer.

Platina melts	23177°. F.
Manganefe melts	28877.
Iron melts	21637.
Nickel melts	20577.
Pig iron begins to melt; Cobalt melts	17977.
Fine gold melts	5237.
Settling heat of flint glafs	4847.
Fine filver melts, according to Mr. Wedgwood	4717.
Fine filver melts, according to Sir James Hall	3937.
Swedifh copper melts	4587.
Brafs melts	3807.
Zinc melts	700.
Lead melts, according to Newton	540.
Lead melts, according to Seconat	585.
Lead melts, according to Irvin	594.
Lead melts, according to Parker	612.
Lead fixes, according to Crichton of Glafgow	612°. F.
Bifmuth melts	460.
Bifmuth melts, according to Irvin	470.
A mixture of one part of tin and four of lead, melts	476.
Tin melts	408.
Tin melts, according to Irvin	413.
Tin melts, according to Crichton of Glafgow, it congeals at	442.

The laft mentioned gentleman fays, "in melted tin the thermometer funk gradually till it arrived at 442°; then it inftantly funk to 439°; and as inftantly rofe to 442°. At this temperature the mercury remained perfectly ftationary for five minutes, at which time the metal became folid to the centre of the crucible."

A mixture of three parts of tin and two of lead melts; A mixture of two parts of tin, and one of bifmuth melts	334.
A mixture of tin and bifmuth, in equal parts, melts	283.
Sulphur melts	234.
A mixture of five parts of bifmuth, three of tin, and two of lead, melts	212.
A mixture of three parts of tin, five of lead, and eight of bifmuth, melts	219.
Serum of blood begins to coagulate at	156.
Albumen, or the white of an egg, coagulates at	156.
Bees wax melts	142.
Tallow melts	127.
Spermaceti melts	112.
Ice, or congealed water, begins to melt	32.

The increafe of the bulk of water previous to, as alfo following, its point of congelation is a remarkable property, which has been more or lefs obferved with all aqueous fluids, *viz.* they are contracted by cold, until a certain limit, which generally is about 7 or 8 degrees higher than their congealing point; they then expand again as they are cooled farther, and if they are not agitated, they will remain liquid at a temperature lower than their congealing point. The greateft denfity of water, Count Rumford fays, is fomewhat lower than 40°. Profeffor Hope of Edinburgh places it between 39°.5 and 40°. Mr. Dalton fays, that the greateft denfity of water is at the temperature of 42°.5. And that the expanfion of water is the fame at the diftance of the fame number of degrees above and below 42°.5. Thus the expanfion is the fame at 32° and 53°; the fame at 10° and 75°, &c. The increafe of bulk in freezing water is not owing to the formation of air bubbles, for water, which has been deprived of air, will alfo expand in freezing. The bulk of ice, at a mean, is to that of the water which it produces, as 9 to 8. This enlargement of bulk is attributed to a cryftallization; the particles of water in freezing tend to arrange themfelves fo as to form angles of about 60 and 120 degrees; and this tendency is exerted with a prodigious force. Mr. Leflie fays, "water neceffarily difcharges its air previous to the act of congelation; a circumftance which fometimes retards that fpecies of cryftallization. Hence it is, that water freezes fooner which has been boiled. When expofed to cold, crude water will prefent a cake of ice crowded with large bubbles entangled in the mafs; but boiled water will contain a folid lump, almoft pellucid, with only fome minute fpecks or ftriæ fhooting from the centre." Dr. Black fays, that boiled water begins to freeze as foon as the air has cooled it to 32°. Iron likewife occupies lefs room when fluid than when folid. And the fame thing has been afferted of two or three other metallic fubftances.

Vinegar

Vinegar congeals at about - - - 28°. F.
Human blood congeals at - - - - - 25.
Strong wines congeal at about - - - 20.
A mixture of one part of alcohol and three of water congeals at - - - - - - 7.
A mixture of alcohol and water, in equal parts, congeals at - - - - - - *minus* 7.
A mixture of two parts of alcohol and one of water, congeals at - - - - *minus* 11.
Mercury congeals at - - - - *minus* 39.
Mercury expofed to cold, and at about the point of congelation, contracts its bulk irregularly. This fubftance may be cooled fome degrees below its freezing point, before it affumes the folid form; but as foon as it begins to harden, the thermometer rifes to its freezing point, which, from a variety of experiments made by Mr. Hutchins at Hudfon's Bay, appeared upon his thermometer to be —40°. "But (Mr. Cavendifh obferves in the Phil. Tranf. vol. lxxiii. p. 321.) as it appeared from the examination of his thermometer, after it came home, that —40° thereon anfwers to —38⅔ on a thermometer adjufted in the manner recommended by the committee of the Royal Society; it follows, that all the experiments agree in fhewing that the true point at which quickfilver freezes, is —38⅔, or in whole numbers 39° below nothing."
In becoming folid, mercury fometimes fhoots into cryftals or longitudinal filaments like pins. The firft obfervations concerning the natural congelation of mercury were made by Mr. Gmelin about the year 1735, at Yenefeick in lat. 58½° north, at Yakutfk in lat. 62° north, at Rivengo, lat. 57½° north, and elfewhere. (See the Peterfburg Commentaries for the years 1756 and 1765). Profeffor J. A. Braun, of Peterfburg, in the year 1759, firft accomplifhed the congelation of mercury by art, *viz.* by means of fnow and aqua fortis. But with refpect to the artificial methods of congealing mercury, and their hiftory, fee the article FREEZING.
Nitric acid is faid to congeal at - - *minus* 66.

With refpect to the congelation of the fulphuric, or vitriolic acid, the greateft number of experiments feems to have been made by Mr. Keir, and from thofe experiments he infers: "1. That the vitriolic acid has a point of eafieft freezing, and that this is when its fpecific gravity is to that of water as 1780 to 1000. 2. That the greater or lefs difpofition to congelation does not depend on any other circumftance than the ftrength of the acid. 3. That the freezing and thawing degree of the moft congealable acid is about 45° of Fahrenheit's fcale. It is, however, to be obferved, that this degree is inferred from the temperature indicated by the thermometers immerfed in the freezing and thawing acids; but the congelation of the fluid acid could never be accomplifhed without expofing it to a greater degree of cold, either by expofing it to the air in frofty weather, or to the cold of melting fnow. 4. Like water, this acid poffeffes the property of retaining its fluidity when cooled feveral degrees below the freezing point; and of rifing fuddenly to it when its congelation is promoted by agitation, or by contact even with a warmer thermometer. 5. That, like water and other congealable fluids, the vitriolic acid generates cold by its liquefaction, and heat during its congelation, though the quantity of this heat and cold remains to be determined by future experiments. 6. That the acid, by congelation, when the circumftances for diftinct cryftallization are favourable, affumes a regular cryftalline form, a confiderable folidity and hardnefs, and a denfity much greater than it poffeffed in its fluid ftate."

The heat of the earth, at leaft on the furface of it, is derived entirely from the fun; for the heat arifing from combuftion, as about volcanos, or from decompofition of bodies, is trifling and partial. The direct rays of the fun on the fame fpot of the furface of the earth heat it more or lefs, according to the time of the year, clearnefs of the atmofphere, ftate of the winds, colour and quality of the fpot. In Great Britain, during the hotteft time of the fummer feafon, the direct rays of the fun feldom raife the mercury in the thermometer fo high as 110°. But in other climates, efpecially within the tropics, the mercury is raifed confiderably higher by the like expofure. Yet we muft not believe the idle ftories of the fun's heat melting lead, or fetting fire to gun-powder, without the affiftance of lenfes, fpeculums, or other artifice.

It is not on account of the fun's being nearer or farther from the earth, that we receive much more heat in the fummer than in the winter time; fince the difference of thofe diftances is too fmall to be fenfibly felt; but we receive more heat in the fummer than in the winter feafon. 1. Becaufe the fun comes nearer to our zenith in the fummer than in the winter time, in which fituation its rays pafs through a fhorter portion of the atmofphere, and of courfe are lefs intercepted by it. 2. Becaufe, when the fun is nearer to the zenith, a greater quantity of its rays falls upon a given horizontal part of the furface of the earth, than when that luminary ftands lower, and its rays fall more obliquely upon the fame fpot. 3. Laftly, becaufe the fun remains longer above the horizon during a fummer day than a winter one.

The hotteft part of the day is not at noon, nor that of the year when the fun paffes neareft the zenith of a given country; but the hotteft part of the day, when no accidental circumftance intervenes, is fome time in the afternoon, and nearer to noon in the winter than in fummer. In this country and in fummer, the hotteft part of the day generally is either precifely at, or a little before, two o'clock. The hotteft time of the year in this country generally takes place in July, *viz.* after the folftice. The reafon of this is, that though the rays of the fun give more heat when the fun ftands higher, and of courfe at two o'clock they muft give lefs than at noon; yet the earth, and the air contiguous to it, are hotter at two o'clock, becaufe, befides the heat which they are actually receiving from the fun, they retain a confiderable portion of the heat acquired before that time; fo that as long as they acquire at any particular time, a greater quantity of heat than they lofe of that which they had previoufly acquired, their temperature muft continue to increafe. The fame thing muft be underftood with refpect to the communication of cold, which, for fimilar reafons, is greateft fome time after midnight, and fome time after the fhorteft days of the year. The earth acquires heat in the day time, and lofes it during the night. In the fummer feafon the lofs of heat during the night is lefs than the acquifition of it during the day; therefore that excefs of heat is gradually communicated from the furface to the more internal parts of the earth. But when the above-mentioned fummer heat has penetrated a certain way, the winter cold begins to counteract it; and when that cold has penetrated a certain way, the next fummer heat begins again to counteract it, and fo on; hence, below a certain depth there is no alteration of temperature at any time of the year; unlefs fome local combuftion or other fource of heat fhould interfere, which, however, feldom occurs. This fixed degree of temperature at a certain depth below the furface of the earth, varies in different countries, and nearly coincides with the mean temperature of the particular country. Thus in London the mean temperature is 50°; and if a bucket of water be drawn from a pretty deep well, and a thermometer be

be inftantly placed in it, the temperature of that water, (which is the fame as that of the ground furrounding the bottom of the well) will alfo be found to be 50°. In procefs of time the mean temperature of a country is liable to fome alteration arifing from cultivation, clearing of grounds, draining of marfhy grounds, &c. See CLIMATE.

With refpect to the temperature at different altitudes, it has been found that a thermometer placed clofe to the ground is fometimes affected by heat or cold, fooner, or in a greater degree, than a thermometer placed 20, or 30, or 60 feet, higher up; and that at other times the latter is affected fooner, or in a greater degree, than the former. In the night time, efpecially when the air is ftill, and the fky quite free from clouds, a thermometer clofe to the ground generally indicates a greater degree of cold than in a higher fituation. The true caufe of this phenomenon is not fully underftood; though it is attributed to evaporation, or according to Mr. Six, to the coolnefs which the dews or vapours may acquire in their defcent.

At great heights above the furface of the earth, either in the free air, or on the fummit of high mountains, the cold is much greater, and it increafes more fuddenly; 1ft, becaufe they are much more expofed, and 2dly, becaufe they are more remote from the body of the earth, which, as has been obferved above, tends to equalize the temperature, by retaining in the winter time a confiderable degree of the heat acquired in the courfe of the fummer. The winds to which mountains are expofed, efpecially thofe which, after having blown over the plains below, rife along their fides, have a peculiar refrigerating power, arifing from the expanfion of the afcending air, which becomes capable of abforbing more heat in proportion as it is more rarefied. See Dr. Darwin's Paper, Phil. Tranf. for 1788.

Thus we have briefly ftated the natural fources, and the principal caufes which check or promote the heat and the cold, that are ufually experienced in the world, at different times of the day, of the year, and in different countries; whence alone one may pretty well conceive where and when natural congelation may be expected to take place. Yet it is neceffary to fubjoin fome farther obfervations, that have been made with refpect to natural congelation at different times and different places.

The greater obliquity with which the fun's rays fall upon the northern and fouthern parts of the earth, than they do upon fuch parts as are near the equator, undoubtedly produces the variety of the mean temperatures that are obferved in different latitudes; the higher latitudes being generally colder than the lower, and *vice verfâ*. But this gradation is partly counteracted by a variety of local circumftances; and fuch are the vicinity of large tracts of land or great extent of fea, the face of the country being flat or hilly, the difpofition of the hills and mountains, the prevalence of rain and of certain winds, the ftate of cultivation, &c. The influence of winds in certain latitudes is fo very great that a froft or thaw is brought on within a remarkably fhort time by a change of the wind. The action of winds on the temperature of a country principally depends upon three circumftances, *viz.* on their bringing a quick fucceffion of new air in contact with the bodies that are expofed to it, on their having paffed over the furface of hotter or colder tracts of water or land, and upon their increafing the evaporation. Sauffure found that when the wind moves at the rate of forty feet per fecond, it triples that quantity of evaporation that would take place in calm air; hence it follows that frequently unufual heats or colds come on at unexpected times, and that the higher ftrata of the atmofphere are often warmer than the lower; for the heat of the atmofphere is derived not from the immediate action of the fun's rays which pafs through it, but from the warmer and more folid bodies with which it has been, or is, in actual contact. In confequence of thefe various circumftances, it has been obferved that the north Pacific Ocean, above latitude 40°, is much colder than the north Atlantic, between the fame parallels of latitude. The interior parts of Siberia, eaft of longitude 100°, are much colder than the parts equally diftant from the meridian on the weftern fide. The coaft and interior parts of the weftern regions of America are much colder above the latitude of 40°, than the correfponding tracts of the continent of Europe. Large feas, which are agitated by winds and currents, are thereby fo little affected by cold winters or hot fummers, as to preferve a temperature nearly uniform in every feafon, like the internal parts of the earth.

With refpect to the mean temperature of places at different altitudes above the level of the fea, but in the fame country, or nearly about the fame fpot with refpect to latitude, the heat diminifhes nearly one degree of Fahren. for every 200 feet of elevation, according to Dr. Black. Other writers find reafons to affert, that the diminution of one degree takes place at every 299 feet of elevation.

From the ftatement of all the above particulars the reader may form fome idea of the time and place when natural congelation may be expected, and he will at the fame time be able to perceive that clofe to the furface of the earth, no great regularity can be expected. On the continent of Europe congelation formerly took place at a lower latitude than it does at prefent, when natural congelation is feldom obferved lower than the latitude of 40°. In America congelation has been obferved at a much lower degree; and it is remarkable that great degrees of heat, as well as great degrees of cold, are alternately experienced on the fame fpots of that continent. In the more northern parts of the world the degrees of cold are very extraordinary. At Torneao, Reaumur's fpirit thermometer fell to minus 34°. In Siberia the fpirit thermometer has been known to defcend as low as minus 121°. Even at the Glafgow obfervatory in the year 1780, the mercury of the thermometer expofed to the ambient air was found to ftand at minus 14°.

The altitude on the fides of mountains, at which conftant congelation takes place, feems to be lefs fluctuating, though not accurately afcertained. This altitude varies with the latitude; but even in the torrid zone perpetual congelation has been obferved (according to Bouguer and others) at the altitude of about 15600 feet. This altitude, at which the congelation is conftant, or where water ceafes to be a fluid, and beyond which vifible vapour does not feem to afcend, is called the *upper line of congelation*. The *lower line of congelation* is where it freezes at night only. The upper line of congelation, within the tropics, has been obferved at the altitude of 15600. Near the tropics, on the fides of the temperate zones, it lies at the height of about 13428 feet. On the ifland of Teneriffe, in lat. 28° N., it lies at the altitude of about 10000 feet. In Auvergne, lat. 45° N., the line of congelation is at the altitude of 6740 feet. In latitude between 51° and 54° N. it feems to be at the altitude of about 5800. In latitude 80° north, lord Mulgrave found the line of congelation at the altitude of about 1200 feet above the level of the fea; whence, if the progreffion continues uniformly, as general Roy obferves, we may conclude that the furface of the earth, at the pole itfelf, is for ever covered with congelation. Mr. Kirwan, however, places the upper line of congelation confiderably higher. See his paper on the variations of the atmofphere, in the 8th vol. of the Tranf. of the Royal

Royal Irifh Academy. He reckons the altitude of the line of congelation from 0° to 10° of north latitude, at about 27700 feet; from 10° to 15° at about 26400 feet; from 15° to 20°, at about 25200 feet; from 20° to 25°, at about 24000 feet; from 25° to 30°, at about 22000 feet; from 30° to 35°, at about 20000 feet; from 35° to 40°, at about 17000 feet; from 40° to 45°, at about 15000 feet; from 45° to 50, at about 12500 feet; and for every one of the other degrees of latitude, at the altitudes which are annexed to them in the following table. Thefe refults, however, he deduced by computation from a few afcertained particulars.

Degrees of N. lat.	Altitude of the line of congelation.	Degrees of N. lat.	Altitude of the line of congelation.
51°	10124	71°	4354
52	8965	72	4295
53	7806	73	4236
54	6647	74	4177
55	5617	75	4119
56	5533	76	4067
57	5439	77	4015
58	5345	78	3963
59	5251	79	3911
60	5148	80	3861
61	5068	81	3815
62	4989	82	3769
63	4910	83	3723
64	4831	84	3677
65	4752	85	3631
66	4684	86	3592
67	4616	87	3553
68	4548	88	3514
69	4480	89	3475
70	4413	90	3432

CONGENERES *mufculi*, in *Anatomy*, are fuch mufcles in an animal body, as ferve together to produce the fame motion; and they are fo called becaufe they affift one another in their action.

CONGER, or Conger-eel, in *Ichthyology*, the largeft of the Muræna tribe. This voracious fifh grows to the length of five or fix feet, and the thicknefs of a man's thigh. The colour of the upper part is dark grey, fometimes inclining to olive, and the belly pure white; but it is principally diftinguifhed from the other fpecies of the muræna genus by having the lower jaw rather fhorter than the upper; nofe with two tentacula, and the lateral line whitifh, with a row of fpots. See Muræna.

CONGERIES, a Latin word, fometimes ufed in our language for a collection or heap of feveral particles, or bodies, united into one mafs or aggregate.

Congeries, in *Rhetoric*. See Synathroismus.

CONGESTION, in *Medicine*, has been ufed to denote an enlargement of any part of the body, efpecially when accompanied with hardnefs, or alteration of ftructure, which, in the opinion of the humoral pathologifts, was produced by a collection of morbid humours, depofited in the part. The term is ftill employed, chiefly to exprefs the morbid increafe of diftention in the blood-veffels in inflamed parts, or morbid effufions of blood or lymph in the vifcera. Thus, a *congeftion* of blood in the veffels of the brain is faid to have produced apoplexy, when, on diffection, veffels which are ufually invifible, are obferved to be filled with red blood; and congeftion is faid to exift in the lungs, when the circulation of the blood through the minute ramifications of the blood-veffels is impeded, or when lymph is poured out into the cells of the bronchiæ, as in the catarrhus fenilis, and peripneumonia.

CONGHE' Lake, in *Geography*, a lake of Thibet, which intervenes between the Mangarvar lake, and the head of the river Sanpoo.

CONGIARUIM, Congiary, among *Medalifts*, a gift or donative, reprefented on a medal.

The word comes from the Latin *congius*; becaufe the firft prefents made to the people of Rome confifted in wine and oil, which were meafured out to them in congii. The congiary was properly a prefent made by the emperors to the people of Rome. Thofe made to the foldiers were not called *congiaries*, but *donatives*.

The legend on medals reprefenting congiaries, is *congiarium*, or *liberalitas*.

Tiberius gave a congiary of three hundred pieces of money to each citizen: Caligula twice gave three hundred fefterces a head. Nero, whofe congiaries are the firft that we find reprefented on medals, gave four hundred. The congiarium of Nerva had on its reverfe five figures.

CONGIO, or Cungio, Camillo, in *Biography*, was a defigner and engraver of confiderable talents. He was born at Rome about 1604. Little is known of his life, except that he followed his profeffion at the place of his nativity, and at Florence. About the year 1630, he engraved feveral of the plates for the Galleria Juftiniana. Moft of the twenty plates for Taffo's Jerufalem, from the defigns of B. Caftelli, are by Congio, as likewife feveral of the engravings in the fine work entitled Odes Barberinæ. Befides the above, we have many prints by him executed in a bold and firm manner, from the defigns or pictures of Tempefta Lanfranco, Pomerancio, and other mafters, and fome from his own drawings. His plates are generally marked with two C's, the top of one joined to the bottom of the other; or in this manner: C. C. F. the F. ftanding for fecit. Strutt. Huber, Manuel des Arts.

CONGITELLA, in *Antiquity*, half a congius.

CONGIUM, in *Ancient Geography*, a town of Spain, placed by Ptolemy in the Tarragonenfis territory; the country of the Vaccæans, fuppofed to be the prefent Cabeçon.

CONGIUS, an ancient Roman meafure of capacity, or for things liquid, $= \frac{1}{8}$ of a cubic old Roman foot, $= 8$ fextaries, $= 197.137$ cubic Englifh inches, $= .1141$ cubic Englifh feet.

From the original ftandard of Vefpafian extant at Rome, Greaves deduced the value of the Roman pound to be 5256 Troy grains. See Denarius. But Mr. Raper, in an excellent paper on this fubject, has fuggefted feveral objections againft the accuracy of this conclufion. Phil. Tranf. vol. lxi. part ii. p. 496.

The congius has alfo been ufed in England, as appears by a charter of king Edmund in 946.

CONGLETON, in *Geography*, a fmall corporate town in Chefhire, England, is fituated near the upper part of the river Dane, on the borders of Staffordfhire, and governed by a mayor and fix aldermen. It poffeffes two churches, both fubject to the mother church of Aftbury, a village two miles diftant. The town was formerly celebrated for the manufacture of tagged leather laces, called Congleton points; but the chief employment of the poor is now derived from a very capital filk mill erected on the river; and from a ribbon manufactory. In the church-yard of Aftbury are two ancient ftone monuments, ornamented with the infignia of knighthood; but the families whofe memory they were intended to record are now unknown. Congleton is 163 miles N.W. from London; has a market on Saturdays.

In

In the return under the late act the houſes were eſtimated at 855, the inhabitants at 3861, of whom 1713 were males and 2148 females.

CONGLOBATE *glands*, in *Anatomy*, thoſe glands whoſe ſubſtance is not divided, but firm, entire, and continued; and their ſurface ſmooth and uniform.

They are thus called, in oppoſition to *conglomerate* glands. Conglobate glands have each of them an artery which brings them blood, a vein which carries it back again, after the proper juice has been filtrated, and ſeveral excretory ducts.

Some of them have a cavity in the middle, with lymphatic veſſels, which diſcharge themſelves into a common reſervoir, or canal.

CONGLOBATE *flowers*, are thoſe with globular heads.

CONGLOMERATE *glands*, are thoſe which are compoſed of ſeveral little ones; or they are ſeveral glandulous bodies joined together under the ſame common membrane. See GLAND.

Such are the ſalival glands, lachrymal glands, the pancreas, &c. which ſee under their proper articles.

The conglomerate glands, beſides their arteries, veins, and nerves, are alſo furniſhed with an excretory veſſel, ramified throughout their own ſubſtance; by means whereof they diſcharge the liquors they have filtrated into reſervoirs.

CONGLOMERATE *flowers*, are thoſe which are irregularly crowded together.

CONGLOMERATION, in *Mineralogy*, is the term uſed to expreſs confuſed mixtures or concretions of different mineral ſubſtances. Kirwan's Geol. Eſſays, p. 303 and 306.

CONGLUTINATION, the act of gluing, or faſtening two bodies together, by the intervention of ſome third, whoſe parts are unctuous and tenacious, in the nature of a glue, *gluten*; from whence the word is formed.

In the animal œconomy, the parts of the body are ſaid to be conglutinated by means of their natural moiſture; by the help of bandages, as in ſeveral caſes of ſurgery; or by the ſupply of viſcid particles. In which laſt acceptation, conglutination differs little from accretion, or nutrition.

CONG-MOU-ING, in *Geography*, a town of China, in the province of Se-tchuen; 42 miles N.W. of Hoei-li.

CONGO, or KONGO, a name given to the country of Africa, otherwiſe called *Lower-Guinea*, which ſee. It is commonly divided into Loango, Angola, Benguela, and Congo Proper.

CONGO, or KONGO, *Proper*, a kingdom of Africa, bounded on the north by the famous river Zair or the river of Congo, which divides it from that of Loango, on that ſide; on the ſouth by that of Dando, which ſeparates it from the kingdom of Angola; on the eaſt by the kingdoms of Fungono and Metamba, and the burnt mountains of the ſun, thoſe of cryſtal or ſalt-petre and ſilver, and by the rivers Verbela and Chilandea; and on the weſt by the Ethiopic ſea, called the ſea of Congo. Its extent from N. to S. and from E. to W. has not been accurately aſcertained; but according to the relation of John Anthony Cavazzi de Monte Cuculo, a Capuchin miſſionary, the dominions of the kings of Congo were much extended towards the eaſt and the ſouth, before the introduction of the Chriſtian religion; but ſince this event, many of the remote provinces in theſe directions have been diſmembered, ſo that Congo was reduced from above 600 leagues in circuit to leſs than one-half of that extent. Being ſituated under the torrid zone, it is ſubject to the exceſſive heats peculiar to that climate; however, they are conſiderably mitigated by winds and breezes, rains and conſtant dews; as well as by the more equal length of days and nights. Their ſummer and winter, which compoſe their year, are divided into ſix ſeaſons, which they call maſſanza, neaſu, ecundi, quitombo, quiliſo, and quimbangala. The firſt commences with the month of October; which is the beginning of their ſpring, when the rains begin to fall; and they continue during the two, and ſometimes the three, next months. The floods that are thus occaſioned are commonly followed by a famine. Their ſecond ſeaſon begins about the end of January, which is followed by harveſt and new ſowing; their lands commonly yielding them two harveſts. The third and fourth ſeaſons are frequently blended towards the beginning of March, when the more gentle rains begin to fall and continue till the month of May; at which time the air is clear and dry, but occaſional clouds burſt forth into tremendous lightning and thunder without rain; theſe two ſeaſons laſt till about the beginning or ſometimes till the end of September. The two laſt ſeaſons conſtitute their winter, which conſiſts not in froſt or ſnow, for theſe are unknown in this climate, but in dry blaſting winds, that ſtrip the earth and trees of their verdure, till the next maſſanza, or ſpring, reſtores their vernal bloom. The Congoeſe divide the year into twelve lunar months, commencing like that of the Jews, in September. Their week conſiſts of four days; three of which are appointed for labour, and the fourth for reſt or religious exerciſes. The general indolence of the inhabitants prevents their deriving any ſubſtantial benefit from the fertility of their ſoil, which duly cultivated would yield a double, and ſometimes a triple, crop yearly. But the negroes, averſe from labour, ſpend their time in dancing, leaping, hunting, and ſhooting, or in ſmoaking and more liſtleſs indolence; whilſt they commit to their ſlaves, or their wives, the operations of digging, ſowing, reaping, cutting woods, grinding corn, and fetching water. Their ground produces variety of grain, but no corn or rice beſides that which is cultivated by the Portugueſe. Of their maiſe, of which they have regularly two crops, they make their bread. They have three other ſorts of grain, which they apply to the ſame purpoſe. They alſo cultivate a variety of pulſe, as beans and peaſe of different ſorts, which ſerves them for part of their food. Their fruit-trees have been chiefly trees planted there by the Portugueſe; and of palm-trees, which are exotic and brought from America, they have no leſs than eight ſorts, which are all excellent in their kind. If we may credit the accounts that are given of the productions of the country, which ſometimes border on the fabulous, they have a tree called Aliconda, ſo large that ten men cannot fathom it, yielding a fruit which reſembles a gourd, and which ſerves for veſſels of various uſes; the bark of which furniſhes them with a coarſe thread, which they form into ropes and into a cloth, with which the natives cover their middle from the girdle to the knees; and the ſmall leaves of which ſupply them with food in a time of ſcarcity, while the large ones are uſed for covering their houſes, or by burning for the manufacture of good ſoap. Of the bark of the infanda tree, and alſo of the mulemba, reſembling in many reſpects our laurel, they form a kind of ſtuff or cloth, which is fine and uſed for cloaks and girdles by perſons of the higheſt rank. The oil of their palm-trees is uſed inſtead of butter; with the moſs that grows about the trunk, the rich commonly ſtuff their pillows; and the Giagas apply it to their wounds with good effect: with the leaves the Moors cover their houſes, and they draw from theſe trees, by inciſion, a pleaſant liquor like wine, which however turns four in five or ſix days. From the Congo palm-tree, ſo called, becauſe it thrives better in that country than any of the other ſorts, they obtain a liquor, which is reckoned as valuable as the wine that is brought from Europe, though it is rather a kind of milk, ſweet and agree-

ably tart, which will become four in three or four days, and is so strong and heady, that a pint of it will produce intoxication. The fruit of this tree, not unlike a peeled chesnut in colour, taste, and substance, is the common food of the poorer class. With the oil that is drawn from it the natives dress their victuals; but the Europeans only burn it in their lamps. Of their shrubs we shall only mention that which they call capano, or "the fig of hell," from the nut of which they extract an oil for the lamp, and which they also use in the composition of their ointments and plasters. The leaves burnt to ashes, afford a good lye, with which the natives wash their bodies. The Portuguese have taken care to plant several other fruits, as oranges, lemons, citrons, granates, cedars, and others, which thrive as well as in their native soil. Vines have also been brought hither from Candia; and they yield excellent grapes twice a year. They have also plants of the aromatic kind, which yield substitutes for cinnamon and pepper. Their manioc, of which they make bread, is the same which is used in Asia and America; their potatoes and other roots of a like kind yield a grateful nourishment. Wheat is the only grain which the ground will not produce, as it shoots up into straw and ear, the former being high enough to hide a man on horse-back and the latter being unfilled. Their grass grows to a great height, and affords sheltering places for a variety of wild and voracious beasts, and venomous insects; so that it is dangerous to travel through the country on this account. Their lilies, tulips, tuberoses, hyacinths, &c. grow wild, and are singularly beautiful.

The principal rivers of this country are the Zair, into which fall the Bancaro, Vambra, Coungo, and Barbela or Vervel, the Dando, which see respectively. Between the Zair and Dando, are the Lehunda, Doce, Ambriz, Loze, Onzo, and Lutana, with several others of less note.

Congo is divided into six large provinces, under the titles of duchies, counties, and marquisates, and these again are subdivided into lesser signiories or lordships. The situation of these provinces is as follows; along the sea coast lie the county of Sogno, and the great duchy of Bamba; on the north, the duchy of Sundi, and the marquisate of Pango; on the west, the duchy of Batta; and within land, the marquisate of Pemba. See each respectively. The capital of the whole kingdom is Banza, or St. Salvadore, which see. Independent of the six districts above enumerated, Congo has several other lesser provinces, most of which are covered with forests or mountains, and inhabited by a race of men in a barbarous and savage state: their names, as we learn from Cavazzi, are Zuiona, Zujamazondo, Ndamba, Nsusso, Nsellajuva, Alombo, Nsolo, Nzanga, Marsinga, and Mortonda; the three last of which border upon the country of Ajacoa, a nation more barbarous than any of the rest.

The kingdom of Congo, like most other parts of Africa, breeds a prodigious variety of living creatures, both wild and tame, and particularly those of the former sort; such as elephants and lions, of a monstrous size, leopards, tygers, wolves, and other voracious animals. The zebra of this country is a beautiful animal, which the natives hunt, on account of its flesh, which they esteem a dainty food, and for its hide which they send to Europe as a valuable commodity. In this country they have also a great abundance of buffaloes and wild asses. The "Dante" seems peculiar to this country; in shape and colour it resembles an ox, but is not so large; its horns are like those of a he-goat, but very smooth and shining, and of a blackish hue, of which the natives make a variety of pretty baubles; the skin is commonly bought by the Portuguese, and sent into Germany, to be tanned and made into targets, called "Dantes;" and of the raw hide dried, the natives make their shields, which are impenetrable to arrows and darts, and so large as to cover the whole body. Cameleons swarm in Congo; and it has several sorts of wild rats, as the ningi, nsossi, and maimoni, whose furs excel those of the finest tygers, in the beauty, variety, and regularity of their streaks and spots. The forests also swarm with wild dogs, which are extremely fierce and voracious. It has also one singular quadruped, which abides constantly in the trees, and which is said to die immediately upon setting its feet on the ground; it is called "entiengia," and is very small; its skin is so beautifully spotted, that none but the kings of Congo, the princes of the blood, and such nobles as obtain the privilege from him, have the liberty of wearing it. And even the kings of Lovango, Cacongo, and Gay, receive this extraordinary fur, as a valuable present.

The tame animals of Congo, such as oxen, sheep, hogs, horses, mules, and asses, which might be rendered useful and profitable, are much neglected. The Portuguese, however, have directed their attention to the cows, sheep, and goats, chiefly on account of their milk, though they have not learned to make butter or cheese. The land and sea fowls of this country are very numerous; its ostriches are very large and beautiful; the feathers of which, mixed with those of peacocks, no less numerous and beautiful, are used, instead of ensigns and standards, and made into umbrellas. Turkies, geese, hens, and ducks, both wild and tame, and also pheasants, pigeons, doves, woodcocks, and other smaller birds, abound in this country. Of parrots there is a great variety, distinguished both by their size and colour; the most esteemed of these are such as they denominate, by way of excellence, the birds of music, which are kept by persons of rank in cages and aviaries, for the sake of their surprising melody. Here are other birds which the superstitious natives regard with horror; the flight or cry of which throws them into a general panic, and occasions them to disperse with the utmost precipitance and confusion. The most dreaded of the ominous kind are crows, ravens, bats, owls, and especially the great owl, which they call, in their language, "kariam pemba," the name they give to the devil. Birds of prey, such as eagles, vultures, falcons of various sorts, sparrow-hawks, and others of a similar kind, are found in great numbers. Herons, bitterns, and some others of the like voracious kind, commonly abound in their marshes, lakes, and other waters. Among these they have a bird, in shape and size like a crane, and one in particular, called by the Portuguese the pelican, of a large size and whitish colour; and also another called the fisher, which darts from a surprizing height in the air on the fish which he perceives in the sea or in rivers. Of fish, the sea adjoining to this country, and its rivers, afford great plenty and variety. The inhabitants are likewise infested with a great variety of serpents, very long and thick, rattle-snakes, vipers, and other venomous reptiles, scorpions, and other venomous insects, both flying and reptile, of various kinds, are found in this country. This country is said to possess mines of silver and gold, as well as of iron and copper; but the people are too indolent to work them, or to derive any great advantage from them.

When the Portuguese first discovered this country, in the reign of John II., in the year 1484, they found it for the most part covered with towns and villages, swarming with inhabitants; the cities being well filled with people, and particularly the metropolis, which contained above 50,000 persons. We may form some judgment of the population of the country by this circumstance, *viz.* that the army of the king of Congo, in the year 1665, consisted of no less than

than 900,000 fighting men; and, befides, the number of converts to Chriftianity, which a fmall number of Capuchin friars made among the more civilized fort, within the fpace of a few years, is affirmed to have amounted to 600,000. The furprifing fecundity of their women, the hardinefs with which they bring up their children, and the robuft healthy conftitution of their men, if we may credit Cavazzi, and the miffionaries, are fuch that their villages and hamlets fo fwarm with men, women, and children, that a father will exchange one or two of the latter for fome commodity he wants, or even fome trifling bauble which he fancies; infomuch that the number of flaves they fell abroad, doth feldom, communibus annis, fall fhort of 15 or 16 thoufand. Notwithftanding the indolence and confequent poverty of the Congoefe, they entertain the moft extravagant conceit both of themfelves and of their country; fo that it is one of the articles of their belief, that the reft of the world was the work of angels, but that their kingdom of Congo, in its full and ancient extent, was the immediate production of the Supreme Architect himfelf, and muft of courfe enjoy fingular advantages and prerogatives above all others; and that their monarchs muft be the moft opulent, wife, and powerful, and their fubjects the nobleft, richeft, moft ingenious, and happieft in the univerfe. They imagine alfo, that the natives who traffic with them are forced to undertake that fervile employment by their poverty and the fterility of their refpective countries, rather than induced to it by their luxury and avarice; whilft they themfelves, with the utmoft eafe and content, can indulge their natural indolence, though attended with hunger and mifery, rather than difgrace the noblenefs of their blood by any kind of induftry; which, however laudable and beneficial, is regarded by them as a leffer degree of flavery. However, fince the fettlement of the Portuguefe, they have been roufed by their example from this kind of fantaftic pride and fhameful floth into occafional and partial exertion; in weaving nets, and other coarfe ftuffs, fawing of boards, feveral branches of carpentry, and other manufactures and trades. But though they think it beneath their dignity to apply to any ufeful work, they deem it no difgrace to beg and fteal.

The complexion of the genuine natives, that both of the men and women, is black, but fome of them are of a deeper dye than others. Since their intermarriages with the Portuguefe, they have varied from their native hue; fome to a dark brown, fome to an olive, and others to a blackifh red. Their hair is black and curled, and in fome cafes of a dark fandy; their eyes are generally of a fine lively black, but fome are of a dark fea-colour; they have neither flat nofes nor thick lips, like the Nubians and other negroes; their ftature is moftly of the middle fize; and, excepting their black complexion, they much refemble the Portuguefe, though fome of them are more fat and flefhy. In their difpofition, they are generally miftruftful, jealous, envious, and treacherous, and much inclined to revenge. They are fo far devoid of natural affection, that a father will fell his fon or daughter, and perhaps both, for a piece of cloth, a collar or girdle of coral or beads, and often for a bottle of wine or brandy. A hufband may have as many wives, or if a Chriftian, as many concubines, as he pleafes, and repudiate, or even fell them, though with child, at his pleafure. The religion of the country, before the Portuguefe introduced their Chriftianity into it, was, and ftill is, among the unconverted, a monftrous compound of idolatry and fuperftition, and of the moft abfurd and deteftable rites and cuftoms, invented by their "gangas," or priefts, for the purpofe of keeping the people in a ftate of the moft abject fubjection, and cruel tyranny and wretchednefs. They do, indeed, acknowledge one fupreme being, called "Nzambiamponga," believed to be all-powerful, and to whom they afcribe the creation of their country; but they fuppofe that he has committed the care and government of all fublunary things to a great variety of fubordinate or inferior deities, appointed to prefide over the air, fea, and earth; lakes and rivers, winds and ftorms, rain, lightning, drought, heat and cold, men, beafts, fowls, and fifhes, trees, fruits, and other productions of nature, fertile and barren, healthy and fickly feafons. Hence proceeds that immenfe multitude of falfe deities, idols and altars, and that prodigious variety of gangas or priefts, and fuperftitious rites, ftill found in thofe parts of the kingdom, where Chriftianity has not been introduced. Thefe imaginary deities are reprefented under various forms, at the pleafure of the worfhipper, either of living creatures, as ferpents, crocodiles, lions, tigers, he-goats, &c. or of trees and plants of different kinds, or of ftatues and images, fkilfully carved or painted, fome of which they worfhip in their houfes, and others in temples of mean conftruction. Their worfhip confifts in genuflexions, proftrations, fumigations, and other fuch fuperftitious rites; and alfo, agreeably to the injunctions of the gangas, in offerings of their moft valuable effects, for food, apparel, &c. from which the principal revenue of the gangas is derived, who contrive to fell the favour of thefe deities at the moft exorbitant price. Such is the fuperftition of the people, and the unbounded influence of thefe gangas, that they will not attempt to build a houfe or hut without confulting fome ganga, and putting the edifice under the protection of a deity; nor can the owner take poffeffion of it without employing the ganga to make the neceffary facrifices and fumigations, and performing other ceremonies, in order to fecure that protection. Even the giagas, who are the moft barbarous people of this kingdom, never venture to begin their harveft till they have offered various, and even human victims to their gods, and gorged their gangas themfelves with human flefh. Excepting their new moons, they have no fet feftivals or feafons of worfhip, befides thofe which the prefident of the gangas appoints, after a victory, a good harveft, &c. to whom it belongs, to appoint the attendant facrifices and rites, to receive the offerings of the people, and to prefcribe the various ceremonies which accompany them. The higheft power and dignity, pertaining to the prieftly tribe, are thofe which are vefted in the "fhalome" or "chalombe," whom the people reverence as a kind of deity, and to whofe rank and office various privileges belong. The influence of the gangas is fo extenfive and fo powerful, that the kings of Congo, though defirous of extirpating idolatry from their dominions, have been unable to effect it. With regard to the eftablifhment of Chriftianity in the kingdom of Congo, the firft preachers commiffioned by the court of Portugal for this purpofe, were priefts and monks of the church of Rome; fo that the Romifh religion became the eftablifhed religion of all the conquered provinces of the kingdom. But Chriftianity, even under that form of it, has been fo much neglected, that in the greater part of thefe extenfive dominions, nothing now remains but the mere name of Chriftian. It is faid, indeed, that the catholics in the duchy of Sogno, are better Chriftians than others, as they pay a peculiar regard to the external forms of the popifh worfhip. The princes of this province, as well as thofe of Bamba and Pemba, have always diftinguifhed themfelves by their zeal for the Chriftian religion, under that external mode of it in which they have been inftructed; and they have been careful to preferve their refpective governments from being corrupted by the heathenifh gangas or priefts;

priefts; and if any fuch are ever found within their dominions, they are treated with a feverity, which prevents their attempting to repeat their vifits.

The government of Congo is monarchical and defpotic. The kings are the fole proprietors of all the lands within their dominions; which they parcel out to individuals on condition of a certain tribute and of the performance of particular fervices. The tribute is ordered to be brought in once in three years at the fartheft; and the rigorous demand of it is the caufe of many cruel extortions, which often terminate in a revolt, or open rebellion. The crown is partly hereditary, and partly elective, fo that no candidate can be chofen, unlefs he be of the royal blood; and fince the introduction of Chriftianity, a Chriftian of the church of Rome. The whole procefs of his coronation and his mode of living after his advancement to the throne are attended with various circumftances of fplendour and magnificence. Whenever he goes abroad, which is feldom the cafe, he is attended by a numerous guard, confifting of Anfiki (See Ansiko), and fome others of neighbouring nations in whom he repofes the greateft confidence, muficians, knights of the holy crofs, (an order inftituted by the firft Chriftian king of Congo) and a number of officers, richly accoutred. The refpect that is paid him approaches to idolatry. His court is numerous and brilliant; and the royal palace is fpacious, grand, and commodious. His feraglio, in which he keeps a great number of concubines, though he is allowed only one wife, is a kind of prifon; as the women that enter it are confined during the remainder of their lives. His lawful wife prefides in the feraglio over all the other women; who indulge themfelves in the moft licentious gratifications. The royal revenue confifts chiefly in the tribute that is paid him by feveral vaffal princes; free-will offerings, in acknowledgment of the lands which are held under him; the property of all the zimbis, or cockle-fhells, that conftitute the current coin of this and other neighbouring kingdoms: mines of filver and gold, which, however, are much neglected; and the renewal of fiefs and inveftiture, fines and confifcations. He has alfo the prerogative of levying taxes upon his fubjects whenever he pleafes. His ftanding forces are neither numerous, nor well-difciplined, and very badly armed and clothed. Their mode of fighting is tumultuous and ferocious, nor do they give any quarter. Thofe that are taken alive are hurried to the fea-fide, or to fome inland market, where they are fold for flaves to the Europeans. The funeral obfequies of the monarchs of Congo before they were converted to Chriftianity, confifted of various kinds of facrifices and fuperftitious ceremonies, accompanied with mufic, howling, dancing, and feafting, which lafted a whole week, and were refumed once a year, on the anniverfary of the king's demife. It was alfo the cuftom to bury alive a certain number, nor exceeding twelve, of his favourite concubines, or young ladies belonging to his court; but Chriftianity has abolifhed this inhuman cuftom, though it has not fuppreffed the drunken revels that take place on this occafion.

It is confidered as a great crime and liable to punifhment on conviction to fhed tears even for the king. But certain perfons are kept in pay to go to all the public places of the city or town, to remind the fubjects of his death by the mournful found of their ivory cornets. The princes and nobles are interred in wainfcotted vaults hung with black; and two of their old domeftics deftined alternately to guard the entrance, and to pray for the deceafed. Other prayers are to be offered on the anniverfary of their deceafe, and on All-fouls day, at which times their graves are opened, and the hangings exchanged for new ones. The giagas dance about the graves of the deceafed in a frantic manner, and bring them victuals, drink, and other conveniences. The dances that are performed at the funeral of their great men laft eight whole days, without intermiffion: and upon thefe occafions, they never fail facrificing a number of human victims, the flefh of which they devour with peculiar relifh. Mourners of the common clafs fhave their whole heads, and anoint themfelves with oil, upon which they rub fuch a quantity of earth and duft, and dried leaves, as to give them a fhocking appearance. Thofe of higher ranks fhave only the upper part of their heads and bind it with a lift of cloth, linen, or leather, and confine themfelves to the houfe for eight whole days. The Congoefe conceive concerning dying perfons that they are juft paffing from a wretched life into a ftate of tranquillity and happinefs; and therefore they think they cannot act a kinder part than to accelerate their deliverance. Among the vulgar this notion leads to the barbarous practice of ftopping the mouth and nofe of a dying perfon, and thumping upon the breaft with violence, that he may the fooner pafs into a ftate of felicity.

The Congoefe have no written laws; but cuftom and tradition ferve them inftead of a code and commentaries, unlefs favour or bribery interpofe. Every province has a chief juftice for civil and criminal affairs from whom an appeal may be made to the king; and under him are inferior officers in every town and community. Three offences, *viz.* treafon, murder, and forcery, are deemed capital; and the two firft are punifhed with decollation, and the latter by being burned alive. The punifhments of leffer offences are the baftonade, hanging, fines, and imprifonment.

The traffic of the Congoefe with the Europeans confifts chiefly in flaves, and St. Salvadore is the principal mart of the country. The traders who refide in this place bring thither the products of Brafil, fuch as grain, fruit, plants, and other provifions, and the manufactures of Europe, which are ufually Turkey carpets, Englifh cloth, and other ftuffs; copper and brafs veffels, blue earthen ware, rings, and ornaments of gold, filver, and bafe metals, coral, glafs beads, bugles, and other trinkets; tobacco, wine, brandy, and other fpirituous liquors; light ftuffs made of cotton, linen, and woollen, for cloathing; and a great variety of tools and utenfils. In return they carry off a number of flaves, amounting annually to 15 or 16,000. Slaves indeed are employed at home in all their laborious occupations, and are reckoned the moft valuable commodities, which a man poffeffes or is able to bequeath to his children or relations. Among the Congoefe every kind of manufacture is in a very imperfect ftate. The roads through different parts indicate the inattention and indolence both of the government and the people, as they are either extremely bad in themfelves or infefted with banditti, and a variety of pernicious animals.

The houfes of the Congoefe are low, ill-built huts, thatched with ftraw or fern, without windows and with doors fo low, that the fhorteft man is obliged to ftoop when he enters them. They are fo flightly built, as to be liable to be blown away by a guft of wind. Thofe, however, belonging to the Portuguefe are built of brick and mortar, and generally well-furnifhed and adorned. The furniture of the Congoefe houfes confifts chiefly of fome few ill-contrived inftruments for agriculture, a hatchet to fell timber, a cutlafs for travelling or for war, fome few calabafhes for containing their provifions, a pot, kettle, and ladle, a few earthen platters, and a hand-mill for grinding their corn. Their beft bedding is a large coarfe fackcloth, filled with ftraw or leaves, with a flight covering, and perhaps a log of wood inftead of a pillow. But the Portuguefe have introduced

troduced among the fuperior claffes, and particularly in the palaces of the princes and viceroys, various articles of luxury.

Polygamy was univerfally allowed in Congo before the introduction of Chriftianity; and fince that period, the miffionaries have in vain endeavoured to perfuade the inhabitants to be contented, each of them, with one wife. Previous to marriage the perfon is allowed three years trial; and when this term is expired, the prieft performs the ceremony, and the ftipulated dowry is paid. This ceremony is preceded by a fumptuous banquet, and dancing and drinking are continued till the next morning, when the parties retire.

The mufical inftruments, now ufed by the Congoefe, are fuch as the Portuguefe have introduced; fuch as the trumpet, cornet, French-horn, and fife; but the common people are contented with their fifes and tabors at their weddings and other rejoicings. They have alfo ftringed inftruments, which by their rude conftruction feem to be natives of the country; fuch are their "nfambi," refembling the Spanifh guitar, and the "marimba," confifting of fifteen or fixteen fmall calabafhes, of different fizes, faftened to a flat board by ftrings that pafs acrofs their mouths, and which, being touched by fmall pieces of wood, like the fticks of our dulcimers, yield an agreeable variety of founds. Their drums are made of a long hollow trunk of a tree, with a fingle fkin ftretched over one end of it, the other being left open; they are beat either with the fifts, or by fticks of heavy wood, and are ufed at their feftivals as well as in the army; they are called "ngambo" or "ingombo," and give but a dull heavy found, which is raifed either by that of the fife, or the "longa," which confifts of two or more fmall bells. The dancing of the Congoefe confifts in a promifcuous round of men and women, all ftriving who fhall fhew the greateft agility and variety of gambols, contortions, and indecent poftures.

The hiftory of the foundation of the monarchy of Congo is uncertain and fabulous. It is afcribed to the fon of a neighbouring prince, whofe fmall territory was fituate on the banks of the Zair, in the province of Corimba. The name of the young prince was Luqueni, who fubdued the whole province of "Npemlacaffi," fince called Congo, and extended his conquefts from the mouth of the Zair to the city of St. Salvadore. His fucceffors, it is faid, have maintained themfelves on the throne ever fince his time. This country was difcovered by the Portuguefe in the reign of king John II., who employed Diego Cam, a perfon of enterprife and a famous navigator, in an expedition for making difcoveries on the coafts of Ethiopia. Cam, on his arrival near thefe coafts in the year 1484, fell infenfibly upon the rapid ftream of the river Zair, as he was endeavouring to double the cape Catalina; and having caft anchor at its mouth, he explored the country fituated on its banks, and was well received by the inhabitants, who conducted four or five of his officers to St. Salvadore. Before their return, he determined to fet fail for Portugal, and took with him four of the natives. King John was fo pleafed with the account which he received of the country, that he ordered Cam to return with his companions as fpeedily as poffible, and furnifhed him with valuable prefents for the king and his court. He charged him, moreover, to exhort the monarch of Congo, in his name, to become a convert to the worfhip of the only true God, and to permit the Chriftian religion to be propagated through his dominions. Cam, in the year 1485, arrived at Congo, and was very favourably received. No time was loft in eftablifhing an alliance between the two crowns of Portugal and Congo, which has continued to fubfift, though often fufpended by intervening wars. This alliance was followed by the converfion of the king to the Chriftian faith. For a further account of the hereditary fovereigns of Congo, too minute in detail to be introduced into our work, and too uninterefting at this remote period for abridgment, we refer to the "Modern Univerfal Hiftory," vol. xiii.

CONGO *money*, or *Guinea money*, a name given to a peculiar fpecies of *concha veneris*, or porcelain-fhell, which paffes by way of money among the natives of thofe places. It is diftinguifhed from the other porcelains by having a dentated mouth, and fix gibbous protuberances on its furface.

CONGO *Tea*, in *Commerce*. See TEA.

CONGORLAN, a town of Perfia, in the province of Irak; 75 miles N.N.E. of Amadan.

CONGOU, in *Geography*, a town of Perfia, fituated on the eaftern fide of the Perfian Gulf. N. lat. 28°. E. long. 52°.

CONGRATULATION, denotes the immediate expreffion of our joy, on account of any favourable event that has occurred in any of our connections.

CONGREGATION, an affembly of feveral ecclefiaftics, united fo as to conftitute a body.

The term is principally ufed for affemblies of cardinals, appointed by the pope, and diftributed into feveral chambers, for the difcharge of certain functions and jurifdictions, after the manner of our offices and courts. The decifions of thefe focieties are generally fanctioned by the approbation of the Roman pontif, who has not a right, without alleging the moft weighty and evident reafons, to reverfe what they pronounce to be juft and expedient. This form of ecclefiaftical government is, without doubt, a check to the authority of the pope; and hence it is, that many things are tranfacted at Rome in a manner that is in direct oppofition to the fentiments of its fpiritual ruler. This may ferve to correct a miftaken notion concerning the nature and limits of the papal hierarchy maintained by thofe, who pretend, that all the iniquitous proceedings of the court of Rome, the calamities it has occafioned, the contentions, rebellions, and tumults it has excited, are to be wholly laid to the charge of the Roman pontif. Hence alfo arifes that important diftinction that has been frequently employed by the French and other nations in their debates with the Roman pontif, that is, the diftinction between "the pope of Rome," and "the court of Rome." The one is often loaded with the bittereft reproaches and the heavieft accufations, while the other is fpared, and in fome meafure excufed. Nor is this diftinction by any means groundlefs; fince the cardinals and congregations, whofe rights and privileges are held facred, undertake and execute many projects without the knowledge, and fometimes againft the will and confent, of the Roman pontif.

The principal congregations of cardinals are thefe: 1. "The congregation of the Pope," inftituted firft by Sixtus V., to prepare the matters that were to be brought before the confiftory, at which the pope is always prefent. Hence this is called the "confiftorial congregation," and in it are treated all affairs relative to the creation of bifhops and cathedral churches, the reunion or fuppreffion of epifcopal fees, the alienation of church goods, and the taxes and annates that are impofed upon all benefices in the pope's gift. The cardinal-dean prefides in this affembly. 2. "The congregation of the Inquifition," or, as it is otherwife called, "of the holy office," inftituted by Paul III., or, as others fay, by Pius IV., and reformed by Pius VI., which takes cognizance of herefies, apoftacy, magic, and profane writings,

ings, affembling thrice in the week, and every Thurfday in prefence of the pope, who prefides in it. This congregation confifts of at leaft 12 cardinals, with feveral other prelates and divines of different orders, who were called confultors of the holy office. The office of grand inqufitor, which encroached upon the prerogatives of the pontif, has been long fuppreffed, or rather diftributed among the cardinals who belong to this congregation, and whofe decifions come under the fupreme cognizance of his holinefs. See INQUISITION. 3. "The congregation for the propagation of the Roman Catholic faith," founded under the pontificate of Gregory XV., and compofed, (fays the tranflator of Mofheim's Eccl. Hift.), of 18 cardinals, one of the fecretaries of ftate, a prothonotary, a fecretary of the inquifition, and other inferior members. (See COLLEGE *de propaganda fide*). In this congregation are carried on the deliberations which relate to the extirpation of herefy, the appointment of miffionaries, &c.; this congregation has built a moft beautiful and magnificent palace in one of the moft agreeable fituations that could be chofen at Rome, where profelytes to popery from foreign countries are lodged and maintained gratis in a manner fuitable to their rank and condition, and inftructed in thofe branches of knowledge to which their genius inclines. The prelates, vicars, and curates, who are obliged, without any fault on their own part, to abandon the places of their refidence, are entertained charitably in this noble edifice, in a manner correfponding to their rank in the church. 4. "The congregation defigned to explain the decifions of the council of Trent." 5. "The congregation of the Index," whofe principal bufinefs is to examine MSS. and books that are defigned for publication, to decide whether the people may be permitted to read them, to correct thofe books whofe errors are not numerous, and which contain ufeful and falutary truths, to condemn thofe whofe principles are heretical and pernicious, and to grant the peculiar privilege of perufing heretical books to certain perfons. This congregation, which is fometimes held in the prefence of the pope, but generally in the palace of the cardinal-prefident, has a more extenfive jurifdiction than that of the inquifition, as it not only takes cognizance of thofe books that contain doctrines contrary to the Roman Catholic faith, but of thofe alfo that concern the duties of morality, the difcipline of the church, and the interefts of fociety. Its name is derived from the alphabetical tables, or indexes, of heretical books and authors, which have been compofed by its appointment. 6. "The congregation for maintaining the rights and immunities of the clergy, and of the knights of Malta." This congregation was formed by Urban VIII., to decide the difputes and remove the difficulties and inconveniencies that arofe from the trials of ecclefiaftics before princes, or other lay-judges. 7. "The congregation relating to the Bifhops and regular Clergy," inftituted by Sixtus V., to decide the debates which arife between the bifhops and their diocefans, and to compofe the differences that happened fo frequently among the Monaftic orders. 8. "The congregation," appointed by Gregory XIV., for examining into the capacity and learning of the bifhops. 9. "Another," for inquiring into their lives and morals. 10. "A third," for obliging them to refide in their diocefes, or to difpenfe with that obligation. 11. "The congregation for fuppreffing monafteries," *i. e.* fuch whofe revenues are exhaufted, and which thereby become a charge upon the public. 12. "The congregation of the Apoftolic Vifitation," which names the vifitors who perform the duties and vifitations of the churches and convents within the diftrict of Rome, to which the pope is obliged, as archbifhop of that city. 13. "The congregation of Relics," defigned to examine the marks, and to augment the number of thefe inftruments of fuperftition. 14. "The congregation of Indulgences," defigned to examine the cafe of thofe who have recourfe to this method of quieting the confcience. 15. "The congregation of Rites," appointed by Sixtus V., to regulate and invent the religious ceremonies that are to be obferved in the worfhip of each new faint that is added to the kalendar. Such are the congregations of cardinals, fet apart for adminiftering the fpiritual affairs of the church; and they are undoubtedly, in fome refpects, a check upon the power of the pontif, enormous as it may be. There are fix more, which relate to the temporal government of the papal territories. In thefe congregations, where the pope is never prefent, all things are tranfacted which relate to the execution of public juftice in civil or criminal matters, the levying of taxes, the providing of good governors for the cities and provinces, the relief of thofe who are unjuftly oppreffed by fubordinate magiftrates, the coinage, the care of the rivers, aqueducts, bridges, roads, churches, and public edifices.

CONGREGATION is alfo ufed for a company or fociety of religious cantoned out of this or that order; and making, as it were, an inferior order, or a fubdivifion of the order itfelf. Such are the congregations of the Oratory, and thofe of Cluny, &c. among the Benedictines.

The word is alfo ufed for affemblies of pious perfons, in manner of fraternities; frequent among the Jefuits in honour of the Virgin, &c.

CONGREGATION *of Aids*, or *de Auxiliis*, was eftablifhed in confequence of a difpute between the Dominicans and Jefuits. The former had long cherifhed a deep rooted and invincible hatred againft the latter; and having a favourable opportunity of venting their indignation, exhaufted their furious zeal againft the doctrine of Molina, notwithftanding the pacific orders of the papal edict, iffued by Clement VIII., in the year 1594. They inceffantly wearied the Spanifh monarch, Philip II., and the Roman pontif, Clement VIII., with their importunate clamours, till at length the latter found himfelf under a neceffity of affembling at Rome a fort of council for the decifion of this controverfy. Thus commenced, about the year 1598, thofe famous deliberations concerning the conteft of the Jefuits and Dominicans, which were held in the congregation of aids. This congregation was fo denominated on account of the principal point in debate, which was the efficacy of the aids and fuccours of divine grace; and its confultations were directed by Lewis Madrufi, bifhop of Trent, and one of the college of cardinals, who fat as prefident in this affembly, which was compofed befides of three bifhops and feven divines, chofen out of fo many different orders. The hiftory and tranfactions of this congregation are related and illuftrated by feveral writers of different complexions, by Jefuits, Dominicans, and Janfenifts. After all it is ftill a matter of doubt, which party was moft favoured by the court of Rome on this occafion, the Jefuits or the Dominicans, and which of thefe two parties defended their caufe with the greateft dexterity and fuccefs.

CONGREGATION *of the Immaculate Conception.* See IMMACULATE.

CONGREGATION *of the Lateran.* See LATERAN.

CONGREGATION *of the Lord*, in *Ecclefiaftical Hiftory*, an affociation of reformers in Scotland, formed in the year 1557 by the earl of Argyle, his fon lord Lorne, the earl of Morton and Glencarne, Erfkine of Dun, and others, who, obferving the danger to which they were expofed, and defirous of propagating their principles, entered privately into a bond or affociation; and affumed this appellation

Strahan and Prefton,
New-ftreet Square, London.

lation; in contradistinction to the established church, which they denominated the congregation of Satan. Supported by the authority, which, they thought, belonged to them under the denomination they assumed, they ordained that prayer in the vulgar tongue should be used in all the parish-churches of the kingdom; and that preaching, and the interpretation of the Scriptures, should be practised in private houses, till God should move the prince to grant public preaching by faithful and true ministers. This congregation, encouraged by some favourable appearances which occurred, proceeded with alacrity in openly soliciting subscriptions to their league; and the death of Mary of England, with the accession of Elizabeth, which happened about this time, contributed to increase their hopes of ultimate success in their undertaking. They ventured to present a petition to the regent, craving a reformation in the church, and of the wicked, scandalous, and detestable lives of the prelates and ecclesiastics. They also framed a petition, which they intended to present to parliament, in which, after premising that they should not communicate with the damnable idolatry, and intolerable abuses of the papistical church, they desired that the laws against heretics should be executed by the civil magistrate alone, and that the Scripture should be the sole rule in judging of heresy. They even petitioned the convocation, and insisted, that prayers should be said in the vulgar tongue, and that bishops should be chosen with the consent of the gentry of the diocese, and priests with the consent of the parishioners. The regent prudently temporized between these parties; but after some time, she proceeded with greater rigour against the reformers, and the dispute terminated in a civil war. At length the covenant was subscribed by the reformers, who committed themselves to the guidance of John Knox. The consequence was, that the Catholic religion was suppressed, and the presbyterian discipline established. See REFORMATION.

CONGREGATION *of Mission*. See MISSION.

CONGREGATION *of Penitence*. See PENITENCE.

CONGREGATION *of Holy Sacrament*. See SACRAMENT.

CONGREGATION *of Holy Trinity*. See TRINITY.

CONGREGATION, in *Physics*, is used by Dr. Grew for the least and lowest degree of mixtion; or that wherein the parts of the mixt do not consist with, or adhere to, each other, but only touch in one point. That author declares himself of opinion, that the particles of all *fluids* only touch in this manner; or that their cohesion only amounts to a *congregation*. See FLUID.

CONGREGATION also denotes an assembly of persons in social and public worship.

CONGREGATIONALISTS. See INDEPENDENTS.

CONGRESS, CONGRESSUS, is used for an assembly of commissioners, deputies, envoys, &c. from several courts or provinces, meeting to settle terms for a general pacification or to concert measures for their common good.

The congress at the Hague, while held during the course of the war, terminated in 1697, by the treaty of Ryswick, was composed of the envoys of all the princes in the confederacy against France.

CONGRESS, in *Modern History*, denotes that body, in which, by the constitution of the United States of America, all legislative powers are vested. It consists of a senate and house of representatives. The house of representatives is composed of members chosen every second year by the people of the several states; and the electors in each state shall have the qualifications requisite for electors of the most numerous branch of the state legislature. No person shall be a representative under the age of 25 years, who has not been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of the state in which he shall be chosen. The number of representatives, apportioned among the several states, which may be included within this union, according to their respective numbers, to be ascertained by actual enumeration within three years after the first meeting of congress, and within every subsequent term of ten years, shall not exceed one for every thirty thousand; but each state shall have at least one representative. In case of vacancy in the representation of any state, writs shall be issued by the executive authority for filling such vacancies. The house of representatives chuse their speaker, and other officers, and have the sole power of impeachment.

The senate of the United States is composed of two senators from each state, chosen by its legislature for six years; and each senator has one vote. The senators are divided into three classes; the seats of those of the first class being vacated at the expiration of the second year; of the second class at the expiration of the fourth year; and of the third class at the expiration of the sixth year; so that one-third may be chosen every second year.

No person shall be a senator, under the age of 30 years; after being nine years a citizen of the United States, and who is not, when elected, an inhabitant of the state for which he is chosen. The vice-president of the United States is president of the Senate, but has no vote, unless the votes be equally divided. The senate chuses its other officers, and also a president pro tempore, in the absence of the vice-president, or when he shall exercise the office of president of the United States. The senate has the sole power to try all impeachments; and no person shall be convicted without the concurrence of two-thirds of the members present.

The congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December, unless they shall, by law, appoint a different day. Each house has its peculiar powers; but neither house, during the session of congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two houses shall be sitting. The senators and representatives shall receive a compensation for their services, ascertainable by law, and payable out of the treasury of the United States. They are, in all cases, except treason, felony, and breach of the peace, privileged from arrest during their attendance at the session of their respective houses, and in going to, and returning from, them; and for any speech or debate in either house, they are not to be questioned in any other place. No senator or representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States, which shall have been created, or the emoluments of which shall have been increased, during such time; and no person holding any office under the United States shall be a member of either house, during his continuance in office.

All bills for raising revenue shall originate in the house of representatives; but the senate may propose or concur with amendments, as on other bills. Every bill, which shall have passed the house of representatives, and the senate, shall, before it become a law, be presented to the president of the United States; if he approve, he shall sign it; but if not, he shall return it, with his objections, to that house in which it has originated, who, having entered the objections on their journal, shall proceed to reconsider it. If, after reconsideration, two-thirds of that house shall agree to pass the

the bill, it ſhall be ſent, together with the objections, to the other houſe, by which it ſhall likewiſe be reconſidered, and, if approved by two-thirds of that houſe, it ſhall become a law. In ſuch caſe the votes of both houſes ſhall be determined by yeas and nays, and the names of the perſons voting for and againſt the bill ſhall be entered on the journal of each houſe, reſpectively. If any bill ſhall not be returned by the preſident within ten days (Sundays excepted) after it has been preſented to him, the ſame ſhall be a law, as if he had ſigned it, unleſs the congreſs, by their adjournment, prevent its return, in which caſe it ſhall not be a law. Every order, reſolution, or vote, to which the concurrence of the ſenate and houſe of repreſentatives may be neceſſary, ſhall be ſubject to the ſame rules and limitations as are preſcribed in the caſe of a bill.

By the conſtitution the congreſs ſhall have power—to lay and collect taxes, duties, impoſts, and exciſes—to pay the debts and provide for the common defence and general welfare of the United States—to borrow money on the credit of the United States—to regulate commerce with foreign nations, among the ſeveral ſtates, and with the Indian tribes—to eſtabliſh an uniform rule of naturalization, and uniform laws on the ſubject of bankruptcies, throughout the United States—to coin money, regulate its value, and that of foreign coin, and to fix the ſtandard of weights and meaſures—to provide for the puniſhment of counterfeiting the ſecurities and current coin of the United States—to eſtabliſh poſt offices and poſt-roads—to promote the progreſs of ſcience and uſeful arts, by ſecuring for limited times, to authors, and inventors, the excluſive right to their reſpective writings and diſcoveries—to conſtitute tribunals inferior to the ſupreme court—to define and puniſh piracies and felonies committed on the high ſeas, and offences againſt the law of nations—to declare war, grant letters of marque and repriſal, and make rules concerning captures on land and water—to raiſe and ſupport armies, but without appropriating money to that uſe for a longer term than two years—to provide and maintain a navy—to make rules for the government and regulation of the land and naval forces—to provide for calling forth the militia to execute the laws of the Union, ſuppreſs inſurrections, and repel invaſions—to provide for organizing, arming, and diſciplining the militia, &c. reſerving to the ſtates, reſpectively, the appointment of the officers, and the authority of training the militia, according to the diſcipline preſcribed by congreſs—to exerciſe excluſive legiſlation, in all caſes whatſoever over ſuch diſtrict, (not exceeding ten miles ſquare) as may, by ceſſion of particular ſtates, and the acceptance of congreſs, become the ſeat of the government of the United States, and to exerciſe like authority over all places, purchaſed by conſent of the legiſlature of the ſtate in which the ſame ſhall be, for the erection of forts, magazines, arſenals, dock-yards, and other needful buildings—and to make all laws which ſhall be neceſſary and proper for carrying into execution the foregoing powers, and all other powers veſted by this conſtitution in the government of the United States, or in any department or officer thereof.

The powers of congreſs, however, are ſubject to certain limitations; *e g.* the privilege of the writ of habeas corpus ſhall not be ſuſpended, unleſs the public ſafety requires it in caſes of rebellion or invaſion. No bill of attainder, or ex poſt facto law, ſhall be paſſed. No capitation, or other direct tax, ſhall be levied, unleſs in proportion to the cenſus, or enumeration, herein before directed to be taken.—No tax or duty ſhall be laid on articles exported from any ſtate—no preference ſhall be given by any regulation of commerce or revenue, to the ports of one ſtate over thoſe of another—nor ſhall veſſels bound to or from one ſtate be obliged to enter, clear, or pay duties, in another—no money ſhall be drawn from the treaſury, but in conſequence of appropriations made by law; and a regular ſtatement and account of the receipts and expenditures of all public money ſhall be publiſhed from time to time. No title of nobility ſhall be granted by the United States; and no perſon holding any office of profit or truſt under them ſhall, without the conſent of the congreſs, accept of any preſent, emolument, office, or title, of any kind whatever, from any king, prince, or foreign ſtate. With regard to individual ſtates it is provided, that no ſtate ſhall enter into any treaty, alliance, or confederation; grant letters of marque and repriſal; coin money; emit bills of credit; make any thing but gold and ſilver coin a tender in payment of debts; paſs any bill of attainder, ex poſt facto law, or law impairing the obligation of contracts; or grant any title of nobility. Moreover, no ſtate ſhall, without the conſent of the congreſs, lay any impoſts or duties on imports or exports, except what may be abſolutely neceſſary for executing its inſpection laws; and the net produce of all duties and impoſts, laid by any ſtate on imports or exports, ſhall be for the uſe of the treaſury of the United States; and all ſuch laws ſhall be ſubject to the reviſion and control of the congreſs. No ſtate ſhall, without the conſent of congreſs, lay any duty of tonnage, keep troops or ſhips of war in time of peace, enter into any agreement or compact with another ſtate, or with a foreign power, or engage in war, unleſs actually invaded, or in ſuch imminent danger as will not admit of delay. The congreſs, under certain limitations, whenever two-thirds of both houſes ſhall deem it neceſſary, may propoſe amendments to the conſtitution, eſtabliſhed Sept. 17, 1787; or, on the application of the legiſlature of two-thirds of the ſeveral ſtates, ſhall call a convention for propoſing amendments, which, in either caſe, ſhall be valid, to all intents and purpoſes, as part of the conſtitution, when ratified by the legiſlatures of three-fourths of the ſeveral ſtates, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be propoſed by the congreſs. The ſenators and repreſentatives before-mentioned, and the members of the ſeveral ſtate legiſlatures, and all executive and judicial officers, both of the United States, and of the ſeveral ſtates, ſhall be bound by oath or affirmation, to ſupport the conſtitution; but no religious teſt ſhall ever be required as a qualification to any office, or public truſt, under the United States. The executive power is veſted by the conſtitution in a preſident of the United States of America. See President.

Congress, in *Law*, is alſo uſed for an eſſay, or trial, made by appointment of a lay, or ſpiritual judge, in the preſence of ſurgeons and matrons, to prove, whether or no a man be or be not impotent; in order to the diſſolution of a marriage See Impotence.

Neither the civil nor canon law make any mention of this trial of virility by congreſs; it had its origin in France, from the boldneſs of a young fellow, who, in open court, being hard preſſed by his wife, demanded the congreſs. The judge, ſurpriſed with the novelty of the demand, found it could not be denied; as being the ſureſt evidence the caſe could admit of.

In time it became a branch in the French juriſprudence, and was authorized by decrees and arrets: it obtained for about the ſpace of one hundred and twenty years, and was annulled by an arret of parliament in 1677, as being found precarious; ſome having failed under the experiment out of mere modeſty and ſhame, which is found to have the ſame effect with actual impotency.

CONGREVE, William, in *Biography*, a celebrated English dramatic writer, descended from an ancient family in Staffordshire, which traces its lineage beyond the Norman conquest. Neither the time nor the place of his birth can be ascertained with any degree of precision; according to the inscription on his monument, it was in the year 1672, and he himself declares that he owed his nativity to England; though by many of his biographers it has been asserted that he was born in Ireland. Wherever he was born, it is known that he was educated, first at Kilkenny, and afterwards at Dublin, his father having some military employment that stationed him in Ireland. After he had passed the usual preparatory studies, he was sent, at the age of sixteen, to study the law in the Middle Temple. For this his genius does not appear to have been adapted: he looked, at a very early period of life, to polite literature as that by which he might be distinguished. By a feigned name he published the "Incognita, or Love and Duty reconciled," a novel, which has been characterized as sprightly in dialogue, intricate in plot, and unnatural; and Dr. Johnson says "he would rather praise than read it." As a dramatic writer, Congreve's first piece was the "Old Bachelor," written at the age of twenty, and, according to the author's own account, to amuse himself in a slow recovery from a fit of sickness; but which was regarded by Dryden, and others who were his contemporaries, as a very wonderful performance. Its success was very great; few plays have been so beneficial to the writer, for it procured him the patronage of the earl of Halifax, who was the Mæcenas of the day, and who deserves the praise of having bestowed more public patronage on the muses than they have ever received before, or perhaps since, in this country. Upon Congreve the noble lord bestowed the office of commissioner for licensing coaches; and soon after gave him a place in the pipe-office, and another in the customs of 600*l.* per annum.

If the Old Bachelor be nearly examined, says Dr. Johnson, "it will be found to be one of those comedies which may be made by a mind vigorous and acute, and furnished with comic characters by the perusal of other poets, without much actual commerce with mankind. The dialogue is one constant reciprocation of conceits, or clash of wit, in which nothing flows necessarily from the occasion, or is dictated by nature. The characters both of men and women are either fictitious or artificial; and the catastrophe arises from a mistake not very probably produced, by marrying a woman in a mask. Yet this gay comedy, when all these deductions are made, will still remain the work of very powerful and fertile faculties; the dialogue is quick and sparkling, the incidents such as seize the attention, and the wit so exuberant that, it "o'er-informs its tenement."

Congreve's next play was "The Double Dealer," which was not received with equal kindness by the public, but which was honoured with the patronage of the queen, on whose death he wrote a poetical tribute to her memory; in which, says his biographer, "all is unnatural, and yet nothing is new." In the year 1695, his prolific pen produced "Love for Love," a comedy of nearer alliance to life, and exhibiting more real manners, than either of the former. This proved a very popular and profitable piece: and in the same year he published an irregular ode to king William, on the taking of Namur; which exhibited less of the powers of poetry, than of the spirit of loyalty. With the comedy of Love for Love, the new theatre was opened, under the direction of Betterton the tragedian; where, in 1697, was exhibited "The Mourning Bride," a tragedy, so written, as to shew that the author was sufficiently qualified for either kind of dramatic poetry.

About this time began a long and bitter controversy between Jeremy Collier and the poets. In the reign of Charles I., the puritans had raised a violent clamour against the drama, which they regarded as unfit for the encouragement of Christians. This had in a great measure subsided, when, in 1698, Collier published "A Short View of the Immorality and Profaneness of the English Stage;" in which he attacked with great justice, though perhaps with some degree of aggravation, the licentiousness of the dramatic writers, among whom Congreve was included. The poet replied, and endeavoured to palliate the alleged enormity of particular passages, though it was impossible to vindicate the general character and tendency of his pieces. Collier replied, and Congreve retired from the contest; and shortly after published his last comedy of "The Way of the World." This was reckoned the most perfect of his dramatic pieces; but it was received with so little favour on the stage, that, being in a high degree offended and disgusted, he resolved to commit his quiet and his fame no more to the caprices of an audience. From this time his life ceased to the public; he lived for himself and for his friends; and among his friends he was able to name every man of his time whom wit and elegance had raised to reputation.

Congreve continued to write copies of verse upon particular occasions, and in the year 1710, he published a collection of his plays and miscellaneous poems, dedicated to his patron lord Halifax, to whose person and party he remained attached in all fortunes. Such was the respect which Congreve inspired, as well by his private character as his genius, that in the great political change which brought the tories into power, his places were untouched, and he was allowed to maintain a dignified neutrality, praised and complimented on both sides. On the return of his own friends to power, his emoluments were increased by the sinecure place of secretary to the island of Jamaica, which raised his public income to full 1200*l.* a year: yet, says Dr. Johnson, his honours were far greater than his profits. Every writer mentioned him with respect; and, among other testimonies to his merit, Steele made him the patron of his "Miscellany," and Pope inscribed to him his translation of the Iliad.

Indolence was the result of Congreve's affluence. He not only ceased to make any literary exertions, but seems, with a considerable degree of affectation, to have declined the character of a man of letters; and when he received a visit from Voltaire, the topic of his writings being introduced, Congreve spoke of them as trifles beneath him, and hinted that he expected to be visited only as a gentleman. Voltaire replied, that had Mr. Congreve been so unfortunate as to be a mere gentleman, he should never have been desirous of seeing him.

The latter years of his life were clouded with a considerable portion of sickness and infirmity. Cataracts in his eyes at length terminated in total blindness. The melancholy state was aggravated by the gout, for which he sought relief by a journey to Bath, but, being overturned in his chariot, he returned to his house in London, where he died, Jan. 29, 1728-9, in the sixtieth year of his age. Having lain in state in the Jerusalem chamber, he was buried in Westminster Abbey, where a monument is erected to his memory by the duchess of Marlborough; to whom, for reasons either not known, or not mentioned, he bequeathed a legacy of ten thousand pounds, in preference to the claims of kindred, at that time reduced to difficulties and distress.

It does not appear that any peculiar moral excellencies, or any remarkable talents for social intercourse, obtained for Congreve those marks of attachment and regard which

we have feen that he enjoyed. He lived in an eafy independence, and, by the exercife of a polifhed good nature, pleafed and flattered thofe who affociated with him, and never offended any one. He ftands firft among the Englifh writers of comedy: a diftinction for which he is indebted, not to fuch a lively and humorous delineation of natural characters as delights and inftructs in the fcenes of Moliere, but to a continuation of wit and repartee in the dialogue, joined with originality of plot. His perfonages are always ftrongly marked and well fupported. One or two of his comedies are ftill exhibited, and beheld with pleafure, though fo little refembling the productions of the prefent age. His "Mourning Bride" is interefting, and its principal characters well contrafted; it maintains its place in our theatres, and has, during the prefent feafon, been reprefented with the higheft applaufe. Biogr. Britan. Johnfon's Lives of the Englifh Poets.

CONGRIER *en Pouance*, in *Geography*, a town of France, in the department of the Mayenne; 6½ leagues S.W. of Laval.

CONGRUITY, or Congruency, in the *Schools*, a fuitablenefs or relation of agreement between things; whereby we come at the knowledge of what may be expected from them.

The fyftem of congruity in matters of grace confifts in this; that God, who knows perfectly the nature of grace, and the difpofitions of the will in all the circumftances that fhall befall a man, gives graces, wherewith, by virtue of their congruity with the will of a man, confidered in thofe circumftances, man will always infallibly, but not neceffarily, do what God would have him do; becaufe the will, in the language of the congruifts, does always infallibly, though voluntarily, choofe what appears beft.

Congruity, *merit of*. See Merit.

Congruity, in *Geometry*, is applied to figures, lines, &c. which exactly correfpond when laid over one another; as having the fame terms, or bounds.

Thofe things between which there is a congruity are equal and fimilar.

Euclid, and by his example, moft other geometricians, demonftrate all their elements from the fole principle of congruity: M. Leibnitz, and after him Wolfius, fubftitute the notion of fimilitude in lieu of that of congruity.

Congruity, in a lax fenfe, is ufed to exprefs an aptitude, in fome bodies, to unite, or incorporate; by reafon of fome fimilitude or fitnefs of their figures: as incongruity denotes an unfitnefs of their furfaces for joining together. Thus, quickfilver will unite with gold, and many other metals, but will roll off from wood, ftone, glafs, &c.; and water, which will wet falt, and diffolve it, will flip off from tallow without adhering to it; as alfo from a dufty furface, and from the feathers of water fowl.

Two drops of water or of mercury, will, on contact, immediately join and coalefce; but oil of tartar, poured upon quickfilver, and fpirit of wine and oil of turpentine on that, and air over all, will remain in the fame veffel without any manner of union, or mixture with each other. And the caufe of this phenomenon is, that the figures of fome bodies will not admit other bodies near enough to be within their fpheres of attraction, whence they cannot join and cohere; but where their fitnefs of figure will let them approach near enough to feel each others' attractive power, then they clofe and hold together. See Cohesion.

CONG-TCHIN, in *Geography*, a town of China, of the third rank, in the province of Quang-fi; 20 miles N.E. of Ping-lo.

CONGUSTUS, in *Ancient Geography*, a town of Afia, in Galatia. Ptolemy.

CONHOCTON Creek, in *Geography*, a creek of America, in the weftern parts of the ftate of New York, in the Genefee country, which runs over a bed of gravel at the foot of the hills that furround the newly eftablifhed poft-town, called Bath, and, about 20 miles below this town, falls into Tyoga river. In this creek there is a confiderable fall, juft above the town, which affords a very fine feat for mills. Extenfive faw and flour mills have already been erected upon it; the principal faw in the former of which, gave, when Mr. Weld vifited the mill, 120 ftrokes in a minute, fufficient to cut, in the fame interval of time, 7 fquare feet, fuperficial meafure, of oak timber; and yet capable, when the water is high, of producing effect much more expeditioufly. During floods, light batteaux may pafs along the creek, Tyoga and Sufquehannah rivers, from Bath to Chefapeak bay, without interruption.

CONI, a large fortified town of France, in the department of Stura, which was formerly a part of Piedmont in Italy, belonging to the king of Sardinia. It is fituated on the confluence of the Geffe and the Stura, 42 miles S. from Turin, 54 N.E. from Nice, and 615, or 820 kiliometres, from Paris. As chief place of the department, it has a prefect, a court of juftice, and feveral tax offices, and is the refidence of the brigade-general commanding the department. The fertility of the foil of its diftrict, equally abundant in corn and paftures, and the advantage of a canal which goes from the river Stura to the Po, and facilitates its communication with the interior parts of France, render Coni the centre of a confiderable commerce. Its inhabitants amount to 16500. The population of the canton, including 16 communes, is 17,275. The whole diftrict comprizes 85 communes with 121,433 inhabitants, upon a territorial extent of 2530 kiliometres.

Coni is faid to have been firft founded in 1520, during the pontificate of Calixtus II.; and the following account is given of its origin. The inhabitants of fome villages having been grievoufly oppreffed by their lords, who, among other enormities, pretended a privilege granted by the emperor to deflower the brides before the hufbands touched them, the people, at length, attacked their lords, expelled them the country, and deftroyed their caftles, which had ferved as their protection, and left their oppreffors fhould return with foreign aid, they left their home and founded Coni. Their number daily increafing, they formed an alliance with the city of Afti, and Luchin, duke of Milan, and became a flourifhing republic, which form of government continued for fome years. At length they fubmitted to Charles of Anjou, comte of Provence. Some time after his death, they came under Jane, queen of Naples, who was incapable of fupporting the weight of government; and therefore the town of Coni, in order to enfure protection, voluntarily fubmitted to Amadeus VI., comte of Savoy, to whom it afterwards continued faithful. After valiantly defending itfelf againft many fucceffive fieges, for near three centuries, the rapid fucceffes of the French in Piedmont, during the months of April and May in 1796, obliged the king of Sardinia to make overtures for peace, and to furrender Coni, with Alexandria, Sufa, and Tortona, into the hands of the French, as hoftages of his good faith; and it afterwards became the principal place of a diftrict, as we have already ftated, in one of the fix Piedmontefe departments, called Stura.

CONIA, in *Botany*, the name of a genus formed by Ventenat, for the powdery byffi of Linnæus and other authors.

CONIACI, in *Ancient Geography*, a people of Spain, placed by Strabo near the fources of the Ebrus, in the vicinity of the Cantabri.

CONIC SECTIONS, as the name imports, are fuch curve-lines as are produced by the mutual interfection of a plane and the furface of a folid cone. The nature and properties of thefe figures were the fubject of an extenfive branch of the *Ancient Geometry*, and formed a fpeculation well fuited to the fubtle genius of the Greeks. In modern times, the conic geometry is intimately connected with every part of the higher mathematics and natural philofophy. A knowledge of thofe difcoveries, that do the greateft honour to the laft and the prefent centuries, cannot be attained without a familiar acquaintance with the figures that are now to engage our attention.

In this article we fhall treat of the cone, and the more general properties of thofe figures called the conic fections; and we fhall conclude with a fhort hiftorical account of this branch of mathematical learning. The more particular properties of each figure will be delivered under the proper heads in the progrefs of our work.

We begin with premifing a few lemmas, on which the theory of conic fections, we are to deliver, is founded.

LEMMAS.

Definition. If a right line, A B (*Plate* II. *Conics. fig.* 1.), be fo divided in the points D and E, that AD is to DB as AE is to EB; then that right line is faid to be harmonically divided.

Cor. If a right line, A B, be divided in E, then it cannot be cut in D and *d*, fo as to be harmonically divided both in E and D, and in E and *d*.

For, if it were poffible, it is plain that A D would be to D B as A *d* to *d* B, 11. 5. E: which is abfurd, 14. 5. E.

LEMMA I. *Fig.* 1.

If a right line, A B, be bifected in C, and cut in E and D, fo that C A or C B is a mean proportional between C E and C D: then A B is harmonically divided in D and E.

For, becaufe C D : C A :: C A : C E
therefore, C D + C A : C D − C A :: C A + C E : C A − C E
that is, A D : D B :: A E : E B.

Cor. If A B be bifected in C, and harmonically divided in D and E, then A C or C B is a mean proportional between C D and C E. *Cor. Def.* 1.

LEMMA II. *Fig.* 2.

If two tangents of a circle be drawn from the fame point, A, then any chord of the circle, as E D, which, being produced, paffes through A, and cuts the line, B C, that joins the two points of contact, in F, is harmonically divided in the points F and A.

Let O be the centre of the circle, and draw O H perpendicular to E D, and draw O B and O C to the points of contact. Becaufe the angles at B, H, and C, are all right angles, 18. 3. E, the circle defcribed on the diameter A O will pafs through A, B, H, O, and C, 31. 3. E: therefore A F × F H = B F × F C = E F × F D, 35. 3. E: therefore A F × F H + F H², or A H × F H = E F × F D + F H² = (becaufe E D is bifected in H) H D², 5. 2. E. Therefore E D is harmonically divided in F and A, *Lem.* 1.

Cor. And if a chord, as E D, which, when produced, paffes through A, be harmonically divided in A and F, then F is a point in the chord B C.

For, if not, then the chord, D E, could be harmonically divided at A and F, and alfo at A, and another point, different from F, which is abfurd. *Cor. Def.*

LEMMA III. *Fig.* 3 and 4.

Let C be the centre of a circle, and let D and E be two points in a diameter, A B, and both on the fame fide of the centre; and let the radius of the circle be a mean proportional between C D and C E: draw M N perpendicular to A B through E; then any chord, as H K, which, being produced if neceffary, paffes through D, and cuts M N in F, is harmonically divided in D and F.

Draw C L perpendicular to H K from the centre C. Becaufe C A² = C D × D E, therefore C A² − C D² (or C D² − C A²), or A D × D B = E C × C D − C D² (or C D² − E C × C D), or C D × D E. And becaufe the angles at E and L are right angles, therefore L D × D F = C D × D E = A D × D B = H D × D K, 35. 3. E. = (becaufe H K is bifected in L), L K² − D L² (or D L² − L K²). Therefore, L K² = D L² + L D × D F (or D L² − L D × D F) = D L × L F: therefore H K is harmonically divided in D and F. *Lem.* 1.

LEMMA IV. *Fig.* 5 and 6.

The fame conftruction being made as in the laft lemma, if H K be a chord, which, when produced if neceffary, paffes through D; then tangents of the circle drawn from the extremities of H K will meet one another in the line M N. And if tangents of the circle be drawn from a point affumed in M N, the chord drawn through the two points of contact, being produced if neceffary, will pafs through the point D.

Let H K be a chord paffing through D, and let tangents drawn from H and K meet in F: draw C F (cutting H K in L) to the centre of the circle, and join C K and F E. It is manifeft that F C × C L = C K², 8. 6. E. = C D × C E, hyp. Therefore a circle defcribed through D, F, and L, will pafs through E, 36. 3. E; therefore the angle F E D = the angle F L D, 21. 1. E. Therefore F E is perpendicular to A B, and F is a point in M N drawn from E perpendicular to A B.

Next, let F be in M N, and let H K and A B, both produced if neceffary, interfect in *d*. Becaufe the angles F L *d* and F E *d* are right angles; therefore F C × C L = *d* C × C E, 36. 3. E. But F C × C L = C K² = C D × D E; therefore *d* C × C E = D C × C E; therefore the point *d*, in which H K and A B interfect, is the fame as the point D.

LEMMA V. *Fig.* 7.

If the bafe of a triangle, A B, be bifected in D, and C G be drawn parallel to A B through the vertex; then any line, as E F, parallel to C D, and terminated by C B and C A, produced if neceffary, is bifected by C G.

Draw B H K parallel to C D. Becaufe A D = D B; therefore A C = C K, 2. 6. E. Therefore B H = H K. And, it is plain that E F, parallel to B K, is likewife bifected.

LEMMA VI. *Fig.* 8 and 9.

If A B, the bafe of a triangle, be harmonically divided in D and E, and the lines C D and C E be drawn; then any line, as H F, parallel to C E, and terminated by B C and C A, produced if neceffary, is bifected by C D.

Draw L K parallel to C E through D.
Becaufe A D : D B :: A E : E B.
Alternando, A D : A E :: D B : E B.
But, on account of equiangular triangles,
A D : A E :: D L : C E, 4. 6. E.
and D B : B E :: D K : C E;
therefore D L : C E :: D K : C E,

Therefore

Therefore D L = DK, 9. 5. E. Therefore any line parallel to L K, as F H, is bifected by C D.

Cor. If H F be bifected by C D, and C E be parallel to H F, then A B is harmonically divided in D and E.

For, if not, then H F could be bifected by two lines drawn through C; which is abfurd.

Of the Cone and its Sections.

Definitions.

Fig. 10. I. Let A D B be a circle, and V a fixed point without the plane of the circle; then, if a right line, paffing continually through the point V, be carried round the whole periphery of the circle A D B, that right line, being extended indefinitely on the fame fide of V as the circle, will defcribe a conic furface; and, if it be likewife extended indefinitely on the other fide of V, it will defcribe two oppofite conic furfaces.

Cor. A ftraight line drawn from the vertex to any point in a conic furface, being produced indefinitely, is wholly in the oppofite furfaces.

For a line, fo drawn, will coincide with the line that generates the conic furfaces, when this line, by being carried round the circumference of the bafe, comes to the propofed point.

II. The folid figure, contained by the conic furface and the circle A D B, is called a cone. The point V is named the vertex of the cone; the line V C, drawn to the centre of the circle, the axis of the cone; and the circle A D B, the bafe of the cone.

III. A right cone is when the axis is perpendicular to the plane of the bafe; otherwife, it is a fcalene, or oblique cone.

IV. A right line that meets a conic furface in one point only, and is every where elfe without that furface, is called a tangent.

Prop. I. *Fig.* 10.

The common interfection of a conic furface and a plane V D E, that paffes through the vertex, and cuts the bafe of the cone, is a rectilineal triangle.

For the common fection of the plane of the bafe, and the plane drawn through the vertex, (which is a right line, 3. 11. E.), will cut the periphery of the bafe in two points, D and E, and in thefe two points only: then, having drawn D V and E V to the vertex of the cone, thefe lines will be both in the conic furface (*Cor. Def.* 1.), and alfo in the plane furface; and there are no points, excepting in thefe lines indefinitely produced, which are common to both the furfaces. Therefore the figure D V E, which is the common interfection of the cone and a plane through the vertex, is a rectilineal triangle.

Prop. II. *Fig.* 11 and 12.

If two points, D and E, (not in the fame right line with the vertex) be affumed in a conic furface, the right line that joins them falls wholly within the conic furface, and when produced both ways it falls wholly without the furface; but if the affumed points be in oppofite furfaces, the right line that joins them falls without the conic furfaces, and, when produced, it falls within one conic furface on one fide, and within the other conic furface on the other fide.

From V, the vertex of the cone, draw the lines V D and V E, cutting the periphery of the bafe in the points B and C; then, a plane being drawn through the vertex and the points D and E, that plane will cut the bafe in the chord B C, and the common fections of the plane and the conic furfaces are the two right lines V B and V C indefinitely produced, *Pr.* 1. Now the right line D E, which is wholly contained in this plane, can meet the lines V B and V C only in the points D and E. When the points D and E are in the fame conic furface, then the line D E is contained in the angle B V C within the conic furface, and, produced both ways, it is contained in the adjacent angles B V M and C V N without the conic furface. On the other hand, when D and E are in oppofite furfaces, D E is contained in the angle B V M, or C V N, without the conic furfaces, and, being produced both ways, it is contained either in the angle B V C, or in the angle M V N, within the conic furfaces.

Cor. A right line cannot meet a conic furface in more than two points.

Prop. III. *Fig.* 11.

If a point, E, be affumed in a conic furface, and a line, P Q, be drawn through it, fo as to be parallel to a right line, V B, paffing through the vertex, and contained in the conic furfaces; then the right line, P Q, will not meet either of the oppofite furfaces in another point, but it will fall within the furface, in which the affumed point E is, on the one fide, and it will be wholly without both furfaces on the other fide.

For if a plane be conceived to be drawn through the line V B and the point E, the line P Q, parallel to V B, will be wholly in that plane, 7. 11. E; and the common fections of the plane and the conic furfaces will be the line V B and the line V E C drawn through the vertex and the point E, *Pr.* 1. Now the line, Q P, does not meet either of the lines V B or V C in another point different from E. Alfo Q E, the part of the line that is contained in the angle B V C, is within the cone; and P E, the part of it that is contained in the angle C V N, is without both the oppofite furfaces.

Prop. IV. *Fig.* 12.

If a plane be drawn through the vertex of a cone and a tangent of the conic furface G H, it will meet the conic furface only in the line, V D, drawn through the vertex of the cone and the point of contact of the tangent.

For, becaufe the point D and the vertex V are common both to the plane furface and to the conic furface, therefore the line V D, indefinitely produced, is likewife common to both furfaces. And becaufe G H meets the conic furface only in the point D, and is every where elfe without the furface, therefore any line (different from V D), as V F, drawn in one of the conic furfaces, is contained on one fide of the plane; and the fame line continued in the oppofite conic furface, as V K, is contained on the other fide of the plane.

Cor. 1. Any ftraight line, drawn in the plane, V G H, fo as to meet the line V D, is a tangent of the conic furfaces.

Cor. 2. No other plane, befides the plane V G H, can be drawn fo as to touch the conic furfaces in the line V D without cutting them.

For, R S the common fection of the plane V G H, and the plane of the bafe, is a tangent to the periphery of the bafe, *Cor.* 1. And, if there were two fuch planes, there would likewife be two tangents of a circle drawn through the fame point of the periphery, which is abfurd.

Prop. V. *Fig.* 13.

If either of two oppofite conic furfaces be cut by a plane parallel to the bafe of the cone, the fection is a circle, having its centre in the axis of the cone.

Through V C, the axis of the cone, let two planes be drawn cutting the baſe in the lines C D and C E, and the plane parallel to the baſe, in the lines G H and G L, and the conic ſurfaces in the lines V H D and V L E: then, becauſe the baſe is parallel to the cutting plane, therefore C D is parallel to G H and C E to G L, 16. 11. E. Therefore, on account of equiangular triangles, 4. 6. E.

DC : CV :: HG : GV
CV : CE :: GV : GL
Ex æquo DC : CE :: HG : GL

But DC = CE, therefore HG = GL. And in like manner it may be ſhewn that any right line, drawn from G to a point in the interſection of the plane, and the conic ſurface, is equal to G H; therefore the ſection is a circle.

Cor. If, through a point ſituated within or without a conic ſurface, two ſtraight lines, both parallel to the plane of the baſe of the cone (that is, parallel to ſtraight lines in that plane), be drawn to cut, or touch the conic ſurface: then the rectangle contained by the two ſegments (between the point and the conic ſurface), of one of the lines when it cuts, or the ſquare of its ſegment when it touches the conic ſurface, is equal to the rectangle contained by the two ſegments of the other line when it cuts, or to the ſquare of its ſegment when it touches the conic ſurface.

For a plane drawn through the two lines will be parallel to the plane of the baſe, 15. 16. E; and it will interſect the conic ſurface in the periphery of a circle: whence the corollary is manifeſt, 35 and 36. 3. E.

PROP. VI. *Fig.* 14.

If two diameters of the baſe of a cone, as A B and CD, interſect one another at right angles, a plane drawn through the vertex of the cone, and one of the diameters, C D, will biſect any ſtraight line, as E F, terminated both ways by one of the conic ſurfaces, and parallel to the other diameter A B.

Through V and E F draw a plane cutting the conic ſurface in the lines V G and V K, and the plane of the baſe in the line G H K; becauſe E F is parallel to A B; therefore G K is parallel both to A B and E F, 16. 11. E; and it is perpendicular to C D; therefore G K is biſected by the diameter C D, 3. 3. E. And, becauſe G K is biſected in H, therefore E F, parallel to G K, is biſected by V H, that is, by the plane drawn through V and C D.

PROP. VII. *Fig.* 15. *Plate* III.

If a point, as B, be aſſumed in the plane of the baſe of a cone, but without the periphery of the baſe, and, from that point, two tangents, B P and B Q, be drawn to the baſe, and likewiſe a ſtraight line, B V, to the vertex of the cone: then any ſtraight line, as E F, parallel to B V, and terminated both ways by one of the conic ſurfaces, is biſected by a plane drawn through V, the vertex of the cone, and cutting the plane of the baſe in the chord P Q.

Becauſe B V and E F are parallel to one another, therefore they are in one plane, 7. 11. E: let the plane, drawn through B V and E F, cut the conic ſurface in the lines V E G, and V F K; and let the ſame plane cut the plane of the baſe in the line B G K, and the plane paſſing through V, and the chord P Q in the line V D H. Becauſe G K is harmonically divided in H and B, *Lem.* 2. therefore E F, parallel to V B, is biſected by the line V H, *Lem.* 6. But D, the point where V H cuts E F, is the point where the plane drawn through V and the chord P Q cuts E F: therefore E F, parallel to B V, is biſected by that plane.

PROP. VIII. *Fig.* 16.

Let a plane, paſſing through the vertex of a cone, cut the plane of the baſe in a diameter of the baſe C D: and let A B, a diameter of the baſe, be perpendicular to C D; and let M N be drawn through the vertex of the cone parallel to A B; then if a right line G K, in the plane C V D, and terminated by one of the conic ſurfaces, be biſected by a plane paſſing through M N, this plane will biſect a l right lines terminated by one of the conic ſurfaces and parallel to G K.

Let the plane which biſects G K cut the plane of the baſe in the line PQ, and the plane CVD in the line VHO: through V draw V L parallel to G K, and let it meet C D produced in L. Becauſe M N is parallel to A B; therefore P Q (the common ſection of two planes drawn through M N and A B) is parallel to M N and to A B, 16. 11. E: therefore P Q is perpendicular to C D. Becauſe G K is biſected by V O, and is parallel to V L; therefore C D, the baſe of the triangle C V D, is harmonically divided in L and O, *Cor. Lem.* 6. conſequently, if two tangents of the baſe be drawn from L, the chord that joins the points of contact of theſe tangents will paſs through O, *Cor. Lem.* 2; and it will be perpendicular to the diameter C D: therefore that chord will coincide with the line P Q, which is the only line that can be drawn through O perpendicular to C D. Therefore all right lines, terminated by one of the conic ſurfaces, and parallel to V L or G K, are biſected by the plane V P Q drawn through M N to biſect G K, *Pr.* 7.

If G K be parallel to C D, then C D will be biſected in O, and P Q will coincide with A B; ſo that this propoſition, in this caſe of it, is the ſame as *Prop.* 6.

Cor. If a plane be drawn through M N to biſect any one right line terminated by one of the conic ſurfaces, and parallel to a line G K in the plane V C D, the ſame plane will biſect all right lines terminated by one of the conic ſurfaces and parallel to G K.

For, if not, then the ſame ſtraight line could be biſected by two planes both paſſing through M N, which is abſurd.

PROP. IX. *Fig.* 17.

Let a plane, paſſing through the vertex of a cone, cut the plane of the baſe in a line C D, not paſſing through E the centre of the baſe: draw the diameter, A F B, perpendicular to C D, and produce it to M; ſo that E M may be a third proportional to E F and E B the radius of the baſe of the cone, and draw M V N through the vertex: then if a right line G K, in the plane C V D, and terminated by one of the conic ſurfaces, be biſected by a plane paſſing through M N, this plane will biſect all right lines terminated by one of the conic ſurfaces and parallel to G K.

Let the plane which biſects G K cut the plane of the baſe in the line P Q M, and the plane C V D in the line V H O: through V draw V L parallel to G K, and let it cut C D produced in L. Becauſe V O biſects G K, and V L is parallel to G K, therefore C D, the baſe of the triangle C V D, is harmonically divided in O and L, *Cor. Lem.* 6; therefore if two tangents of the baſe be drawn from L, the chord that joins the points of contact of theſe tangents will paſs through the point O, *Cor. Lem.* 2; but the ſame chord, being produced, likewiſe paſſes through the point M, *Lem.* 4: therefore that chord will coincide with P Q, which is the only right line that can paſs through both the points O and M, therefore all right lines terminated by one of the conic ſurfaces and parallel to L V, or G K, are biſected by the plane V P Q drawn through M N to biſect G K, *Pr.* 7.

 Cor.

Cor. If a plane be drawn through M N to bisect any one right line, terminated by a conic surface, and parallel to a line G K, in the plane V C D, or parallel to the plane V C D, that plane will bisect all right lines terminated by a conic surface, and parallel to G K.

For, if not, then the same right line could be bisected by two planes, both passing through M N; which is absurd.

PROP. X. *Fig.* 18.

Let a plane, passing through the vertex of a cone, cut the plane of the base in a line C D, which neither cuts nor touches the periphery of the base: draw A B F, through E, the centre of the base, perpendicular to C D, and take E M, a third proportional to E F, and the radius of the base of the cone; and draw M V through the vertex: then if a right line G K, parallel to the plane C V D, and terminated by one of the conic surfaces, be bisected by a plane passing through M V, this plane will bisect all right lines terminated by one of the conic surfaces, and parall l to G K. But the point H, in which the plane, that b sects G K, cuts G K, must not be in the same right line with ne point M, and the vertex of the cone.

Let the plane which bisects G K, cut the plane of the base in the line P Q, draw V L, parallel to G K; and because G K is parallel to the plane C V D, therefore V L parallel to G K, is in the plane C V D, and it will cut the plane of the base in L, a point of the line C D. And, because G K is parallel to V L, therefore they are contained in one plane, 7. 11. E. Let this plane be drawn, and let it cut the conic surface in V R and V S, the plane of the base in L R S, and the plane V P Q, in V O. Because G K is parallel to V L, and it is bisected by V O, therefore S R, the base of the triangle S V R, is harmonically divided in O and L, *Cor. Lem.* 6.; therefore, if two tangents of the base be drawn from L, the chord that joins the points of these tangents will pass through the point O, *Cor. Lem.* 2.; but, because L is a point in C D, the same chord will pass through M, *Lem.* 4.; and, because the point O does not fall upon M, therefore the chord will coincide with P Q, which is the only line that can pass both through O and M. Therefore, all right lines, terminated both ways by one of the conic surfaces, and parallel to V L, or G K, are bisected by the plane, V P Q, *Pr.* 7.

PROP XI. *Fig.* 19.

Let a plane touching a conic surface cut the plane of the base in a line, C D, which touches the periphery of the base in P; then, if a right line, G K, terminated by one of the conic surfaces, and parallel to the touching plane, V C D, be bisected by a plane drawn through V P; this plane will bisect all right lines parallel to G K, and terminated by one of the conic surfaces.

Through V draw V L parallel to G K: because G K is parallel to the plane V C D, therefore, V L, parallel to G K, is in the plane V C D, and it will cut the plane of the base in L, a point in C D. And, because V L is parallel to G K, therefore they are contained in one plane, 7. 11. E.; let this plane be drawn, and let it cut the conic surface in the lines V M and V N, the plane of the base in the line L M N, and the plane V Q P, in the line V O. Because G K is parallel to V L, and it is bisected by V O, therefore, M N, the base of the triangle V M N, is harmonically divided in O and L, *Cor. Lem.* 6. Therefore, if two tangents of the base be drawn from L, the chord that joins the two points of contact of these tangents will pass through the point O, *Cor. Lem.* 2.; but the same chord likewise passes through Q, which is one of the points of contact of tangents drawn from L; therefore, the chord coincides with the line Q P. Therefore the plane V Q P, bisects all right lines terminated by one of the conic surfaces, and parallel to V L, or G K, *Pr.* 7.

Fig. 20, 21, 22, 23. If a cone be cut by a plane P Q, which neither passes through the vertex, nor is parallel to the base, then, a plane, as V M N, being drawn through the vertex parallel to the cutting plane, it will necessarily meet the plane of the base of the cone. The line of common section of the parallel plane, and the base of the cone M N, may have one or other of three different positions; *viz.*

Fig. 20. 1st. It may be without the base of the cone.

Fig. 21. 2dly. It may touch the periphery of the base of the cone.

Fig. 22. and 23. 3dly. It may cut the periphery of the base of the cone.

These three different cases offer three sections for our consideration that are very different from one another, and possess many properties that are peculiar to each, while they have many that are common to all the three.

Def. V. If the line of common section, M N, (*fig.* 20.), be without the base of the cone, then the plane V M N, drawn through the vertex, will be entirely between the two conic surfaces, not meeting either of them. In this case, the cutting plane P Q, will meet every line drawn from the vertex in one of the conic surfaces, and the curve line of common section will surround that conic surface, and will completely enclose a space. In this position of the cutting plane, the conic section is called an ellipse.

Def. VI. If the line of common section M N, (*fig.* 21.) touch the periphery of the base, then the plane drawn through the vertex will touch the conic surfaces, *Pr.* 4. And the opposite surfaces will be on different sides of it. In this case also the cutting plane will meet every line drawn from the vertex in one of the conic surfaces, excepting only the line of contact, V B, in which the touching plane meets that conic surface: and as the cutting plane is indefinitely extended along the touching plane without meeting it, it is obvious that the curve line formed by the common section of the cutting plane and the conic surface does not return into itself so as to enclose a space, but it is open on the side opposite to the vertex of the cone. In this position of the cutting plane, the conic section is called a parabola.

Def. VII. If the line of common section M N (*fig.* 22 & 23.) cut the periphery of the base, then the plane drawn through the vertex will divide each of the opposite conic surfaces into two parts lying on opposite sides of it. In this case the cutting plane being indefinitely extended will meet every line drawn from the vertex in those parts of the two conic surfaces that lie on the same side of the plane, through the vertex, as the cutting plane itself; and thus two curve lines will be formed by the common intersection, of the cutting plane, and the two opposite conic surfaces. It is obvious that these curve lines may be indefinitely extended, and that they do not return into themselves so as to enclose a space. In this position of the cutting plane the conic section, formed by its intersection with one of the conic surfaces is called a hyperbola; and the two conic sections formed by its intersections with the two opposite conic surfaces, are called opposite hyperbolas, or opposite sections.

Def. VIII. The nature of the several conic sections defined in the three last definitions depends entirely, as we have seen, on the relative position that the line of common section of the plane of the base and the plane drawn through the vertex parallel to the cutting plane, has in respect to the circle

cle that forms the bafe of the cone. As there will be frequent occafion to refer to this line, in the following theory of the conic fections, it will be requifite, for the fake of abridging language, to diftinguifh it by a peculiar name. For this purpofe we fhall call it the *determining line*.

Def. IX. Let a plane, as P Q, (*fig.* 20 and 22.) cut a conic furface, or oppofite furfaces, and let M N be the *determining line*, or the common fection, of the plane of the bafe and the plane drawn through the vertex parallel to the plane P Q: from C, the centre of the bafe of the cone, draw C D perpendicular to M N, and take C E a third proportional to C D and C A or C B, the radius of the bafe: then, a line being drawn from the vertex V to the point E, it will meet the plane P Q in a point G, which is called the centre of the conic fection, or oppofite fections, formed by the common interfection of the plane P Q, and the conic furface, or oppofite furfaces.

But, if the *determining line* M N (*fig.* 23.) cut the bafe of the cone, and pafs through its centre, then, the diameter A B being perpendicular to M N, and V G being drawn through the vertex parallel to A B; V G will meet the plane P Q in a point G, which, in this cafe, is the centre of the oppofite fections.

Fig. 20, 22, 23. *Cor.* 1. The centre of an ellipfe is a point within the figure; but the centre of two oppofite hyperbolas is a point without both hyperbolas, and fituated between them.

For, when the line M N is without the bafe of the cone, the point E and the line V E are within the conic furface; but, when M N cuts the bafe, then E and V E are without both of the two conic furfaces and between them.

Cor. 2. A parabola has no centre.

Fig. 21. For, in this cafe, the points E and D coincide with the point B, where M N touches the periphery of the bafe; and the line V E coincides with the line V B which does not meet the cutting plane P Q.

Cor. 3. The centre of a conic fection is never in the axis of the cone, unlefs when the cutting plane is parallel to the bafe of the cone.

Def. X. A right line drawn in the plane of a conic fection fo as to meet the curve of the fection in one point only, and which, being produced both ways, is contained on one and the fame fide of the fection, is called a tangent of the fection.

Cor. 1. A tangent of a conic fection is a tangent of the conic furface.

For it can meet the conic furface only in the point in which it meets the fection.

Cor. 2. There cannot be more than one tangent of a conic fection at the fame point of the curve.

For if there were two tangents, then two planes drawn through them and the vertex of the cone would meet the conic furface in the fame right line without cutting the conic furface, which is abfurd. *Cor.* 2. *Pr.* 4

Prop. XII.

A right line, drawn in the plane of a conic fection, cannot meet the curve in more than two points.

For fuch a line does not meet the conic furface in more than two points. *Cor.* 2.

Prop. XIII.

A right line drawn through a point in a conic fection, in the fame plane with it, and parallel to a line drawn from the vertex in the conic furface, does not meet the curve of the conic fection again in another point.

For it does not meet the conic furface in another point, *Pr.* 3. Thus, in the parabola, if P Q be drawn parallel to V B, (*fig.* 21.), then P Q meets the curve only in the point P.

Prop. XIV. *Fig.* 24, 25, and 26. *Plate* IV.

Every ftraight line, as F H, drawn through G, the centre of an ellipfe, or oppofite hyperbolas, and terminated both ways by the curve, or oppofite curves, is bifected in the centre.

I. When the *determining line* M N, (*fig.* 24 and 25), does not pafs through the centre of the bafe. Through V, the vertex of the cone, and the line F H, draw a plane cutting the conic furface in the lines V H L and V F K, and the plane of the bafe in the line L K M, and the plane V M N in the line V M. Becaufe the point G is in the line V G E; therefore, the line L K M will pafs through the point E. And becaufe F H and V M are the common fections of the plane V K L, and two parallel planes (*viz.* the plane of the fection and the plane V M N), therefore F H is parallel to V M, 16. 11. E. And, becaufe C B or C A, the radius of the bafe of the cone, is a mean proportional between C D and C E, and M N is perpendicular to A B; therefore, the chord K L is harmonically divided in E and M, *Lem.* 3. And becaufe L K is the bafe of the triangle K V L, and F H is parallel to V M, therefore, F H is bifected by V E, *Lem.* 6.: that is, F G = G H.

In the ellipfe, when F H (*fig.* 20.) is parallel to M N, it will be perpendicular to a diameter of the bafe drawn perpendicular to the diameter A B; therefore, it is bifected by the plane V A B, which cuts it in G, *Pr.* 6.

II. When the *determining line* (*fig.* 26.) paffes through the centre of the bafe. In this cafe, V G is parallel to the diameter A B. *Def.* IX. And L K, the common fection of the plane of the bafe, and the plane V Q K (drawn through V, and the line F G H), is parallel both to A B and to V G, 7. 11. E. But the diameter M N is perpendicular to the diameter A B; therefore, it is alfo perpendicular to K L, and it bifects K L, 3. 3. E. And becaufe F H and V M are the common fections of two parallel planes (*viz.* the plane of the conic fection, and the plane V M N), therefore F H is parallel to V M. And becaufe V M bifects the bafe of the triangle K V L, and V G is parallel to that bafe, therefore V G bifects F H parallel to V M. *Lem.* 5.

Definitions.

XI. A ftraight line drawn through the centre of an ellipfe, or oppofite hyperbolas, and terminated both ways by the curve or oppofite curves, is called a diameter of the ellipfe, and a tranfverfe diameter of the oppofite hyperbolas.

XII. A ftraight line in the plane of a parabola, as P Q, (*fig.* 21.) drawn parallel to the right line V B, in the conic furface (which paffes through the vertex of the cone, and the point in which the *determining line* touches the periphery of the bafe), is called a diameter of the parabola.

Cor. All the diameters of a parabola are parallel to one another.

XIII. A vertex of a diameter is a point where the diameter meets the curve of the conic fection.

Cor. A diameter of a parabola has only one vertex, *Pr.* 13.

XIV. A ftraight line (which is not a diameter of an ellipfe), terminated both ways by the curve of a conic fection, and bifected by a diameter of the fection, is faid to be ordinately applied to that diameter; or it is called a double

 ordinate;

ordinate; and the half of it, an ordinate of the diameter.

Prop. XV. *Fig.* 24, 25, and 26.

If a ſtraight line be ordinately applied to a diameter of an ellipſe, or a parabola, or to a tranſverſe diameter of a hyperbola, then all right lines parallel to it and terminated both ways by the ſame curve, or by the oppoſite curve, are ordinately applied to the ſame diameter.

Let R S T (*fig.* 24 and 25.) be ordinately applied to F H, a diameter of an ellipſe or a parabola, or a tranſverſe diameter of a hyperbola or oppoſite hyperbolas; then all other right lines, as P Q, parallel to R T, and terminated by the ſame curve, or the oppoſite curve, are ordinately applied to the ſame diameter F H. Draw a plane through V, the vertex of the cone, and the diameter F H. Then, in the caſe of the ellipſe and hyperbola, when the *determining line* does not paſs through the centre of the baſe, this plane will neceſſarily paſs through the line V E. And, becauſe the plane of the conic ſection is parallel to the plane V M N, therefore R T, in the former plane, is parallel to the latter plane. And becauſe the plane drawn through V, and the diameter F H, paſſes through V E, and biſects R T, which it cuts in S, a point not in the ſame right line with V and E; therefore, the ſame plane will biſect all right lines in either of the oppoſite cones that are parallel to R T. *Pr.* 10. and *Cor.* 9. Therefore, the diameter F H in that plane will biſect all the right lines which it meets, that are parallel to R T, and terminated by the ſection, or either of the oppoſite ſections.

And, when the *determining line* paſſes through the centre of the baſe (*fig.* 26.), then, as before, R T is parallel to the plane V M N. And the diameter A B is perpendicular to the diameter M N, and G V is parallel to A B, *Def.* IX; therefore, the plane drawn through V G and F H, which biſects R T, will biſect all right lines in either of the oppoſite cones that are parallel to R T, *Pr.* 8. Therefore, F H in that plane will biſect all the right lines which it meets that are parallel to R T, and terminated by either of the oppoſite hyperbolas.

In the parabola, becauſe the plane of the ſection is parallel to the plane V M N; therefore, R T, (*fig.* 27.) in the former plane, is parallel to the latter plane. And becauſe V B is parallel to F H, therefore a plane may be drawn through them both; let this plane be drawn, and it will biſect all right lines in either of the oppoſite cones that are parallel to R T, *Pr.* 11. Therefore, F H, in that plane, will biſect all the right lines which it meets, that are parallel to R T, and terminated by the curve of the parabola.

Prop. XVI. *Fig.* 28.

A right line, drawn from a vertex of a diameter of an ellipſe, or a parabola, or from the vertex of a tranſverſe diameter of a hyperbola, ſo as to be parallel to a line ordinately applied to that diameter, is a tangent of the curve.

Fig. 28. Let F H be a diameter of an ellipſe or a parabola, or a tranſverſe diameter of a hyperbola, and R S T, a line ordinately applied to that diameter; then F M, drawn from a vertex of the diameter, ſo as to be parallel to R T, is a tangent of the curve. For, if F M be not a tangent, it will cut the ſection again in another point (*Cor.* 2. *Def.* X), let it cut the ſection again in K, and biſect F K in I. Then, if a diameter of the ſection be drawn through I, F K will be ordinately applied to that diameter, *Def.* XIV; therefore that diameter would biſect R T parallel to F K, *Pr.* 15. Therefore R T would be biſected by two different diameters; *viz.* by the diameter F H, and by that drawn through I. But, in the ellipſe and hyperbola, all the diameters paſs through the centre; and, in the parabola, they are all parallel to one another; therefore two diameters of a conic ſection will cut every ſtraight line (which does not paſs through the centre of the ellipſe and hyperbola) in two different points. Therefore R T cannot be biſected by two different diameters. Therefore F M, parallel to R T, does not cut the curve again; that is, F M is a tangent of the conic ſection.

Cor. 1. If R T be ordinately applied to the diameter F H, it is parallel to a tangent, F M, at a vertex of that diameter.

For there cannot be two tangents of a conic ſection at the ſame point of the curve.

Cor. 2. All right lines ordinately applied to the ſame diameter of a conic ſection are parallel to one another.

For they are all parallel to a tangent at a vertex of that diameter.

Prop. XVII. *Fig.* 24 and 27.

A diameter of a conic ſection being given, to draw a right line that ſhall be ordinately applied to that diameter.

Fig. 24. Let F H be a diameter of an ellipſe; draw a plane through the vertex V, and the diameter F H, cutting the plane of the baſe in the chord K L, which neceſſarily paſſes through the point E; draw tangents of the baſe from K and L, and let them interſect in O. Then O is a point in the *determining line* M N; *Lem.* 4; and V O being drawn to the vertex of the cone, it is in the plane V M N, and parallel to the plane of the ellipſe. Now, all ſtraight lines, as P Q and R T, in the plane of the ellipſe, drawn parallel to V O, are ordinately applied to the diameter F H; for theſe lines are all biſected by the plane V K L, that is, by F H in that plane, *Pr.* 7.

The conſtruction is exactly the ſame for the hyperbola.

Fig. 27. In the parabola the plane drawn through the diameter F H, paſſes through V B, parallel to F H, and it cuts the plane of the baſe in a chord B K, drawn from the point where the *determining line* M N, touches the periphery of the baſe; in this caſe draw K O, a tangent of the baſe, interſecting M N in O; then, as before, V O, drawn to the vertex, is parallel to the plane of the parabola; and all right lines, as R T, P Q, in that plane, parallel to V O, are ordinately applied to the diameter F H, *Pr.* 7.

Fig. 20, 21, 22, and 23. In all the conic ſections, when the plane drawn through the vertex of the cone, and a diameter P Q, cuts the plane of the baſe in a diameter of the baſe A B; then all right lines, as R T, in the plane of the ſection, drawn parallel to the *determining line* M N, are ordinately applied to the diameter P Q. For, if a diameter of the baſe be drawn parallel to M N, that diameter will be parallel to R T, and perpendicular to the diameter A B; therefore R T is biſected by the plane V A B, that is, by P Q, the diameter of the ſection in that plane, *Pr.* 6.

Prop. XVIII.

Tangents drawn from the vertices, of a diameter of an ellipſe, or of a tranſverſe diameter of a hyperbola, are parallel to one another; but tangents of a conic ſection, drawn from the vertices of two different diameters, are not parallel.

Let a right line be ordinately applied, to a diameter of an ellipſe, or to a tranſverſe diameter of a hyperbola, *Pr.* 17; then the tangent of the curve at either vertex of the diameter is parallel to that right line; conſequently, the two tangents at the extremities of the diameter are parallel to one another.

2 And

And becaufe a right line ordinately applied to one diameter of a conic fection is not ordinately applied to another diameter; therefore a tangent at a vertex of one diameter is not parallel to a tangent at a vertex of another diameter.

Cor. If there be two parallel tangents of an ellipfe, or of oppofite hyperbolas; thefe tangents are drawn from the extremities of a diameter of the ellipfe, or of a tranfverfe diameter of the hyperbolas.

PROP. XIX. *Fig.* 28.

A ftraight line terminated both ways by the curve of a conic fection, and parallel to a tangent, is ordinately applied to the diameter drawn through the point of contact.

Let R T, terminated by the curve of a conic fection, be parallel to a tangent of the curve F M; then R T is ordinately applied to the diameter F H, drawn through the point of contact. Draw P Q ordinately applied to F H, *Pr.* 17. Then P Q is parallel to the tangent F M, *Cor.* 1. *Pr.* 16; therefore P Q is alfo parallel to R T. Confequently, R T is ordinately applied to F H, *Pr.* 15.

PROP. XX. *Fig.* 29.

A ftraight line G T, drawn from the centre of oppofite hyperbolas fo as to be parallel to F O and H I lines touching the curves at the vertices of a tranfverfe diameter F H, bifects all lines, as R S, terminated by the oppofite hyperbolas and parallel to the tranfverfe diameter: and if a tranfverfe diameter, F H, be drawn parallel to a ftraight line, as R S, terminated by oppofite hyperbolas, and bifected by a line G T drawn through the centre, this line is parallel to F O and H I the tangents at the vertices of the tranfverfe diameter.

Draw the diameter R P, join S, P, and produce F H to cut S P in Q. Becaufe R S is parallel to F H, and R G = G P; therefore S Q = Q P: therefore S P is parallel to H I or F O, *Cor.* 1. *Pr.* 16. But G T is parallel to F O or H I: therefore G T is parallel to S P. Therefore it is manifeft that G T bifects R S, 2. 6. E.

Again, if G T bifect R S, then is G T parallel to H I or F O; for, becaufe R T = T S, and R G = G P, therefore G T is parallel to S P, 2. 6. E. And becaufe F H is parallel to R S, therefore S Q = Q P, 2. 6. E.: therefore S P is parallel to H I, *Cor.* 1. *Pr.* 16. Therefore G T is parallel to H I or F O.

Def. XV. Let the *determining line* M N (*fig.* 30.) of two oppofite hyperbolas cut the periphery of the bafe of the cone in M and N, and let tangents of the bafe be drawn from thefe points (which tangents will pafs through the point E when M N does not pafs through the centre of the bafe of the cone, *Lem.* 4; but they will both be parallel to the diameter A B and to the line V G, when M N does pafs through the centre): through the line V G, and the two tangents P M and Q N, let two planes be drawn cutting the plane of the hyperbolas in the lines G P and G Q, interfecting in the centre of the hyperbolas: then thefe lines are called afymptotes of the hyperbolas.

Cor. 1. The afymptotes do not meet the hyperbolas.

For the planes V P M and V Q N meet the conic furfaces only in the lines V M and V N produced, *Pr.* 4.: therefore the lines G P and G Q, in thofe planes, are without the conic furfaces in which the hyperbolas are.

Cor. 2. The afymptotes G P and G Q are parallel to V M and V N, the lines in which the planes V M P and V N Q touch the conic furfaces.

For the plane V M P cuts the plane of the hyperbolas and the plane V M N (which are parallel planes) in the lines G P and V M; and the plane V N Q cuts the fame planes in the lines G Q and V N.

Cor. 3. If a line be drawn parallel to one of the afymptotes through a point in one of the hyperbolas, that line does not meet the fame hyperbola, nor the oppofite one, again in another point.

For a line parallel to one of the afymptotes is parallel to one of the lines V M and V N in the conic furface; therefore it does not meet either of the conic furfaces again in another point, *Pr.* 3.

Cor. 4. A ftraight line in the plane of the hyperbolas, as F H, drawn through the centre of the hyperbolas within the angle contained by the afymptotes, will meet both the hyperbolas.

Becaufe the afymptotes are parallel to V M and V N, therefore, if V O be drawn parallel to F H, it will be within the angle M V N; and it is plain that F H, parallel to V O, meets both the conic furfaces.

LEMMA VII. *Fig.* 31.

Let A B and A C be two right lines that meet one another: then if B C, drawn through D, and terminated by A B and A C, be bifected in D, no other ftraight line, terminated by A B and A C, and drawn through D, will be bifected in that point.

Draw G H through D, and D E parallel to A C; becaufe B D = D C, therefore A E = E B, 2. 6. E. Therefore A E and E G are not equal to one another: and, confequently, G D and D H are not equal.

PROP. XXI. *Fig.* 30.

If a ftraight line, terminated by the afymptotes, as K L or S T, touch either of the hyperbolas, it is bifected in the point of contact: and if the middle point of a ftraight line, as K L or S T, terminated by the afymptotes be in either of the hyperbolas, that line is a tangent of the curve. Draw the diameter F H and let *a b* be ordinately applied to it, *Pr.* 17: alfo draw *d e*, between M V and V N, parallel to *a b*. Conceive a plane to be drawn through V G and F H, and let this plane cut the plane M V N in the line V O. It is manifeft that V O is parallel to the diameter F H, 16. 11. E. And becaufe a plane drawn through V G bifects *a b*, the fame plane will bifect all right lines in either of the oppofite cones that are parallel to *a b*, *Cor.* 9; therefore it will bifect *d e*; that is, *d o* = *o e*. Becaufe K L is a tangent, it is parallel to *a b*, *Cor.* 1. *Pr.* 16, and, confequently, to *de*. And becaufe the afymptotes are parallel to V M and V N, *Cor.* 2. *Def.* XV., and F H is parallel to V O, and *de* to K L, it is plain that K L and *de* are fimilarly divided in H and O: therefore K H = H L.

Again, if K L meets the hyperbola in H, and is bifected there, it is a tangent. For, if not, then, a line being drawn between the afymptotes to touch the hyperbola in H, it would likewife be bifected in H as has already been fhewn: which is abfurd. *Lem.* 7. Therefore K L is a tangent.

PROP. XXII. *Fig.* 32. *Plate* V.

If a right line, that cuts an hyperbola or oppofite hyperbolas, likewife cuts both the afymptotes; the fegments between the hyperbola, or hyperbolas, and the afymptotes, will be equal.

Let the right line D E cut a hyperbola in S and P, and the afymptotes in D and E: draw the tranfverfe diameter F H to bifect S P, and let K L be drawn to touch the hyperbola in H: becaufe F H bifects S P, therefore S P is parallel to the tangent K L, *Cor.* 1. *Pr.* 16, but K L is bifected in

in H, *Pr.* 21.; therefore D E, parallel to K L, is biſected in Q: and becauſe D E and S P are both biſected in Q, therefore D S and S E are reſpectively equal to S P and P D.

Next let S R cut the two oppoſite hyperbolas in S and R; and the aſymptotes in N and I: draw G T through the centre to biſect S R; and draw the tranſverſe diameter F H parallel to S R; and let K L touch one of the hyperbolas at H, and draw K M parallel to S R: becauſe G T biſects S R parallel to F H, therefore G T is parallel to K L, *Pr.* 20: becauſe K M and F H are both parallel to S R, therefore they are parallel to one another: but K L is biſected at H, *Pr.* 21, therefore L M is biſected at G, and K M is biſected at O, 2. 6. E; therefore N I, parallel to K M, is biſected at T. And, becauſe S R and N I are both biſected at T, therefore the ſegments S N and N R are reſpectively equal to the ſegments R I and I S.

Prop. XXIII. *Fig.* 32.

The curve of an hyperbola approaches the nearer to the aſymptote the farther it is continued; and, if continued far enough, the diſtance of the curve from the aſymptote will become leſs than any aſſigned diſtance how ſmall ſoever.

Aſſume any point, as A in the hyperbola, and draw A X parallel to the aſymptote G C; then A X does not meet the hyperbola again, *Cor.* 3. *Def.* XV: through A draw any line B C to a point, as Z in the curve, and let B C meet the aſymptotes in B and C, and draw B X perpendicular to A X, and Z Y perpendicular to the aſymptote G C: becauſe A B = Z C, *Pr.* 21, it is plain that B X = Z Y: now the more diſtant the point Z is, the nearer is the line A B to the line A X, and the leſs is B X, or Z Y the diſtance of the curve from the aſymptote. And becauſe A B may be drawn ſo as to make B X leſs than any aſſigned line, therefore a point of the curve may be found that ſhall be nearer to the aſymptote than any aſſigned diſtance.

Definitions.

Fig. 30. *Plate* IV. XVI. If a ſtraight line be drawn through the centre of oppoſite hyperbolas parallel to the tangents S T and K L at the vertices of a tranſverſe diameter F H, and a part of that line biſected in the centre, as I R, be taken equal to the ſegments S T and K L (it is plain that S T = K L) of the tangents terminated by the aſymptotes; then I R is called a ſecond diameter of the hyperbolas, and the extremities of it are called the vertices of the ſecond diameter.

But the word diameter is often uſed to ſignify a ſtraight line drawn through the centre of an ellipſe or oppoſite hyperbolas, without regard to the magnitude of ſuch line.

XVII. A ſtraight line, terminated by two oppoſite hyperbolas and biſected by a ſecond diameter, is ſaid to be ordinately applied to that diameter; or it is called a double ordinate, and the half of it, an ordinate.

XVIII. Two diameters of an ellipſe, or of oppoſite hyperbolas, that are mutually parallel to the ordinates of one another, are called conjugate diameters, or they are ſaid to be conjugate to one another.

Prop. XXIV.

If a diameter of an ellipſe, or of oppoſite hyperbolas, be parallel to the ordinates of another diameter, theſe two are conjugate diameters.

The demonſtration of this propoſition, in the caſe of the hyperbola, is manifeſt from *Prop.* 20th; for the ordinates of a tranſverſe diameter of a hyperbola are parallel to a tangent at a vertex of the diameter, *Cor.* 1. *Pr.* 16.

Fig. 33. *Plate* V. In the ellipſe, let the diameter E D be parallel to P Q S an ordinate of the diameter F H; draw the diameter P R and join S R cutting E D in T. Becauſe P Q = Q S, and P G = G R; therefore S R is parallel to F H. And becauſe E D is parallel to P Q S, and P G = G R; therefore R T = T S. Therefore R S is an ordinate of the diameter E D, *Def.* XIV, and it is parallel to F H; therefore E D and F H are conjugate diameters, *Def.* XVIII.

Cor. If a diameter of an ellipſe, as E D, be parallel to F O, a tangent at a vertex of another diameter F H; then F H is parallel to D I, a tangent at a vertex of E D.

For a tangent at a vertex of a diameter is parallel to the ordinates of that diameter.

Def. XIX. When a ſtraight line drawn through a point, ſituated within or without a cone, meets one, or both, of the conic ſurfaces in two points, it is called a ſecant; and the two parts of ſuch a line, between the point through which it is drawn and the conic ſurface or ſurfaces, are called the ſegments of the ſecant. And when a line, drawn from a point without a cone, touches one of the conic ſurfaces; that part of it between the point from which it is drawn and the conic ſurface is denoted by the word tangent in the following propoſitions.

Prop. XXV. *Fig.* 34, 35, and 36.

If a ſtraight line be drawn from the vertex of a cone to a point, as B, in the plane of the baſe, but not in the periphery of the baſe; and, through any point, as P, ſituated without or within the cone, another ſtraight line, parallel to the former, be drawn to cut or touch the conic ſurface, or oppoſite ſurfaces; then the ſquare of the line drawn from the vertex of the cone to the point B is to the rectangle under the ſegments of the ſecant, or to the ſquare of the tangent, drawn from the point P, as the rectangle under the ſegments of any line drawn from B to cut the baſe of the cone, is to the rectangle under the ſegments of any line, parallel to the baſe of the cone, drawn through the point P, to cut the conic ſurface.

Fig. 34. Let the point B be without the baſe of the cone, and let Q R, drawn through P without or within the conic ſurface, be parallel to V B, and let it cut the conic ſurface in Q and R: through P and the line V B draw a plane cutting the conic ſurface in the lines V G and V H, and the plane of the baſe in the line B G H; and through P draw L K parallel to G H. Becauſe V B and P Q R are parallel, therefore the line P Q R is contained in the plane B V P, 7. 11. E; and the points Q and R are in the lines V H and V G, the common ſections of the plane and the conic ſurface. Becauſe Q P is parallel to V B and L K to G H, therefore the triangle Q P L is equiangular to the triangle V B H, and the triangle P K R to the triangle V G B: therefore 4. 6. E.

$$VB : PR :: BG : PK$$
$$VB : PQ :: BH : PL$$

Conſequently, $VB^2 : PR \times PQ :: BG \times BH : PK \times PL$, 23. 6. E. But the rectangle $BG \times BH$ is equal to the rectangle under the ſegments of any other line drawn from B to cut the baſe of the cone, 35 and 36. 3. E; and the rectangle $PK \times KL$ is equal to the rectangle under the ſegments of any other line, parallel to the plane of the baſe, drawn from P to cut the conic ſurface, *Cor. Pr.* 5; and hence the proportion is manifeſt in this caſe.

Fig. 35. And if the point B be within the baſe of the cone, and a ſtraight line (as P Q R), parallel to the line

V B that joins the point B and the vertex of the cone, be drawn to cut the oppoſite ſurfaces through a point P ſituated without or within the cone: the propoſition may be demonſtrated in this caſe, in the very ſame words as in the former caſe.

Fig. 36. And if the point P be without the cone as well as the line V B, and P S, parallel to V B, be drawn to touch the conic ſurface, inſtead of cutting it; then the plane PV B will meet the conic ſurface in a line VS M; and B M will touch the baſe of the cone, and P N, parallel to B M, will touch the conic ſurface. And becauſe the two triangles S P N and V B M are equiangular, therefore,

$$VB : PS :: BM : PN$$

$$\text{And } VB^2 : PS^2 :: BM^2 : PN^2$$

But BM^2 is equal to the rectangle under the ſegments of any line drawn from B to cut the baſe of the cone; and PN^2 is equal to the rectangle under the ſegments of any line, parallel to the baſe of the cone, drawn from P to cut the conic ſurface; and hence the propoſition is manifeſt in this caſe alſo.

Prop. XXVI. *Fig.* 37.

If a point be aſſumed without or within a cone, and two lines be drawn through it to meet a conic ſurface, or oppoſite ſurfaces, and ſo as to be parallel to two ſtraight lines given by poſition; then the rectangle under the ſegments of the ſecant, or the ſquare of the tangent, parallel to one of the lines given by poſition, has to the rectangle under the ſegments of the ſecant, or to the ſquare of the tangent, parallel to the other line given by poſition, a ratio that is conſtantly the ſame, wherever the point (from which the lines are drawn) is aſſumed without or within the cone.

Fig 37. Let V B and V C be two ſtraight lines, drawn from the vertex of a cone to the plane of the baſe, and given by poſition (or parallel to lines given by poſition); and let P Q and M N be two ſtraight lines drawn through any aſſumed point, as R, to cut the conic ſurface, and ſo as to be reſpectively parallel to C V and V B: and as CV^2 is to the rectangle $CK \times CL$ (contained by the ſegments of any line drawn from C to cut the baſe of the cone), ſo let D, any aſſumed line, or magnitude, be to E; and as VB^2 is to $BG \times BH$ (the rectangle contained by the ſegments of any line drawn from B to cut the baſe of the cone), ſo let F be to E; and draw S T parallel to the baſe of the cone through the point R; then, *Pr.* 24.

$(CV^2 : CK \times KL$, or$)$ $D : E :: PR \times RQ : SR \times RT$, and $BV^2 : BG \times GH$, or$)$ $F : E :: MR \times RN : SR \times RT$. Therefore invertendo and ex æquo,

$$D : F :: PR \times RQ : MR \times RN.$$

And, as the ſame reaſoning applies wherever the point R is aſſumed, therefore the ratio of the rectangles $PR \times RQ$, and $MR \times RN$ is the ſame with, or equal to, the conſtant ratio of D to F, wherever the point R is aſſumed.

And, in like manner, may the propoſition be demonſtrated in all other caſes, or in all poſitions of the lines PQ, and MN, whether they cut, or touch, the ſame or oppoſite ſurfaces.

Prop. XXVII. *Fig.* 38.

If a point be aſſumed in the curve of an hyperbola, and a ſtraight line be drawn through it to cut both the aſymptotes; the rectangle, contained by the ſegments intercepted between the point in the curve and the aſymptotes, will be equal to the ſquare of the ſemidiameter to which the ſtraight line is parallel.

Firſt, let the ſtraight line E M N, drawn through E in the curve of a hyperbola and cutting the aſymptotes in M and N, be parallel to the tranſverſe diameter, G H; join H E, and produce it to meet the aſymptotes in R and S: it is obvious that the triangle R G H is equiangular to the triangle R E N, and the triangle G H S to the triangle S E M; therefore, 4. 6. E.

$$NE : ER :: GH : HR$$

$$SH : GH :: SE : EM$$

And, becauſe $SH = ER$, and $SE = HR$, *Pr.* 22. therefore,

$$\text{ex æquo } NE : GH :: GH : EM$$

$$\text{conſequently, } ME \times EN = GH^2, \text{ 17. 6 E.}$$

Next, when the line is parallel to a ſecond diameter. And if it touch the curve at the point H through which it is drawn, as K L; then the two ſegments, K H, and H L, are equal to one another, *Pr.* 13, and to the ſemidiameter G P, to which K L is parallel, *Def.* XVI; whence the propoſition is manifeſt. But if a line, as D F, drawn through the point of the curve, E, parallel to the ſecond diameter G P, do not touch the hyperbola, let K L, parallel to G P, touch the hyperbola in H, and join H E, cutting the aſymptotes in R and S. Becauſe K L and D F are parallel (being, both, parallel to G P), therefore the triangles, R H L, and K H S, are reſpectively equiangular to the triangles R E F and D E S; therefore,

$$FE : ER :: HL : HR$$

$$SH : HR :: SE : ED$$

And, becauſe $SH = ER$ and $SE = HR$, therefore,

$$\text{ex æquo } FE : HK :: HL : ED$$

$$\text{conſequently, } FE \times ED = HK \times HL = GP^2.$$

Cor. If any number of ſtraight lines, all parallel to one another, meet the two aſymptotes and the hyperbola or oppoſite hyperbolas; the rectangles contained by the ſegments of the parallels, intercepted between the aſymptotes and the curve, will be all equal to one another.

For each of the rectangles is equal to the ſquare of the ſemidiameter drawn parallel to the lines.

Prop. XXVIII. *Fig.* 38.

If a point be aſſumed without or within a conic ſection, and two ſtraight lines be drawn through it to cut or touch the ſection or oppoſite ſections, and ſo as to be parallel to two lines given by poſition; then the rectangle under the ſegments of the ſecant, or the ſquare of the tangent, parallel to one of the lines given by poſition, will have to the rectangle under the ſegments of the ſecant, or to the ſquare of the tangents parallel to the other line given by poſition, a ratio that is always the ſame, wherever the point (through which the lines are drawn), is aſſumed without or within the ſection. And in the ellipſe and hyperbola, or oppoſite hyperbolas, the conſtant ratio is equal to that of the ſquares of the diameters drawn parallel to the lines given by poſition.

For ſecants and tangents of a conic ſection are ſecants and tangents of a conic ſurface, and thus the firſt part of this propoſition is included in propoſition 25.

And becauſe the diameters of an ellipſe interſect in the centre, and are biſected there, *Pr.* 14; therefore the ratio of the rectangles under the ſegments of the ſecants, is, in this caſe, the ſame with the ratio of the ſquares of the ſemidiameters, or the ſame with the ratio of the ſquares of the diameters themſelves: and thus the ſecond part of the propoſition, in as much as it regards the ellipſe, is manifeſt from the firſt part.

It remains to demonſtrate the ſecond part of the propoſition in the caſe of the hyperbola. Aſſume any point, as F, (*fig.* 38.), in one of the aſymptotes, and through F draw

B I

B I and C E (terminated by the hyperbola, or oppofite hyperbolas), parallel to two femidiameters G P and G H; and let B I, and C E, or thefe lines produced, cut the other afymptote in D and A. Becaufe $BA = FI$, *Pr.* 22; therefore $BF \times FI = BF \times BA = GH^2$; and, in like manner, $EF \times FC = DC \times CF = GP^2$, *Pr.* 27. Therefore the ratio of the fquares of the femidiameters G H and G P, or the ratio of the fquares of the diameters themfelves, is equal to the ratio of the rectangles $BF \times FI$ and $EF \times FC$. And becaufe the ratio of the rectangle $BF \times FI$ to the rectangle $EF \times FC$ is equal to the ratio of the rectangles under the fegments of any lines terminated by the curve or curves that interfect one another, and are parallel to B I and F D (the fquares of the tangents being taken when the lines touch the curve inftead of cutting it), therefore, in the cafe of the hyperbola alfo, the fecond part of the propofition is manifeft from the firft part.

Cor. 1. If two tangents be drawn to an ellipfe, or a hyperbola, or oppofite hyperbolas, from the fame point, then thefe tangents are proportional to the diameters, or femidiameters, drawn parallel to the tangents.

For the fquares of the tangents are proportional to the fquares of the diameters.

Cor. 2. If a right line be ordinately applied to a diameter of an ellipfe, or to a tranfverfe diameter of a hyperbola; then as the fquare of the diameter is to the fquare of the conjugate diameter, fo is the rectangle contained by the abfciffes of the diameter, between the vertices and ordinate, to the fquare of the ordinate.

For the double-ordinate is bifected by the diameter, and it is parallel to the conjugate diameter.

Prop. XXIX. *Fig.* 39.

If an ordinate be drawn to a fecond diameter of oppofite hyperbolas; the fquare of this fecond diameter is to the fquare of the conjugate diameter, as the fum of the fquares of the fecond diameter, and of the part of it between the centre and the ordinate, is to the fquare of the ordinate.

Let P Q (*fig.* 39.) be a fecond diameter of two oppofite hyperbolas, and F H the diameter conjugate to it, and let M O be an ordinate to P Q: draw M N parallel to P Q; then M N will be an ordinate of the diameter F H; *Def.* XX.

Therefore, $GH^2 : GP^2 :: FN \times NH$, or $GN^2 - GH^2 : MN^2$, *Cor.* 2. *Pr.* 27:

therefore $GH^2 : GP^2 :: GN^2$, or $MO^2 : GP^2 + MN^2$ 12. 5. E. and invertendo, $GP^2 : GH^2 :: GP^2 + MN^2 : MO^2$.

Prop. XXX. *Fig.* 40.

If a right line, as P T, drawn through a point P in the furface of a cone fo as to be parallel to a right line V B contained in the conic furface, meet two parallel lines (in the points R and S) that cut or touch the conic furface or oppofite furfaces: then P R is to P S as the rectangle under the fegments of the fecant, or the fquare of the tangent, drawn through the point R, is to the rectangle under the fegments of the fecant or to the fquare of the tangent, drawn through the point S.

Through the two parallels P T and V B (*fig.* 40.) draw a plane cutting the conic furface again in the line V A, and the plane of the bafe in the line B A; and, through R and S, draw M N and H G parallel to A B. Becaufe P T is parallel to V B and R N to S G, therefore R N G S is a parallelogram; and R N is = G S. It is obvious that the triangles P M R and P H S are equiangular: therefore P R is to P S as M R is to H S, 4. 6. E, or as $MR \times RN$ is to $HS \times SG$, 1. 6. E. But $MR \times RN$ and $HS \times SG$ are refpectively equal to the rectangles contained by the fegments of any two lines, parallel to the bafe of the cone, drawn through R and S to cut the conic furface, *Cor. Pr.* 5. and hence the propofition is manifeft, when P T meets two lines parallel to the plane of the bafe.

And if P T meet two parallel lines D E and I K, not parallel to the plane of the bafe; then, let the fame conftruction be made as before: and becaufe D E is parallel to I K, and M N to G H; therefore,

$DR \times RE : MR \times RN :: IS \times SK : HS \times SG$;

Alternando, $DR \times RE : IS \times SK :: MR \times RN : HS \times SG$. Therefore, as is obvious from what has already been fhewn,

$$PR : PS :: DR \times RE : IS \times SK.$$

And if S be without the cone and the line drawn through it touch the conic furface inftead of cutting it, the reafoning is ftill the fame, when the fquare of the tangent is taken in place of the rectangle under the fegments of the fecant.

Prop. XXXI.

If two points be affumed in the diameter of a parabola, or in a right line drawn through a point in the curve of an hyperbola parallel to one of the afymptotes, and two parallel lines be drawn from thefe points to cut, or touch, the curve or oppofite curves; then, as the rectangle under the fegments of the fecant or the fquare of the tangent, drawn from one of the affumed points, is to the rectangle under the fegments of the fecant, or to the fquare of the tangent, drawn from the other affumed point, fo is the fegment of the diameter of the parabola, or of the line parallel to the afymptote, between the firft affumed point and the curve, to the fegment of the fame line between the fecond affumed point and the curve.

Becaufe all the diameters of a parabola, *Def.* XIII. and all the ftraight lines drawn parallel to an afymptote of a hyperbola, *Cor.* 2. *Def.* XV. are parallel to a right line contained in the conic furface; and becaufe fecants, and tangents of a parabola, or a hyperbola, are fecants and tangents of a conic furface: therefore it is manifeft that this propofition is included in the laft propofition.

Cor. The fquares of the ordinates drawn to a diameter of a parabola are proportional to the abfciffes of the diameter between the ordinates and the vertex.

Fig. 43. For the double ordinates of a diameter of a parabola, as G F D and L K E are parallel to one another; *Cor. Def.* XVII. therefore, by this propofition,

$GF \times FD$, or $GF^2 : LK \times KE$, or $LK^2 :: AF : AK$.

Prop. XXXII. *Fig*, 41, 42, and 43.

If an ordinate be drawn to a diameter of a conic fection, which is not a fecond diameter of a hyperbola: then, in the ellipfe, the fquare of the ordinate is equal to a rectangle contained by an abfcifs of the diameter and a conftant line, deficient by a rectangle fimilar to that contained by the conftant line and the diameter; and, in the hyperbola, the fquare of the ordinate is equal to a rectangle contained by an abfcifs of the diameter, and a conftant line, exceeding by a rectangle fimilar to that contained by the conftant line and the diameter: and in the parabola, the fquare of the ordinate is equal to a rectangle contained by the abfcifs of the diameter and a conftant line.

Let A B (*fig.* 41 and 42.) be a diameter of an ellipfe, or a tranfverfe diameter of a hyperbola, F G an ordinate of it, and D E the conjugate diameter; draw A H perpendicular to A B and equal to a third proportional to A B and D E, and

and join B H: draw F L parallel to A H, and complete the parallelograms A K, F N and A M. It is obvious that B A is to A H as B F is to F L, 4. 6. E, or as B F × F A is to F L × F A or the rectangle F N, 1. 6. E. And becaufe A H is a third proportional to B A and E D, therefore,

B A : A H :: BA^2 : DE^2, *Cor.* 2, 20. 6. E. :: A F × F B : FG^2. *Cor.* 2. *Pr.* 28.

Therefore,

A F × F B : FG^2 :: A F × F B : rect. F N, 14. 5. E.

Therefore GF^2 = rectangle F N. Now, in the ellipfe, the rectangle F N is deficient from the rectangle A M, contained by the abfcifs A F and the line A H (which is the fame for all the ordinates) by the rectangle N M, fimilar to the rectangle A K, contained by A H and A B; and, in the hyperbola, the rectangle F N exceeds the rectangle A M by the rectangle N M, fimilar to the rectangle A K.

In the parabola (*fig.* 43.) let one ordinate of a diameter be pitched upon, as L K, and take A H, a third proportional to the abfcifs A K and the ordinate L K; then, if F G be any other ordinate,

$LK^2 : FG^2$ :: AK : AF, (*Cor. Pr.* 31) :: AK × AH : AF × AH.

And becaufe LK^2 = A K × A H, therefore FG^2 = A F × A H, the rectangle contained by the abfcifs A F and the line A H, which is the fame for all the ordinates of the diameter.

Def. XX. The conftant line A H is called the parameter of the diameter A B; and, in the ellipfe and hyperbola, it is a third proportional to the diameter A B, and the conjugate diameter D E; but, in the parabola, it is a third proportional to the abfcifs of any one ordinate of a diameter, and the ordinate itfelf.

Scholium.

The phrafes "deficient" and "exceeding by a rectangle fimilar to another rectangle," occur in Euclid's Elements, 27 and 28. 6. E. although they are now generally difufed by geometricians; and, it muft be confeffed, they are far from expreffing the meaning they are intended to convey, in a fimple and perfpicuous manner. Thefe expreffions have been ufed in enunciating this propofition, with the view of drawing the attention to the diftinguifhing circumftances from which the feveral conic fections derived their names. For Apollonius gave the name of the ellipfe to one of thefe curves, on account of the defect of the fquare of the ordinate from the rectangle contained by the abfcifs and the parameter: and he called another of them an hyperbola, from the excefs of the fame fquare above the fame rectangle; and the third a parabola, on account of the exact equality of the fame two fpaces.

Prop. XXXIII. *Fig.* 44. *Plate* VI.

Let a fcalene cone be cut by a plane drawn through the axis perpendicular to the plane of the bafe, making the triangular fection V A B; and let V D, cutting A B produced, in D, be drawn fo as to make the angle B V D equal to the angle V A B; and let I E be drawn in the plane of the bafe perpendicular to A D: then, if a point be affumed in the plane of the bafe of the cone, but without the bafe, the fquare of the line drawn from that point to the vertex of the cone is greater than, or equal to, or lefs than, a rectangle contained by the fegments of any line drawn from the fame point to cut the bafe of the cone, according as the affumed point is on the fame fide of the line I E as the bafe of the cone, or in the line I E, or on the oppofite fide of the line I E.

For, let I be any point in the line I E, and draw I V to the vertex, and I K to cut the bafe of the cone through the centre C. Becaufe the angle B V D is equal to the angle B A V, therefore V D is a tangent of a circle defcribed about the triangle A V B, 32. 3. E.; therefore VD^2 = AD × DB (36. 3. E.) = $DC^2 - CB^2$, 6. 2. E.: to thefe equals add DI^2; and $VD^2 + DI^2 = DC^2 + DI^2 - CB^2$. But it is evident that D I is perpendicular to the plane A V D; therefore, $VD^2 + DI^2 = VI^2$, 47. 1. E.; and $DC^2 + DI^2 - CB^2 = IC^2 - CL^2$ = K I × I L, 6. 2. E. Therefore, K I × I L = VI^2.

Secondly, let M be a point, without the bafe of the cone, and on the fame fide of the line, I E, as the bafe; and, let a plane drawn through M V, and the centre of the bafe, cut the cone in the triangle, K V L, and the plane of the bafe in the line K L M: produce K M to meet I E in I, and draw I V. It has been fhewn that IV^2 = I K × I L; therefore, if a circle be defcribed about the triangle K V L, V I will be a tangent of that circle (32. 3. E.), and the line V M, will cut its periphery in a point *m*, fituated between V and M; and becaufe V, *m*, L, and K are points in the fame circle, therefore V M × M *m* = K M × M L, 36. 3. E. But VM^2 is greater than V M × M *m*; therefore it is alfo greater than K M × M L.

Thirdly, let N be a point in the plane of the bafe of the cone on the oppofite fide of the line I E; and, the fame conftruction being made as before, it is manifeft that V N will be entirely without the circle defcribed about the triangle K V L (of which V I is a tangent); and that V N, when produced, will cut the periphery as at *n*; then *n* N × N V = N K × N L. But NV^2 is lefs than *n* N × N V; therefore it is lefs than N K × N L.

Cor. If I be a point in the plane of the bafe of the cone, fuch that IV^2 = I K × I L: then I is a point in the line, found in the manner defcribed in the enunciation of this propofition.

Prop. XXXIV. *Fig.* 45.

If a fcalene cone be cut by a plane perpendicular to the plane of the bafe, making the triangular fection V A B; and let I E be the line found in the laft propofition; alfo, let the cone be cut by a plane, making an elliptical fection, P F Q H, the *determining line* of which, M N, is parallel to the line I E; and let F H be the diameter of the fection that is parallel to M N. Then, if M N fall between the bafe of the cone and I E, F H is the leaft diameter of the fection; and, if M N fall upon I E, all the diameters of the fection are equal to F H and to one another; and if F H fall on the oppofite fide of I E to the bafe of the cone, F H is the greateft diameter of the fection.

Let R S be any diameter of the fection different from F H, and draw V K (meeting M N in K) parallel to R S; and let K L T cut the bafe of the cone. Becaufe R S and H F are bifected in the centre G, therefore,

$RG^2 : HG^2 :: VK^2$: K L × K T, *Pr.* 25.

Now, if M N fall between the bafe of the cone and I E, then VK^2 is greater than K T × K Q, *Pr.* 33; therefore R G is greater than H G; and, in this cafe, FH is the leaft diameter of the fection.

And, if M N fall upon I E, then VK^2 = K T × K L; therefore R G = H G; and, in this cafe, the fection is a circle.

And, laftly, if M N be on the other fide of I E to the bafe, then KV^2 is lefs than K T × K L; therefore R G is lefs than H G; and, in this cafe, F H is the greateft diameter of the fection.

Cor. 1. If a fection of a cone, not parallel to the plane of the bafe, be a circle, then I E, the line found in *Prop.* 32, is the *determining line* of that fection.

For $RG^2 : HG^2 :: KV^2$: K T × K L.

And,

And, becaufe the fection is a circle, therefore $RG = HG$; therefore $KV^2 = KT \times KL$; therefore K is a point in the line I E, *Cor. Pr.* 25. And, in like manner, it may be fhewn that every point of the *determining line* of the fection is in the line I E.

Cor. 2. Let P Q be the common fection of the plane V A B, and the plane of the ellipfe; then PQ is a diameter of the ellipfe. It is manifeft that MN is perpendicular to the plane V A B; therefore F H, parallel to M N, is perpendicular to the fame plane and to P Q. Alfo P Q and F H are conjugate diameters, *Pr.* 17. Therefore, when the plane V A B is perpendicular to the plane of the bafe, F H, the diameter of the ellipfe, parallel to the bafe of the cone, cuts its conjugate diameter, P Q, at right angles.

SCHOLIUM.

If F P Q H be a fection of the cone, of which I E is the *determining line*, it is plain that P Q is parallel to V D; therefore, the angle V Q P = angle B V D = angle V A B. Therefore, the triangle P V Q is fimilar to the triangle B A V; but the angles at the bafe of the one triangle have a fub-contrary pofition to the equal angles at the bafe of the other triangle. For this reafon a fection of a cone that has the line I E (found as in *Prop.* 32.) for its *determining line*, is called a fub-contrary fection.

The word ellipfe has hitherto been ufed to denote, generally, thofe fections of a conc which have their *determining lines* without the bafe of the cone; but, as it has been fhewn that the conic fection is a circle in one particular cafe (*viz.* the fub-contrary fection) included in this general definition, precifion requires that the term ellipfe be hereafter reftricted in its fignification, fo as to exclude that particular cafe.

PROP. XXXV. *Fig.* 46.

An ellipfe being given, it is required to draw a diameter of it that fhall be equal to F H, the diameter which is parallel to the bafe of the cone; but the plane V A B, drawn through the vertex of the cone, and that diameter of the bafe which is perpendicular to the *determining line* of the ellipfe, muft not be perpendicular to the plane of the bafe of the cone.

Draw the line I E, as in propofition 32. And becaufe I E and M N are perpendicular to two different diameters of the bafe of the cone, they are not parallel: let them meet in K, and draw V K, and the diameter R S, parallel to V K; then $FH = RS$. For, becaufe R S and F H are bifected in the centre G, therefore,

$$VK^2 : KT \times KL :: FG^2 : RG^2, \quad Pr.\ 24.$$

But $VK^2 = KT \times KL$; therefore, $FG = RG$.

Cor. Only one diameter can be drawn that fhall be equal to F H.

For, if $FH = RS$, then $VK^2 = KT \times KL$; therefore, K is in the line I E; and I E can meet M N only in one point.

Def. XXI. A diameter of a conic fection, that cuts its ordinates at right angles, is called an axis.

Cor. Becaufe two conjugate diameters of an ellipfe, and oppofite hyperbolas, cut their ordinates in the fame angles, *Pr.* 24.; therefore, if thefe become axes of thefe curves, there will neceffarily be two; and thefe will be conjugate diameters, and they will cut one another at right angles.

PROP. XXXVI. *Fig.* 47 and 48.

An ellipfe has only two axes.

Let F H (*fig.* 47.) be the diameter of the ellipfe drawn parallel to the bafe of the cone; and, firft, let F H be the greateft or the leaft diameter of the ellipfe, *Pr.* 34.; then, it has already been fhewn, that F H cuts its conjugate P Q at right angles, *Cor.* 2 *Pr.* 34.; and, therefore, F H and P Q are axes of the ellipfe, *Cor. Def.* XXI. Alfo they are the only axes of the ellipfe. For, let X Y be any other diameter; then X Y is not perpendicular to F H; draw F Z O, (cutting the ellipfe again in O) perpendicular to X Y, and draw G O. Becaufe F H is the greateft or leaft diameter of the ellipfe; therefore, F G is not equal to G O; therefore, F Z is not equal to Z O, 47. 1. E. Therefore F O, perpendicular to X Y, is not an ordinate of X Y; therefore, X Y is not an axis.

Secondly, when F H is not the greateft or leaft diameter of the ellipfe, draw the diameter R S equal to F H, *Pr.* 35.; and draw the diameter L K and D E to bifect the angles contained by F H and R S; join FS. And, becaufe L K bifects the angle at the vertex of the ifofceles triangle F G S, it will bifect the bafe F S, and will cut it at right angles. And becaufe L K cuts F S, one of its ordinates at right angles, therefore L K is an axis; and, it is plain, that D E, parallel to F S, is another axis and the conjugate of L K. Alfo, L K and D E are the only axes of the ellipfe. For, let X Y be any other diameter; then X Y is not perpendicular both to F H and to R S; let it be not perpendicular to F H, and draw F Z O (cutting the ellipfe again in O) perpendicular to XY, and join G O. Becaufe R S is the only diameter of the ellipfe that is equal to F H, *Cor. Pr.* 35.; therefore F G is not equal to G O; therefore F Z is not equal to ZO. And becaufe F O, perpendicular to X Y, is not an ordinate of X Y, therefore X Y is not an axis.

PROP. XXXVII. *Fig.* 49.

A hyperbola has only two axes.

Let G F and G K be the afymptotes of the hyperbola, and draw the tranfverfe diameter G A to bifect the angle of the afymptotes, and the fecond diameter D E to bifect the adjacent angle; let FK, drawn between the afymptotes, be perpendicular to G A, and meet the hyperbola in M and N. Becaufe F K is perpendicular to G L, and the angle $FGL =$ the angle K G L, therefore $FL = LK$, 26. 1. E. But $FM = NK$, *Pr.* 22.; therefore $ML = LN$. Therefore, MN perpendicular to G A, is an ordinate of G A; therefore, G A is an axis; and D E, parallel to M N, is the conjugate of G A, and another axis, *Pr.* 24.

And if G A do not bifect the angle F G K, then F K, perpendicular to G A, will not be bifected in L; therefore M L will not be equal to L N; therefore in this cafe, MN, perpendicular to G A, is not an ordinate of G A. Therefore, the hyperbola has no axes befides G A and D E.

PROP. XXXVIII. *Fig.* 50.

A parabola has only one axis.

Let O S, terminated by the curve, be perpendicular to any diameter, and draw the diameter P Q to bifect O S; and, becaufe all the diameters of the curve are parallel, therefore, P Q is perpendicular to O S, and an axis of the curve, *Def.* XXI. And becaufe O S can be an ordinate of only one diameter, therefore there is only one axis.

PROP. XXXIX. *Fig.* 51 and 52.

The two axes of an ellipfe are always unequal; and the greater axis is the greateft diameter, and the lefs axis the leaft diameter of the curve. And that axis of a hyperbola, which is a tranfverfe diameter, is the leaft of all the tranfverfe diameters.

Let

Let A B and D E (*fig.* 51.) be the two axes of an ellipſe, C the centre, and C H any ſemidiameter; draw H P perpendicular to A B, and H Q perpendicular to D E. Becauſe A B and D E are conjugate diameters; and H P an ordinate to A B, and H Q an ordinate to D E; therefore,

$AB^2 : DE^2 :: AP \times PB : HP^2$, *Cor.* 2. *Pr.* 28.

Now, if A B be ſuppoſed to be equal to D E, it will follow that $AP \times PB = HP^2$; therefore, $AP \times PB + CP^2 = HP^2 + CP^2$, or $AC^2 = CH^2$. Therefore, $AC = CH$; and the ellipſe will be a circle, which is not the caſe, *Cor.* 1. *Pr.* 33. Therefore, A B and D E are unequal; let A B be ſuppoſed to be greater than D E.

Becauſe AB^2 is greater than DE^2, therefore $AP \times PB$ is greater than HP^2; and $AP \times PB + CP^2$, or AC^2, is greater than $HP^2 + PC^2$, or CH^2. Therefore the ſemi-axis A C is greater than any other ſemi-diameter H C.

In like manner,

$DE^2 : AB^2 :: DQ \times QE : HQ^2$.

Therefore $DQ \times QE$ is leſs than HQ^2; and $DQ \times QE + CQ^2$, or CD^2, is leſs than $HQ^2 + CQ^2$, or CH^2. Therefore the ſemi-axis D C is leſs than any other ſemi-diameter C H.

Fig. 52. In the hyperbola, a tangent of the curve drawn from the extremity of the axis C A, as A T, falls between the centre and the curve; and becauſe CA, the ſemi-axis, is leſs than any other line drawn from C to A T, much more is it leſs than a ſemi-diameter C H drawn from C to the curve on the other ſide of A T.

Definition XXII.

The greater axis of an ellipſe is called the tranſverſe axis; and the leſs, the conjugate axis; and, in the hyperbola, that one is the tranſverſe axis which is a tranſverſe diameter, and the other is the conjugate axis.

Prop. XL. *Fig.* 51 and 52.

A diameter of an ellipſe nearer the tranſverſe axis is greater than one more remote; and a tranſverſe diameter of the hyperbola nearer the tranſverſe axis is leſs than one more remote.

Fig. 51. Let C K and C H be two ſemi-diameters of an ellipſe; join H K, and draw A G parallel to H K; join C G and draw C L to biſect H K. Becauſe C L biſects H K, it will likewiſe biſect A G, *Pr.* 15. And becauſe $AM = MG$, and A C is greater than C G, therefore the angle A M C is greater than the angle G M C, 25. 1. E; that is, the angle K L C is greater than the angle H L C. And becauſe $HL = LK$, therefore K C, nearer to C A, is greater than H C more remote from C A, 24. 1. E.

In the hyperbola, the ſame conſtruction being made, becauſe A C is leſs than C G, therefore the angle A M C, or K L C, is leſs than the angle G M C, or H L C. Therefore C K is leſs than C H.

Definitions. *Fig.* 53, 54, and 55.

XXIII. Let A B (*fig.* 53 and 54.) be the tranſverſe axis, D E the conjugate axis, and C the centre of an ellipſe, or hyperbola, or oppoſite hyperbolas; and let C F and Cf be taken in the tranſverſe axis, ſuch that CF^2 and Cf^2 are each equal to $CA^2 - CD^2$ in the ellipſe, and to $CA^2 + CD^2$ in the hyperbola; then the two points F and f are called the foci of the ellipſe, hyperbola, or oppoſite hyperbolas.

Fig. 55. But the focus of a parabola is a point F in the axis, within the curve, and diſtant from the vertex by a line equal to one fourth part of the parameter of the axis.

Cor. The diſtance of each of the foci of an ellipſe from either extremity of the conjugate axis is equal to half the tranſverſe axis; and the diſtance of either of the foci of a hyperbola from the centre is equal to the diſtance between the extremities of the tranverſe and conjugate axes.

XXIV. If F (*fig.* 53 and 54.) be a focus of an ellipſe, or hyperbola, or oppoſite hyperbolas, and A G be taken in the tranſverſe axis (on the oppoſite ſide of the vertex to the focus F), ſuch, that A F is to A G as C F is to C A; then a line, as H K, drawn through G perpendicular to the tranſverſe axis, is called a directrix of the ellipſe, or hyperbola, or oppoſite hyperbolas.

Fig. 55. But the directrix of a parabola is a line, as H K, perpendicular to the axis, drawn through a point G as far diſtant from the vertex of the axis on the one ſide as the focus is on the other ſide.

Cor. An ellipſe, hyperbola, or oppoſite hyperbolas, have two directrices; one correſponding to each focus. For the ſame conſtruction that is made for one focus, may be made for the other focus.

Prop. XLI. *Fig.* 53 and 54.

Let A B be the tranſverſe, and D E the conjugate, axis of an ellipſe, or hyperbola, or oppoſite hyperbolas; from any point in the curve, or oppoſite curves, as M, let M C be drawn to the centre, and M P perpendicular to the tranſverſe axis, and take C O, in the ſame axis, ſuch that CO^2 may be equal to $MC^2 - CD^2$ in the ellipſe, and to $MC^2 + CD^2$ in the hyperbola; then as A C is to C F ſo is P C to C O.

For, becauſe A B and D E are conjugate diameters, therefore,

$AC^2 : CD^2 :: AP \times PB : MP^2$, *Cor.* 2. *Pr.* 28, therefore, $AC^2 : AC^2 \mp CD^2 :: AP \times PB : AP \times PB \mp MP^2$. But in the ellipſe $AC^2 - CD^2 = CF^2$; and $AP \times PB - MP^2 = AC^2 - CP^2 - MP^2 = AC^2 - MC^2 = AC^2 - CD^2 - CO^2 = CF^2 - CQ^2$: and, in the hyperbola, $AC^2 + CD^2 = CF^2$; and $AP \times PB + MP^2 = -PC^2 - AC^2 + MP^2 = MC^2 - AC^2 = CO^2 - CD^2 = CA^2 = CO^2 - CF^2$. Therefore, the laſt analogy becomes,

$AC^2 : CF^2 :: AC^2 \mp CP^2 : CF^2 \mp CO^2$

Conſequently $AC^2 : CF^2 :: CP^2 : CO^2$ 19. 5. E.

And $AC : CF :: CP : CO$.

Prop. XLII. *Fig.* 53 and 54.

If M be a point in an ellipſe or hyperbola, and M F and M f be drawn to the foci; then, in the ellipſe, the ſum of M F and Mf is equal to the tranſverſe axis; and, in the hyperbola, the difference of M F and Mf is equal to the tranſverſe axis.

Draw M P perpendicular to the tranſverſe axis, and take C O as in the laſt propoſition. And, becauſe

$AC : CF :: CP : CO$, *Pr.* 41.

Therefore $AC \times CO = FC \times CP$; and $4\,AC \times CO = 4\,CF \times FO$. But, becauſe A B and F$f$ are biſected in C, therefore $4\,AC \times CO = BO^2 - AO^2$, 8. 2. E, and $4\,FC \times CP = Pf^2 - PF^2 = fM^2 - MF^2$, 47. 1. E; therefore $BO^2 - AO^2 = fM^2 - MF^2$.

Again, $MF^2 + Mf^2 = fP^2 + FP^2 + 2\,MP^2 = 2\,FC^2 + 2\,CP^2 + 2\,MP^2 = 2\,FC^2 + 2\,MC^2 = 2\,FC^2 \pm 2\,CD^2 + 2\,CO^2 = 2\,AC^2 + 2\,CO^2 = BO^2 + AO^2$.

And,

And, becaufe $BO^2 + AO^2 = fM^2 + MF^2$, and $BO^2 - AO^2 = fM^2 - MF^2$; therefore, by adding the equals, $2BO^2 = 2fM^2$; and, by fubtracting the equals, $2MF^2 = 2AO^2$. Therefore $fM = BO$, and $FM = AO$; whence the propofition is manifeft.

Prop. XLIII. *Fig.* 53, 54, and 55.

A ftraight line drawn from any point in a conic fection to a focus has to a perpendicular drawn to the correfponding directrix, a ratio that is conftantly the fame wherever the point is affumed in the curve; and, in the ellipfe, the conftant ratio is a ratio of minority (or of a lefs magnitude to a greater); in the hyperbola, the conftant ratio is a ratio of majority (or of a greater magnitude to a lefs); and, in the parabola, the conftant ratio is a ratio of equality.

Fig. 53 and 54. Let M be a point in an ellipfe or hyperbola, and draw M F to a focus and M K perpendicular to the directrix H G, which correfponds to that focus; draw M P perpendicular to the tranfverfe axis and take C O as in *Prop.* 41. Then

$$AC : CF :: CP : CO, \textit{ Pr. } 41.$$
Invertendo, $CF : CA :: CO : CP$
Therefore $CF : CA :: FO : AP$, 19. 5. E
But $CF : CA :: AF : AG$, *Def.* XXIV.
Therefore $CF : CA :: AO : GP$, 12. 5. E

But, as has been fhewn in the demonftration of the laft propofition, $AO = MF$, and $GP = MK$; therefore

$$CF : CA :: MF : MK.$$

But the ratio of C F to C A is a conftant ratio; and it is a ratio of minority in the ellipfe, and a ratio of majority in the hyperbola.

Fig. 55. In the parabola, $GA = AF$, and $4AF \times AP = MP^2$, *Def.* XXIII.; but $4AF \times AP = GP^2 - PF^2$, 8. 2. E; therefore $MP^2 = GP^2 - PF^2$; and $MP^2 + PF^2$, or $MF^2 = GP^2$, or MK^2. Therefore $MF = MK$.

Moft branches of human learning take their origin from a few detached truths, viewed at firft without connexion, and which, in the progrefs of knowledge, are at length joined together in one body of fcience. But when a fcience has rifen, by accumulated difcoveries, to fuch a degree of importance as to intereft the curiofity of mankind, it is often too late to retrace its hiftory, and to delineate its rife and progrefs in an accurate and fatisfactory manner. It generally happens that the authors of many of the fubordinate difcoveries have already fallen into oblivion; and that fome important improvements are difputed, and afcribed to different inventors by different writers. In reviewing the hiftory of the conic fections, we muft add, to the caufes which commonly obfcure the origin of all the fciences, the very high antiquity of this branch of the mathematics, and the lofs of the early geometricians who have written on it. No work of antiquity that profeffedly treats of the hiftory of the conic fections has reached our time; and there is little to fatisfy curiofity in this inquiry, excepting a few incidental notices collected from different authors.

The difcovery of the curves, denominated the conic fections, is attributed to the philofophers of the fchool of Plato; and it is even afcribed, by fome authors, to the founder, himfelf, of that celebrated fect. Other authors, grounding their opinion on a few words in an epigram of Eratofthenes, have given the honour of this difcovery to Menechmus, who lived a little pofterior to the time of Plato. But the information derived from ancient writers is too fcanty to enable us to decide concerning the original difcoverer of the conic fections, or to form a well-founded judgment of the refpective inventions of the early mathematicians whofe works have not come down to our time. We know nothing of Ariftæus, or Conon the friend of Archimedes, excepting that they treated of the conic fections; and that they deferved the commendations of fucceeding geometricians by improving and extending the branch of fcience which they cultivated.

It is probable that the theory of the conic fections, like other parts of fcience, grew up gradually from a fmall beginning, increafing in magnitude and importance by the fucceffive improvements of many geometricians. New and difficult problems would naturally lead to new artifices and inventions for their folution; and they would thus contribute to the extenfion of knowledge. The hiftory of the mathematics mentions two problems, famous in ancient times, much agitated by the geometricians of the Platonic fchool, and both of them fo difficult as to tranfcend the limits of the ordinary, or plane, geometry. We allude to the problems of the duplication of the cube, and the trifection of an angle; and there is no doubt but that the theory of the conic fections received great additions, and was enriched with many new properties, by the refearches that were undertaken for refolving thefe problems. Two folutions of the former problem, derived from the conic fections, are preferved by Eutocius, in his commentary on the works of Archimedes, which are attributed by him to Menechmus. Some folutions of the latter problem, by means of the conic fections, are likewife extant in ancient authors, for which fcience is probably indebted to the ingenuity of the followers of Plato.

The teftimony of ancient authors, as well as the folutions of the problems which we have juft mentioned, lead us to infer that great progrefs had been made in inveftigating the properties of the conic fections before the time of Archimedes. This conclufion is confirmed by the writings of that celebrated mathematician. Many principal propofitions are there exprefsly faid to have been demonftrated by preceding writers, and are fpoken of as truths commonly divulged and known to mathematicians. Archimedes himfelf, perhaps the greateft genius of antiquity, and deferving to be ranked with Galileo and Newton, enriched the theory of the conic fections with many noble difcoveries. After a lapfe of two thoufand years, the quadrature of the parabola is ftill the moft remarkable inftance, within the precincts of geometry, of the exact equality of a curvilineal to a rectilineal fpace. To this beautiful difcovery there muft be added, the determining of the proportions of the elliptic fpaces to one another, and to the circle; and likewife the menfuration of the folids generated by the revolution of the conic fections about their axes.

But we are chiefly indebted to the prefervation of the writings of Apollonius for a more perfect knowledge of the theories of the ancient geometricians concerning the conic fections. Apollonius was born at Perga, a town of Pamphylia, and he is faid to have lived under Ptolemy Philopater, about forty years pofterior to Archimedes. He was inftructed in geometry in the fchool of Alexandria; and, under the fucceffors of Euclid, he there acquired that fuperior fkill in the fcience which diftinguifhes his writings. Befides his great work on the conic fections, he publifhed many fmaller treatifes, relating chiefly to the geometrical analyfis, which have all perifhed, and are known to us only by the account given of them in the feventh book of the mathematical collections of Pappus.

The treatife of Apollonius on the conic fections is writ-

ten in eight books, and it was esteemed a work of so much merit by his contemporaries as to procure for its author the title of the great geometrician. The purpose of the four first books, as we are informed in the prefatory epistle to Eudemus, is to deliver the elements of the science : and, in this part of his work, Apollonius professes only to have collected and methodized what had already been published by former writers. One improvement introduced by him deserves to be particularly mentioned ; as it is a curious instance of the progress of the mind in generalizing its first conceptions. The conic sections, according to the definitions now given of them, are such curves as are produced by the common section of a plane and a cone of whatever kind. But the first mathematicians who noticed these curves, did not define them in a way so general. They confined their attention to the right cone only ; and, even in this kind of cone, they always supposed the cutting plane to be perpendicular to the slant side. In this view of the matter it is manifest, that the species of the curve would depend on the sort of cone by which it was produced. If the vertical angle of the cone were supposed to be an acute-angle, then the cutting plane, perpendicular to the slant side, would meet one of the conic surfaces only, and the line of common section would surround the whole, and would be an ellipse. If the vertical angle of the cone were supposed to be a right-angle, then the cutting plane would still meet only one of the conic surfaces, but the line of common section, not embracing the whole contour of the solid, would, in this case, be a parabola : and, lastly, if the vertical angle of the cone were supposed to be obtuse, then the cutting plane would intersect both the opposite conic surfaces, and the curve produced would be a hyperbola. It is true that the curves, thus defined, were rightly denominated conic sections, considering them as parts of a class ; but it did by no means follow that they comprehended all the species of the class. Even retaining the right cone, yet curves of a different nature might possibly be produced merely by varying the inclination of the cutting plane : and much more so, if the species of the cone, and the position of the cutting plane, were both changed. To Apollonius belongs the honour of having generalized the ancient definitions of the conic sections, and of presenting the subject in the more perfect form in which it still continues to be taught : and the improvement is equivalent to the discovery that all the possible sections of any cone, are reducible to three distinct species and no more.

Before the time of Apollonius, the names of the several conic sections were likewise different from those that they now bear. In conformity to the ancient definitions of the curves, the ellipse was called the section of an acute-angled cone by the more early geometricians : and, in like manner, the parabola, and hyperbola, were denominated the sections of a right-angled, and obtuse-angled, cone. The present names are commonly supposed to have been invented by Apollonius; and, in compliance with the generality of writers, we have noticed the properties from which he derived them. But the received opinion on this point is probably not well founded : for both the terms, parabola and ellipse, occur in the writings of Archimedes, which were prior to the time of Apollonius.

The four first books of the conics of Apollonius is the only part of that work that has come down to us in the original Greek. On the revival of learning, the lovers of the mathematics had long to regret the loss of the original of the latter part of this important treatise. In the year 1658, Borelli, passing through Florence, found an Arabic manuscript in the library of the Medici family, which he judged to be a translation of all the eight books of the conics of Apollonius. Transported with joy, he had interest enough to prevail on the duke of Tuscany to entrust him with the manuscript, which he carried to Rome : and, having procured the assistance of Abraham Ecchellensis, a person skilled in the Arabic tongue, he published a Latin translation of it in 1661. The manuscript, discovered by Borelli, was entitled, "Apollonii Pergæi Libri Octo," and was supposed to be a complete translation of the work of the ancient geometrician : but, on examination, it was found to contain the first seven books only. Two other Arabic translations of the conics of Apollonius have been discovered by the industry of learned men: but both of them have the same defect as that found at Florence. From the circumstance of all the three manuscripts agreeing in the want of the eighth book, it is reasonable to suppose that this part of the treatise had already perished when the translations were written : and there is now no room to hope that the loss will ever be recovered. It is not easy to ascertain in what age the original of Apollonius's work disappeared ; but we know that the whole of it was extant in the time of Pappus Alexandrinus. In the "Collectiones Mathematicæ," this author has given a succinct account of the contents of all the eight books, and has added the lemmas required for the demonstrations of the propositions they contain : and this circumstance enabled Dr. Halley to annex, to the complete edition of the conics of Apollonius, which he published in 1710, a restoration of the eighth book executed with so much ability as to leave little room to regret the want of the original.

In the four last books of his treatise, Apollonius, as he informs us in the prefatory epistle, delivers the higher and more abstruse parts of the theory of the conic sections. He here claims the merit of originality, and professes to develope the results of his own researches. And it must be confessed that the genius, invention, and geometrical skill, displayed in this part of his work, are such as fully to justify the honourable appellation bestowed on him by his contemporaries. This treatise must be allowed, even in the present times, to contain a very extensive, if not a complete, theory of the conic sections. This branch of the mathematics has, perhaps, been more cultivated than any other, since the revival of learning ; but the industry of modern mathematicians has discovered few properties of their curves, of which some traces are not to be found in the work of the great geometrician. Montucla thus delivers his opinion of the treatise of Apollonius: "Pour donner enfin de l'ouvrage d'Apollonius l'idée qu'il mérite, je remarquerai que nous avons dans notre langue, et en style algebrique, un traité des sections coniques dont on fait cas avec justice ; je veux parler de celui de M. le marquis de l'Hôpital : cependant je ne craindrai point de dire qu'il y a dans le géomètre ancien un theorie bien plus ètendue et plus complete de les courbes que dans le géomètre moderne."

The mathematicians, who followed Apollonius, seem to have been content with the humble task of commenting on his treatise. It would be uninteresting to enumerate the crowd of commentators who, at different times, have written on his work, and have endeavoured to render it of more easy access to the general class of mathematicians. Among the number we find the name of the learned Hypatia, the daughter of Theon : and we still possess the lemmas of Pappus Alexandrinus for all the eight books, and the commentary of Eutocius on the four first books. Since the revival of learning, the theory of the conic sections has been much cultivated, and is the subject of a great variety of ingenious works.

There

There is a relation fubfifting between all the parts of human knowledge, which frequently connects fpeculations the moft abftracted, and feemingly the moft barren, with inquiries that are highly interefting to us, and moft fertile in ufeful confequences. In ftudying the properties of the conic fections, the followers of Plato fought merely to gratify a contemplative turn of mind. Their refearches were chiefly undertaken with the view of refolving fpeculative problems; they were directed to no immediate object of practical utility. It excites fome degree of admiration, when we reflect that enquiries, purely intellectual, and apparently fo little connected with external things, have, in modern times, been employed to explain many of the moft remarkable phenomena of the material world. The doctrine of the conic fections is equally ufeful in the fcience of optics, and in determining the path of a projectile body. Above all, this branch of the mathematics derives its chief importance from the applications that are made of it in modern aftronomy.

The ufes of the conic fections in phyfical fcience have, as it is natural to conjecture, led modern mathematicians to confider thefe curves under particular points of view fuited to their purpofes. It is for this reafon that the properties of thofe remarkable points, called foci, have been inveftigated with fo much care in latter times. In optics, thefe points are almoft exclufively the fubjects of confideration when the conic fections are concerned; and, in aftronomy, the fun invariably occupies one of the foci of the elliptical orbits which the planets and comets defcribe round him. Thefe points did not entirely efcape the penetration of the ancient geometricians. Apollonius has anticipated the moderns here, as well as in other parts of this fcience. He has unfolded many of the moft curious properties of the foci, in the ellipfe and hyperbola. He treats of them under the appellation of "Puncta ex applicatione facta;" which fignifies that they are points formed by cutting the tranfverfe axis in the ellipfe, and the tranfverfe axis produced in the hyperbola, into two fegments containing a rectangle equal to the fquare of half the lefs axis; and the phrafe is thus equivalent to the modern definitions of the fame points. The focus of the parabola is not noticed by Apollonius, nor by any other ancient author; unlefs, indeed (as has been pointed out to the writer of this article by a friend,) we except a propofition (Theor. 222, Prop. 238.) in the feventh book of the "Collectiones Mathematicæ," where Pappus delivers, in the form of a Locus, that beautiful property of the focus, and the correfponding directrix of any conic fection, which fome modern writers, confidering it as characteriftical, have made the bafis of a definition of the curves in plano. Mydorgius, contemporary with Des Cartes, is the firft who treated generally of the foci, of all the conic fections. Since his time the properties of thefe points have been gradually and fully developed.

Before Dr. Wallis, all the writers on conic fections followed the ancient geometricians in making the cone the common origin and foundation of their theories. That mathematician firft entertained the idea of ufing the cone as little as poffible in delivering the elements of the conic geometry; and this plan is purfued in his treatife, publifhed at Oxford in 1655. In fupport of this innovation, Dr. Wallis urges the prolixity of Apollonius's work, and the difficulty and perplexed nature of the demonftrations. On the old plan, many propofitions refpecting the generating of the cone, and the properties of that folid, are to be previoufly gone through; and the diagrams are rendered confufed by many lines drawn in different planes. On thefe accounts, he afferts, that the ftudy of the conic fections was generally neglected: "unde et nimis neglecta fuit (conicorum doctrina), tanquam infuperabilis difficultatis plena." It muft be allowed that the objections of Dr. Wallis are not without foundation. On the other hand, it has been the opinion of fome later mathematicians, that the defects of the treatife of Apollonius arife, not from his having made too much ufe of the cone, but from his having availed himfelf too little of the affiftance to be derived from that folid. They contend that the moft general and characteriftical properties are firft to be fought for in the cone itfelf; whence they are to be transferred to its fections, as particular cafes of more general propofitions. The lateft, and moft approved writers, who have adopted this opinion, are Dr. Hamilton and profeffor Robertfon of Oxford. Although Dr. Wallis propofed to introduce the cone as little as poffible in delivering the elements of the conic geometry; yet it is to be remarked that he ftill imitated his predeceffors in deriving, from that folid, the fundamental property which he afterwards made the bafis of all his reafonings. But the idea, which he introduced, was foon carried farther; and treatifes on the conic fections were written, in which the cone was entirely laid afide, and the curves were defined from defcriptions in plano. De la Hire, in his "Nouveaux Elemens des Sections Coniques," publifhed at Paris in 1679, is the firft author who fuccefsfully treated on the conic fections in this new view of the fubject. He derives the defcription of the parabola from the equality that fubfifts between two lines meeting in any point of the curve, one of which is drawn to the focus, and the other is perpendicular to the directrix; and he defcribes the ellipfe and hyperbola from the analogous properties, that, in the one, the fum of two lines drawn from any point in the curve to the two foci, and, in the other, the difference of two fuch lines, are equal to the tranfverfe axes. In thefe fundamental points De la Hire is followed by moft of the later writers, who have treated of the conic fections independently of the cone; and, in particular, by Dr. Simfon of Glafgow, who has publifhed an extenfive and accurate treatife on this fubject. Befides the method of De la Hire, another way of defining the curves in plano has been propofed. It is founded on that general property of the directrix firft given by Pappus Alexandrinus, as we have already noticed above. The learned abbé Bofcovich, an excellent Italian mathematician, has drawn his definitions of the curves from this fundamental property in the ingenious treatife on conic fections, publifhed in his "Elementa Mathefeos Univerfæ:" and we have two works in our own language, which are founded on the fame primary definitions; that of Mr. Newton of Cambridge, and that of Mr. Walker of Nottingham.

The doctrine of the conic fections is of great ufe in phyfical and geometrical aftronomy, and the phyfico-mathematical fciences. This doctrine has been much cultivated by geometers ancient and modern: and we have many good treatifes on the fubject; but that publifhed by Mr. Simfon, profeffor of mathematics at Glafgow, deferves to be particularly mentioned, not only for its elegance, but for its geometrical accuracy, which, as he juftly remarks in his preface, has not always been fo well obferved in treatifes of this kind, as it ought to be. See alfo Gregorii a St. Vincenti Opus de Quadratura Circuli, & Sectionum Coni; Mydorgius de Sectionibus Conicis: De la Hire de Sectionibus Conicis; Trevigar Elem. Section. Con.; Hamilton's Tract. Geom. de Section. Con.; De l'Hopital's Anal. Treat. of Conic Sections; Muller's Treatife, &c.; Hutton's; and Halley's edition of Apollonius, &c. Oxon. 1710. fol.

To the properties of the conic fections, mentioned above

above, it may be proper to add the properties of their osculatory circles, or circles of curvature. See CURVATURE.

CONIC *sections, similar.* See SIMILAR.

CONIC *Form of Mountains and Hills.* Too many naturalists have fallen into the mistake, of denominating mountains or hills which have a conical top, to be of volcanic origin; because, granite sometimes, as Achterman mountain in the Hartz, assumes a conic form, Lasius 17; and porphyry frequently takes this shape. In some rare instances, the rupture of the strata has produced conical hills. See ELEVATION *of Strata* and VOLCANO.

CONICA, in *Ancient Geography,* a town of Asia, in Paphlagonia. Ptolemy.

CONICS, that part of the higher geometry, or geometry of curves, which considers the cone, and the several curve lines arising from the sections thereof.

CONICTHYODONTES, or *Plectronitæ,* in *Natural History,* one of the three names by which the fossil teeth of fish are known; so called, from their supposed resemblance to the spur of a fighting cock.

Though authors assure us that these are the teeth of a fish, the jaws having been found with these bodies in them; yet they do not pretend to know to what fish they belong. They are generally of an oblong conic figure, broad at the base, and narrow at the point, where they are usually a little crooked: they are hollowed at the root, and are from the tenth of an inch to two inches long, commonly of a chesnut colour, and are found in the strata of clay, but most usually in those of stone; and are seen more frequently in England than in any other part of the world. Hill's Fossils, p. 645.

CONJECTURE, in the *Philosophy of the Mind,* expresses a degree of belief founded upon slight evidence. In some cases, a disposition to conjecture, indiscreetly indulged, may be productive of many extravagancies. It may prompt us to build favourite hypotheses on very weak foundations, and to ascribe the conduct of others to wrong motives, according to our prejudices for or against them. When indulged with discretion, a conjecture affords some relief to the mind from the inquietude of ignorance and uncertainty. It provides a temporary substitute for knowledge; and it frequently suggests ideas which lead to the discovery of truth.

Conjectural criticism, and consequent emendations of ancient authors, classical and scriptural, should be exercised with great caution; otherwise, the imagination will be apt to mislead persons most eminent for their genius and learning.

It is one of the most important, and at the same time one of the most disputed points in sound criticism, says Michaelis, whether what is called "conjectura critica," may be applied to the New Testament; or, in other words, whether in certain cases, and under certain restriction, provided we use all due care and caution, we may reject the readings of all the MSS., versions, and fathers, and merely on a probable supposition, admit a reading that is supported by no written authority; and whether, if we proceed on these principles, we have any reason to expect, that we shall ever arrive at the truth. Many learned men, deservedly esteemed critics, are of opinion, that conjectures are as allowable at present in the New Testament, as in the classic authors. Nevertheless, the majority of divines formerly considered them as presumptuous, if not impious; but those persons who are so strenuously attached to the printed text, are not aware, as Wetstein observes, in his Prolegomena, that a very great number of readings, which they so zealously support, are merely critical conjectures, advanced either by the ancient fathers, or by the modern editors of the Greek Testament, in the 16th and 17th centuries. These readings must therefore be immediately rejected, if critical conjecture is wholly inadmissible. As this question is purely critical, it should be argued, not on theological, but on critical grounds. The argument which is drawn from the hypothesis, that Divine Providence would not permit the true reading in any text of the New Testament to be lost, seems to be very extraordinary, when it is urged by persons who tacitly acknowledge that the same providence has not guarded against the necessity of conjecture in the Old Testament. Besides, no man can assert, that, because the true reading of any passage is no longer to be found, it is therefore totally lost, since the number of MSS. of the Greek Testament (together with other original documents) which have been actually collated, are trifling in comparison with the whole number that have been written; and a reading, which is now supported only by probable conjecture, may, in process of time, be confirmed by good authority. Moreover, it by no means diminishes the certainty of our faith, that some few passages of the New Testament have certain internal marks, which discover them to be not genuine, and which render it necessary to restore the true reading by critical conjecture. Our faith would only be in danger, if the number of these passages was so very great, as to render the whole New Testament suspicious; or, if the principal and distinguishing doctrines of Christianity must be either added to, or taken from, the sacred text, on no other authority than that of mere conjecture. But if, without assuming to ourselves the power of altering articles of religion, and confining our emendations to mere matters of criticism, we alter some words or sentences, the grounds of our faith are by no means affected, nor need we apprehend any evil consequences. In ancient writings, of which only one copy is extant, critical conjecture is indispensable. The necessity remains the same, even where there are several MSS. if those MSS. are only copies of one and the same more ancient MS. If we have more than a single copy of any work, and those copies are transcripts of different and distinct MSS., the necessity of critical conjecture decreases in proportion to the number of copies; but it does not entirely vanish, unless the number of the MSS. is very considerable. We have, therefore, no reason for censuring the critics of the 16th century, if, in their editions of the Greek Testament, they have sometimes, departed from the reading of their MSS., and substituted such as were agreeable to probable conjecture. The probability, however, that critical conjecture alone can restore the true reading, decreases in the same proportion, as our materials of criticism, or collections of various readings increase. And since so many MSS., works of the fathers, and ancient versions made in distant countries, and in different periods, have been carefully collated; and since also those very ancient Latin versions that vary so considerably from each other, and were translated from very different Greek MSS. have been made known to the public, we might even doubt whether critical conjecture ought not at present to be entirely rejected. It has, however, its learned and zealous advocates. It deserves to be considered, in reply to the plausible objection above suggested, that we have not a single MS. now extant, that was written in the four first centuries, and that the ancient versions have not descended to us without alterations. It is likewise evident, from the writings of the fathers, that many readings were in those times in the Greek MSS., which are not now found in any, or only in a very few; having been altered either by accident, or because they appeared to the transcribers to be obscure, or exceptionable.

ceptionable. It is therefore not impossible, that other readings, which have not been preserved in the works of the fathers, or in the Greek MSS., may have been equally lost; and among them, perhaps, some that were genuine. Besides, it is not impossible that there are many important MSS. of which we have no knowledge; and that a collation of those MSS. might confirm the critical conjectures of the 18th century, in the same manner as many conjectures of the 16th century have been confirmed in the 18th, by the authority of MSS., and ancient versions. It might further be added, and it deserves consideration, that all our MSS., and versions of the New Testament, were probably taken, not from the single copies of the Gospels and Epistles, which proceeded from the hands of the Apostles themselves, but from the collection that was formed of the several parts of the New Testament. If, instead of 292 MSS. enumerated by Michaelis, we had above 1000, they would still be transcripts of one and the same copy; and if this copy had any errors, which it would be the highest presumption to deny, these errors must have been transmitted into every MS. of the Greek Testament, whatsoever; and these errors can be remedied only by the aid of critical conjecture. Upon the whole, it appears, that a collection of critical conjectures may be of great use in establishing the genuine text of the Greek Testament; and it is likewise attended with this particular advantage, that we are led by it to examine MSS., and other original documents, with greater accuracy, in order to see whether those readings, which had no other support than conjecture, may not be established by written authority. Such a collection has been published by Bowyer, a learned bookseller in London, the third edition of which, with improvements, was published in London in 1782. Of several hundred conjectures, which Bowyer has produced, there is hardly one, says Michaelis, which, after impartial examination, will be found probable. On the other hand, it cannot be denied, that there are some few, which bear on them the marks of probability. Several of these are examined by Michaelis, and he has added a variety of his own conjectures, for which we must refer to his work, cited at the close of this article. Besides the critical conjectures already mentioned, there is another kind of conjecture, denominated by Michaelis "theological conjecture," which consists in altering the text of the sacred writings, according to the maxims adopted by any particular party, whether it be the ruling, or the persecuted party, in the church. Although it is allowable to venture a conjecture in matters relating to history, to dates, or to names, as in these cases the Bible is not our only "principium cognoscendi," yet whoever alters the text in subjects which relate to points of divinity, evidently presupposes a "principium cognoscendi," that is prior to the Bible itself; and this is frequently nothing more than a set of principles, which this or that particular person has thought proper to adopt. It has been urged by those who defend theological conjecture, that we ought never to lose sight of the "analogia fidei," or analogy of faith. Thus, if two passages in the Bible contradict each other in matters of faith, the one must be altered. But the question recurs, how shall we determine which of the two is to be altered? "In my opinion," says Michaelis, "we should alter neither, but reject the whole, as not coming from the Deity, if it be true that there are real contradictions, for it is upon this ground, that we condemn the Koran." But every apparent contradiction is not a contradiction in reality; and passages that are seemingly at variance may, with skill and patience, be reconciled. Such is the case with respect to Rom. iii. 28. and James, ii. 24. the whole contradiction vanishing, as soon as we reflect that St. Paul understands faith in Christ, St. James faith in the unity of the Godhead. For other observations on this subject, we refer to the author. Michaelis's Introduction to the New Testament by Marsh, vol. ii. part. 1. See CRITICISM.

CONIFERÆ, in *Botany*, the fifteenth natural order in the Philosophia Botanica of Linnæus, and the fifty-first of the Prælections. In the Philosophia Botanica the genera included in it are abies, pinus, cupressus, thuja, juniperus, taxus, ephedra. These are all retained in the Prælections, pinus and abies being united, and equisetum added with a mark of doubt, and an observation that it has the pollen of filix. The order derives its name from the cones or strobiles in which the seeds are contained. The fruit of juniperus, indeed, seems to be a berry, but it is properly a strobile, with pulpy scales, which do not open; for it has six fleshy connate scales, each containing a single seed. Taxus also apparently bears a berry; but this false berry is only the fleshy receptacle almost covering the seed. All the coniferæ yield a resin, which renders most of them evergreen. The fruit in all is biennial, produced in the spring, but not ripening and dropping its seeds until the spring after.

The coniferæ compose also one of the natural orders of Jussieu, the fifth of his fifteenth class, with the following character: *Flowers* monoicous or dioicous. *Males* most frequently in a catkin, or heaped together upon a catkin, each furnished with a scale, with or without a calyx: the stamens attached either to the calyx, or to the scale. *Stamens* definite or indefinite in number: filaments sometimes distinct, sometimes united into a simple or branched stipes. *Females* either solitary, or capitate, or disposed in a strobile or cone, densely imbricated with scales that separate the flowers; furnished either with a calyx or with a scale discharging the office of a calyx. *Germ* superior, conical, either double or manifold, with as many styles and stigmas, and either as many seeds, or as many one-seeded capsules. *Corculum* cylindrical, central, in a fleshy perisperm, two-lobed; the lobes sometimes, but rarely, divided or palmate, thence appearing many-lobed. *Stem* a tree or shrub. It contains the following genera: I. With a staminiferous calyx; ephedra, casuarina, taxus. II. With only a staminiferous scale, the true coniferæ: Juniperus, cupressus, thuya, araucaria (Dom. beya: Lam.), pinus, abies.

Ventenat has the same division and genera, except that he omits araucaria.

CONIGLIANO, in *Geography*, a small, but populous, town, in the district of Treviso, in the territory of Venice, which now forms part of the kingdom of Italy.

CONIL, a small town of Spain, in the kingdom of Seville, in Andalusia, on a bay to which it gives name; 15 miles S.S.E. from Cadiz, with a strong castle. Its inhabitants subsist chiefly by fishing. N. lat. 36° 16.′ W. long. 6°-8′.

CONIMBRIGA, or CONIMBRICA, in *Ancient Geography*, *Coimbre*, a town of Spain, in Lusitania, on the Munda.

CONIN, or KONIN, in *Geography*, a town of Poland, in the palatinate of Kalisch; 18 miles S.S.E of Gnesen.

CONJOINED, or CONJUNCT, in *Heraldry*, a term used for charges in arms when linked together.

CONJOINT, or CONJUNCT, is applied in *Ancient Music*, in the same sense as *consonant*, to two or more sounds heard at the same time. See CONSONANCE.

CONJOINT *degrees*, two notes which immediately follow each other in the order of the scale; as *ut* and *re*.

CONJOINT *tetrachords*, are two tetrachords, where the same *chord* is the highest of the one, and the lowest of the other.

CONIQUE,

CONIQUE, *Fr.* This term is applied to a piece of artillery, of which the bore is wider towards the muzzle than it is towards the breech.

CONIRA, in *Botany*, a name ufed by fome authors for the *myrrhis*. Gær. Emac. Ind. 2.

CONISALUS, in *Mythology*, a god of the Athenians mentioned by Strabo, and fuppofed to be the fame with Priapus.

CONISBERG, in *Geography*. See KONGSBERG.

CONISCI, in *Ancient Geography*, a people of Spain, who formed a part of the Cantabri, and in their drefs refembled the Gauls, according to Strabo.

CONISIUM, a town of Afia, in Myfia, according to Pliny. Hierocles calls it *Ciniofine*, and makes it an epifcopal city in the province of the Hellefpont.

CONISOR. See GOGNISOR.

CONISSALÆ, in *Natural Hiftory*, the name of a clafs of foffil bodies; the word is derived from κονισσαλος, *powder;* all the fpecies of bodies of this clafs being found like common fand, in form of powder, have been ufually confounded together, under the common name of *fands*. The coniffalæ are defined to be ftones of a differently debafed, cryftalline, or fparry matter, but always found in form of fmall and difunited particles, great numbers of which, being amaffed together, form a kind of powder.

Of this clafs of bodies there are two diftinct and large genera. 1. The fands properly fo called, which are compofed of particles all appearing to have a tendency to the fame regular figures, tranfparent, vitrifiable by a ftrong fire, and not foluble in, or effervefcing with acids. 2. The *faburræ*, or *grit*, of ftone found loofe; thefe are found in form of powder, the particles of which, in general, have no tendency to any particular figure, but appear to be rudely broken fragments of larger maffes. Hill's Hift. of Foff. p. 543.

CONISTERIUM, a room in the ancient Gymnafia or Paleftræ, in which was kept the fand for the ufe of the wreftlers, who were accuftomed, after anointing their bodies with oil, to fprinkle themfelves with fand to afford a firmer grafp in their encounters.

CONISTON, in *Geography*, a village in the northern part of Lancafhire, in the hundred of Loynfdale. Latitude about 54° 29′, and longitude 2° 44′. W. It is fituate on the fteep afcent of a mountain of blue argillaceous fchiftus, near the northern end of a romantic lake, of fix miles in length, and one in breadth, called after its name; near this town fome copper-mines are worked, but to no confiderable extent, and fome veins of lead-ore: flate quarries are alfo to be found near this place. There is a torrent or mountain ftream of water which precipitates itfelf into the lake near this place.

CONISTORSIS, in *Ancient Geography*, a town of Spain in Celtiberia. Strabo mentions it as a very famous town.

CONITZ, or CHOINITZ, in *Geography*, a town of Pruffia, in Pomerelia; 40 miles S. of Dantzick.

CONJUGAL RIGHTS, in *Law*. The fuit for "reftitution of conjugal rights" is one fpecies of matrimonial caufes; which is brought whenever the hufband or wife is guilty of "fubtraction," or lives feparate from the other without any fufficient reafon: in which cafe the ecclefiaftical jurifdiction will compel them to come together again, if either party be weak enough to defire it, contrary to the inclination of the other.

CONJUGATE *Axis*, &c. in *Conics*. See CONIC *Sections*.

CONJUGATE *Point*, in *Geometry*. See POINT.

CONJUGATES, in *Rhetoric*, denote words deduced from the fame origin with that of the fubject: *e.g. He who does juftly, is juft.*

CONJUGATION, in *Anatomy*, a term applied by the older anatomifts to the nerves coming from the brain, in the fame fenfe that we employ the expreffion, pair of nerves.

CONJUGATION, in *Grammar*, an orderly diftribution of the feveral parts or inflexions of verbs, in their different moods and tenfes, to diftinguifh them from each other: or, the manner in which the perfonal terminations of verbs are changed to exprefs the feveral moods and tenfes.

The Latins have four conjugations, diftinguifhed by the terminations of the infinitive, *are*, *ēre*, *ĕre*, *ire;* and moft of the French grammarians reduce the conjugations of their language to the fame number, ending in *er*, *re*, *ir*, and *oir*. Some have added a fifth Latin conjugation called the *mixt*, becaufe it is compofed of the third and fourth, as *accipere*, *accipio*.

The Greeks have three kinds of verbs; the firft called *barytons*, becaufe the laft fyllable is pronounced with a grave accent; (fee BARYTONUM); fuch are τεινω, *tendo*, and τυπτω, *verbero:* the fecond are circumflex verbs, which admit a contraction in their termination, and are then marked with a circumflex accent; fuch is αγαπαω, αγαπω, *amo:* the third kind comprehends the verbs in μι, as ειμι, *fum*. Of the firft fort there are fix conjugations; divided according to their characteriftic, *i. e.* the letter preceding the termination. Accordingly verbs having the labials π, β, φ, or πτ, form the firft conjugation of barytons; thofe having the gutturals κ, γ, χ, or κτ, the fecond; thofe having the dentals τ, δ, θ form the third; verbs in ζω, σσω, or ττω, comprehend the fourth conjugation; the liquids λ, μ, ν, ρ, mark the fifth; while thofe in ω pure, fuch as τιω, λυω, diftinguifh the fixth conjugation. Of the fecond there are three, *viz.* thofe in αω, εω, οω: but all thefe and the barytonous verbs are conjugated, that is, are varied in the fame way to exprefs mood, time, number, and perfon. Of the third, there are four. But Meffrs. de Port Royal reduce thefe 13 conjugations to two: *viz.* one in ω, comprehending the barytons and circumflex verbs; and the other thofe in μι.

Mr. I. Jones, in his "Grammar of the Greek Tongue, on a new and improved Plan," has judicioufly rejected the fore-mentioned diftinctions as unneceffary, becaufe they are ufelefs and unmeaning; and diftributed the Greek conjugations into four; *viz.* the active ω, its paffive ομαι, the active μι, and its paffive μαι.

In the Hebrew language there are four conjugations, *viz. kal* with its paffive *niphal*, *pihel* with its paffive *pyhal*, to which alfo may be referred *pohel*, *hiphil* with its paffive *hophal*, and *hithpahel*. The third perfon fingular mafculine of the firft conjugation is the preterite of the theme; the fecond conjugation has a *dagefh forte* in the fecond radical; the third has the prefix letter ה; and the fourth, the fyllable הת.

In Englifh, where the verbs have fcarce any natural inflexions, but derive all their variations from additional particles, pronouns, &c. we have hardly any fuch thing as ftrict conjugations.

Some grammarians, however, diftribute Englifh verbs into three conjugations, or claffes, diftinguifhed from one another by a peculiar formation in fome principal part belonging to each: and they obferve that the three different terminations of the participles, *viz. ed*, or its contraction *t*, *ght*, and *en*, may be confidered as the characteriftics of the conjugations.

conjugations. But as the verbs of the firſt conjugation would ſo greatly exceed in number thoſe of both the others; and as thoſe of the third conjugation are ſo various in their form, and incapable of being reduced to one plain rule; it ſeems better in practice, as biſhop Lowth juſtly obſerves, to conſider the firſt in *ed* as the only regular form, and the others as deviations from it: after the example of the Saxon and German grammarians. Lowth's Introd. to Engliſh Grammar, p. 104, 1772. Murray's Eng. Gram. p. 96. ed. 8. Others again diſtinguiſh them by the different inflexion of the firſt tenſe in each root, and thus make four conjugations in the active voice: the firſt has three radicals alike: as *I do read; I read; i. e.* yeſterday; *I have read, i. e.* juſt now. The ſecond has the firſt and third radical alike; as *I run, I ran, I have run.* The third conjugation has the ſecond and third radical alike; as *I eſteem, I eſteemed, I have eſteemed.* The fourth has the three radicals different; as *I write, I wrote, I have written* or *writ.* The paſſive voice, being made up of the third radical and the auxiliary verb *am*, admits of no difference of conjugations. Ward's Eſſays on the Engliſh Language, p. 87.

CONIUM, in *Botany*, κωνειον; Theophraſt. Dioſc. derived by Henry Stephens from κωνος, the cone of the mathematicians, a name given alſo, on account of its form, to that well-known children's toy, a top. From this latter ſenſe came the verb κωναω, which Heſychius explains by περιδινῶ implying a capacity to produce a whirling motion; and thence the poiſonous herb employed by the Greeks as the means of inflicting a capital puniſhment, was called κωνειον, becauſe it occaſioned a ſenſation of giddineſs in the ſufferer. Linnæus unaccountably derives the word from κονια, *duſt*). Linn. Gen. 336. Schreb. 469. Willd. 53. (Cicuta. Tourn. 160. Hall. 766. Gært. 117. Lam. Ill. 503. Juſſ. 223. Vent. 3. 28. Ciguë. Lam. Enc.) Claſs and order, *pentandria digynia.* Nat. Ord. *Umbellatæ*; Linn. *Umbelliferæ*; Juſſ. Vent.

Gen. Ch. *Umbel* partial, and univerſal with many ſpreading rays. *Involucre univerſal*, three or many-leaved, ſhort, unequal, membranous towards the baſe: *partial* with about three leaves, only half encloſing the pedicels. *Cal.* ſcarcely perceptible. *Cor.* Petals five, inflexed, heart-ſhaped, unequal. *Stam.* Filaments five, about the length of the petals; anthers roundiſh. *Piſt.* Germ inferior; ſtyles two, ſhort, reflexed; ſtigmas obtuſe. *Peric.* none. *Fruit* nearly globular, with five crenulate ridges; compoſed of two *ſeeds*, which are convex, almoſt hemiſpherical, ſtriated on one ſide, flat on the other, ſeparating as they become ripe.

Eſſ. Ch. Partial involucre only on one ſide, about three-leaved. Fruit nearly globular, with fine crenulate ridges.

Sp. 1. C. *maculatum.* Common hemlock. Linn. Sp. Pl. 1. Mart. 1. Willd. 1. Jacq. Auſt. 2. tab. 156. Curt. Flor. Lond. 1. tab 17. Eng. Bot. 1191. Woodv. Med. Bot. tab. 22. (Cicuta major; Lam. Ill. tab. 195. fig. 1. Bauh. Pin. 160. Rai. Syn. Cicuta domeſtica. Moriſ. Umb. 18 *c. b.* § 9. tab. 6. fig. 1. Coriandrum. Roth Cranz.) "Seeds ſtriated." Linn. "Stem ſpotted at the baſe; furrows of the ſeeds crenate." Lam. "Seeds without prickles; ſtem much branched, ſhining, ſtriated." Dr. Smith. *Root* biennial, ſpindle-ſhaped, often branched, white, fleſhy. *Stem* three or four feet high, erect, cylindrical, hollow, furrowed, ſmooth, ſhining, marked with purple ſpots, much branched, eſpecially towards the top, leafy. *Leaves* ſupra-decompound, or ſeveral times pinnated; bottom ones very large, ſometimes two feet long; leaflets oblong, acutely notched, dark green above, paler underneath. *Rays* of the *umbel* from ten to twelve; of the umbellule fifteen or ſixteen. General involucre commonly many-leaved, deflexed. *Petals* white, heart-ſhaped, inflexed, nearly equal. The whole plant is narcotic, with a diſagreeable ſmell and nauſeous taſte. Very different opinions have been entertained with reſpect to its active qualities, but it may be doubted whether authors have always intended the ſame plant. Haller was inclined to think, that the plant which was fatal to Socrates and Phocion, was not that now before us, but the cicuta viroſa of Linnæus, which the French writers have called cicutaria. La Marck, on the other hand, aſſerts that the conium maculatum of Linnæus, his cicuta magna, is the cicuta of ancient authors, the very plant by which Socrates was poiſoned; and ſeverely cenſures Linnæus for changing its name to conium. But if this great botaniſt had looked into the Greek authors, he would have found that Linnæus only reſtored the moſt ancient name, and that the word cicuta is entirely of Latin origin, unknown to the Greek language. Whether Linnæus would not have done better, if he had retained the term cicuta, which had been adopted by all the modern botaniſts before him, is a queſtion to which an affirmative anſwer may perhaps be given. His cicuta viroſa might then, in concurrence with Haller's opinion, have been called conium. But when the change was made and had, through the extenſive circulation of the works of Linnæus, obtained general currency, a revival of the ancient name, inſtead of removing, has, in fact, increaſed the confuſion. Whatever may have been the plant by which Socrates was judicially murdered, our conium maculatum unqueſtionably poſſeſſes deleterious qualities; but, as Dr. Smith obſerves, it is happily too nauſeous to be incautiouſly ſwallowed in any dangerous quantity. See Cicuta in the Materia Medica, where it ſhould have been obſerved that Plato does not call the plant, by which Socrates periſhed, cicuta, a word which he had never heard; nor does he give it any Greek name peculiar to it; but conſtantly uſes the very general term Φαρμακον, which denotes a ſtrong potion either poiſonous or medicinal. 2. C. *rugoſum.* Willd. 2. Thunb. prod. 50. (C. ſuffruticoſum; Berg. cap. 77.) "Seeds wrinkled." *Stem* ſomewhat ſhrubby. A native of the Cape of Good Hope. 3. C. *rigens.* Linn. Mant. 56. Mart. 2. Lam. 2. Willd. 3. Thunb. prod. 50. "Seeds ſomewhat muricated; peduncles furrowed; leaflets channelled, obtuſe." *Root* perennial. *Stem* purpliſh, rigid, ſtriated, erect, diffuſe, branched. *Leaves* twice-winged, ſomewhat fleſhy, doubled, obtuſe, crenulate, hard, the colour of rue; petioles longitudinally channelled. *Florets* all fertile, white; leaflets of the general involucre five, ſhorter than the rays of the umbel; one or two divided; thoſe of the little umbels ſeven; a few of them crenate; petals equal, lanceolate, rolled inwards. *Seeds* reddiſh, ſtriated and ſomewhat muricated. A native of the Cape of Good Hope, on the coaſt, introduced into England in 1787, by Maſſon. 4. C. *africanum.* Linn. Sp. Pl. 2. Mart. 3. Willd. 4. Jacq. hort. tab. 194. (Cicuta africana; Lam. 3. Ill. tab. 195. fig. 2. Caucalis africana; Boerh. Lugd. b. 1. tab. 63. Capnophyllum; Gært. 2. tab. 85. fig. 6.) "Seeds prickly." Linn. "Seeds muricated; petioles and peduncles even-ſurfaced." Willd. "Leaves twice winged, glaucous; petioles and peduncles even-ſurfaced; ſeeds tooth-muricated." Lam. *Root* annual. *Stems* three or four inches long, herbaceous, cylindrical, ſmooth, glaucous; with a few leaves, and one or two ſhort axillary branches. *Root-leaves* almoſt as long as the ſtem; leaflets flat, not channelled, ſmall, gaſhed. *Flowers* white, almoſt regular, in ſmall terminal umbels; leaflets of the general involucre from three to five, membranous towards the baſe;

bafe; feveral of the florets barren. *Fruit* in the centre, feffile. Linn. *Fruit* elliptical, lenticularly compreffed, folitary in the centre of the partial umbels, nearly feffile. *Seeds* flightly convex on one fide, with three, fometimes only two, tubercled or tooth-muricated ribs; flat or a little concave on the other; marked with a longitudinal middle line, and two curved, nearly obfolete, lateral ones. Gært. A native of the Cape of Good Hope; cultivated in 1759 by Miller, who received the feeds from Boerhaave. 5. C. *tenuifolium.* Mart. 5. Vahl. Symb. 3. 49. "Root and ftem-leaves fimple, linear." *Stem* a foot high, herbaceous, upright, fcarcely branched, flender, cylindrical, fmooth, flightly ftriated. *Leaves* very narrow, a little broader at the bafe, fomewhat fheathing, very fmooth; lower ones about four inches long. *Peduncles* lateral and terminal, few, remote. *General involucre* five-leaved; leaflets awl-fhaped, fomewhat rigid, fhorter than the umbel; *partial* ones the length of the little umbels. *General umbel* fmall, five-rayed; partial ones eight or ten-flowered. *Seeds* oblong, ftriated, fmall, fmooth. A native of the Cape of Good Hope.

Conium *Royeni.* Linn. See Caucalis *arvenfis.*

Conium *dichotomum.* Desfont. See Tordylium *peregrinum.*

Conium, in *Ancient Geography*, a town of Afia Minor, in Pacatian Phrygia. It appears to have been founded by Cineas, king of Theffaly; and according to the notitia of Hierocles, it had been epifcopal.

CONJUNCT. See Conjoint Pair.

Conjunct *of an arch.* See Supplement.

Conjunct *fentence.* See Sentence.

CONJUNCTION, in *Aftronomy*, the meeting of the ftars or planets, in the fame point or place of the heavens, and it is either *true* or *apparent.*

If the two bodies meet both in the fame degree of longitude and latitude, a right line drawn from the centre of the earth through the centre of one of them, paffes through that of the other; then the conjunction is faid to be true and central: and if the lower hides the upper, the conjunction is faid to be corporal.

If the line pafs wide of the centre of the earth, the conjunction is faid to be partile.

If the bodies do not meet precifely in the fame degree, but are joined with fome latitude, the conjunction is faid to be apparent. Thus, when a right line, fuppofed to be drawn through the centres of two planets, does not pafs through the centre of the earth, but through the eye of the fpectator; it is faid to be an apparent conjunction.

Some have alfo divided conjunctions into *great* and *greateft:* the former denoting thofe which occur at comparatively a fhorter interval, fuch as the conjunctions of Jupiter and Saturn, and the latter happening after a longer interval, fuch as thofe of the three fuperior planets, Mars, Jupiter, and Saturn. But this divifion has little place in aftronomy; being founded on the notion of the particular influences, &c. of the heavenly bodies in fuch and fuch afpects.

Aftrologers maintain, that the deluge was owing to a conjunction of all the planets in Capricorn; and that the conflagration will be occafioned by their conjunction in Cancer: whence they pretend to foretel the end of the world.

The conjunction is the firft, or the principal, of all the afpects; and that whence the other afpects commence; as oppofition is the laft, where they terminate. See Character.

The moon is in conjunction with the fun every month. Her conjunctions and oppofitions are called by a general name, *fyzygies.*

Eclipfes of the fun never happen, but when there is a conjunction of the fun and moon in or near the nodes of the ecliptic.

Conjunction, in *Grammar*, a particle which expreffes a relation or dependance between words and phrafes; thus called, becaufe it ferves to join or connect the parts or members of a difcourfe, which is its common ufe, and alfo to connect words; fo as to fhew the relations which thofe words fo united have to other parts of the fentence.

Conjunctions, however, often unite fentences, when they appear to unite only words: *e.g.* "Duty and intereft forbid vicious indulgences;" which form of expreffion contains in reality two fentences. See Murray's Eng. Gram. p. 105. ed. 8.

Mr. Harris defines a conjunction to be a part of fpeech, void of fignification itfelf, but fo formed as to help fignification, by making two or more fignificant fentences to be one fignificant fentence; and he diftributes them into fuch as connect fentences and their meaning, and fuch as conjoin the fentences whilft they disjoin the fenfe. The former are *conjunctive*, and are either copulative or continuative, the former joining all fentences, however incongruous in fignification, and the latter joining only thofe which have a natural connection; and the latter *disjunctive*, fome of which are fimple, as, *either* it is day *or* it is night, and adverfative, as, it is not day *but* it is night. Hermes, p. 240, &c. See Adversative and Continuative.

Mr. Horne Tooke, in his "Diverfions of Purley," has made fome remarks, in his ufual manner, on the definition of a conjunction given by Mr. Harris, charging the author not only with felf-contradiction, but with great want of perfpicuity. Accordingly he thus ftates Mr. Harris's definition: "A found fignificant devoid of fignification, (referring to Mr. Harris's definition of a word), having at the fame time a kind of *obfcure* fignification; and yet having neither fignification nor no fignification; but a *middle fomething* between fignification and no fignification, fharing the attributes both of fignification and no fignification; and linking fignification and no fignification together." This acute and ingenious writer denies conjunctions to be a feparate fort of words or parts of fpeech by themfelves. For they have not a feparate *manner of fignification*; although they are not *devoid* of fignification. And the particular fignification of each muft be fought for from amongft the other parts of fpeech, by the help of the particular etymology of each refpective language. By fuch means alone can we clear away the obfcurity and errors in which grammarians and philofophers have been involved by the corruption of fome common words, and the ufeful abbreviations of conftruction. (See Abbreviation.) And, at the fame time, we fhall get rid of that farrago of ufelefs diftinctions into conjunctive, adjunctive, disjunctive, fubdisjunctive, copulative, negative copulative, continuative, &c. &c. &c., which explain nothing; and (as moft other technical terms are abufed) ferve only to throw a veil over the ignorance of thofe who employ them. In difmiffing conjunctions from the rank which they have long held as diftinct parts of fpeech, Mr. Tooke cites feveral authorities; and among others, bifhop Wilkins, who, in his "Effay towards a real Character and a philofophical Language," (part iii. c. 4. p. 312.), fays, "According to the true philofophy of fpeech, I cannot conceive this kind of words" (fpeaking of adverbs and conjunctions) "to be properly a diftinct part of fpeech, as they are commonly called. But until they can be diftributed into their proper places, I have fo far complied with the grammars of inftituted languages as to place them here together." Mr. Locke, who was much indebted to Wilkins, expreffes his diffatisfaction

diffatisfaction with all the accounts of language which he had feen. Sanctius refcued *quod* particularly from the number of thefe myfterious conjunctions, though he left *ut* amongft them: and Servius, Scioppius, G. J. Voffius, Perizonius, and others, have explained and difplaced many other fuppofed adverbs and conjunctions. "In fhort," fays the author whom we are now citing, "there is not fuch a thing as a conjunction in *any* language, which may not, by a fkilful herald, be traced home to its own family and origin; without having recourfe to contradiction and myftery with Mr. Harris; or, with Mr. Locke, cleaving open the head of man, to give it fuch a birth as Minerva's from the brain of Jupiter."

The author's fcheme is fully developed in the following table, and the feveral conjunctions which it exhibits: and he fays that

	Are the Imperatives	of their refpective Verbs.	
If	Gif	Gifan	To Give.
An	An	Anan	To Grant.
Unlefs	Onlef	Onlefan	To Difmifs.
Eke	Eac	Eacan	To Add.
Yet	Get	Getan	To Get.
Still	Stell	Stellan	To Put.
Elfe	Alef	Alefan	To Difmifs.
Tho' or Though	Ðaf or Ðafig	Ðafian or Ðafigan	To Allow.
Būt	Bot	Botan	To Boot.
Bŭt	Be-utan	Beon-utan	To Be-out.
Without	Wyrð-utan	Wyrðan-utan	To Be-out.
And	An-ad	Anan-ad	*Dare congeriem.*

Left is the paft participle Lefed of Lefan, To Difmifs.

Since { Siððan, Syne, Seand-er, Siððe or Sin-er } is the participle of Seon. To See.

That is the article or pronoun Ðat.

For a farther and ample illuftration and proof of the etymologies above given, and feveral others, we muft refer to Tooke's ΕΠΕΑ ΠΤΕΡΟΕΝΤΑ, or Diverfions of Purley, part i. p. 136—287, ed. 2.

The conjunction, according to the long eftablifhed claffification, is the fixth of the eight vulgar parts of fpeech. See Speech.

Conjunctions render the difcourfe more fmooth and fluent; and ferve very good purpofes in the argumentative and narrative ftyle; but they muft ever be omitted where a perfon fpeaks with emotion, as only ferving to weaken and enervate it. Boileau obferves, that nothing gives more warmth and life to a difcourfe than to drop the conjunctions or copulatives; a paffion, adds he, embarraffed with conjunctions and ufelefs particles, lofes all the fire and vehemence it would require in its progrefs.

Conjunctions are of various kinds.

Conjunctions *copulative*, or *conjunctive*, are thofe which exprefs a relation of union or comparifon between things; and ferve to connect or continue a fentence, as, *and, only, as much as, in the fame manner as, neither more nor lefs, inafmuch as, not only, but alfo.*

Conjunctions *adverfative*, thofe which exprefs a reftriction, or contrariety; as, *but, neverthelefs, although, far from.* See Adversative.

Conjunctions *caufal*, thofe which fhew that the reafon of fomething is alleged: as, *for, becaufe, feeing, the rather fince, inafmuch as.*

Conjunctions *conclufive*, thofe which denote a confequence drawn: as, *for which reafon, but then, of confequence, fo that,* &c.

Conjunctions *conditional*, are thofe which import a condition: as, *if, if not, on condition that, provided that, in cafe of.* See Conditional.

Conjunctions *continuative*, thofe which exprefs a fucceffion, or continuation of the difcourfe: as, *in effect, even, whatever it be.* See Continuative.

Conjunctions *disjunctive*, thofe which exprefs a relation of feparation or divifion, or which ferve not only to connect and continue the fentence, but alfo to exprefs oppofition of meaning in different degrees: as, *neither, whether, or, though, yet, but,* &c.

Conjunctions *dubitative*, thofe which exprefs fome doubt, or fufpenfion of opinion: as, *if, that is to fay,* &c.

Conjunctions *exceptive*, are, *if it be not, unlefs that,* &c.

CONJUNCTIVA Tunica, in *Anatomy*, is the membrane which connects the front of the eyeball to the pofterior furface of the eyelids. See Eye.

CONJURATI Fratres. See Fratres.

CONJURATIO, in *Antiquity*, denotes an oath; and *conjuratus* the fame with *conjurator, viz.* one who is bound by the fame oath. *Conjurare* is ufed when feveral perfons affirm a thing by oath. Mon. Ang. 7. 1. p. 207.

CONJURATION, in *Law*, fignifies a plot or confederacy, made by perfons combining together by oath or promife, to do fome public harm. But it was more particularly ufed, formerly, for having a perfonal conference with the devil, or fome evil fpirit, to know any fecret, or to effect any purpofe. Anno 5 Eliz. c. 16.

It is faid in fome of our law books, that the difference between *conjuration* and *witchcraft* is, that the former endeavours by prayers and invocation of God's powerful name, to compel the devil to fay or to do what the offender commands him; the latter deals rather by friendly and voluntary conference or agreement with the devil or familiar, to have the offender's defires ferved, in lieu of blood, or other gift offered to the devil, efpecially of the offender's foul. And both thefe differ from *inchantment* or *forcery*; becaufe thofe were fuppofed to be perfonal conferences with the devil, and thefe

thefe are but medicines and ceremonial forms of words (commonly called *charms*) without apparition. Cowel.

Hawkins, in his "Pleas of the Crown," (l. i. c. 3.) fays, that *conjurors* are thofe, who, by force of certain magic words, endeavour to raife the devil, and oblige him to execute their commands. *Witches* are fuch who, by way of conference, bargain with an evil fpirit, to do what they defire of him: and *forcerers* are thofe who, by the ufe of certain fuperftitious words, or by the means of images, &c. are faid to produce ftrange effects, above the ordinary courfe of nature. All thefe were anciently punifhed in the fame manner as *heretics*, by the writ "de hæretico comburendo," after a fentence in the ecclefiaftical court; and they might be condemned to the pillory, &c. upon an indictment at common law. 3 Inft. 44. H. P. C. 38. The prefident Montefquieu alfo (Sp. Laws, b. xii. c. 5.) ranks forcery and herefy together; laying it down, at the fame time, as an important maxim, that we ought to be very circumfpect in the profecution of magic and herefy; becaufe the moft unexceptionable conduct, the pureft morals, and the conftant practice of every duty in life, are not a fufficient fecurity againft the fufpicion of crimes like thefe. See Witch-*craft*.

Our fore-fathers were ftronger believers in the ridiculous ftories that have been generally told concerning witchcraft and forcery than any who live in thefe more enlightened times, when they enacted by ftat. 33 Hen. VIII. c. 8. all witchcraft and forcery to be felony without benefit of clergy; and again by ftat. 1 Jac. I. c. 12. that all perfons invoking any evil fpirit, or confulting, covenanting with, entertaining, employing, feeding, or rewarding any evil fpirit; or taking up dead bodies from their graves to be ufed in any witchcraft, forcery, charm, or inchantment; or killing or otherwife hurting any perfon by fuch infernal acts; fhould be guilty of felony without benefit of clergy, and fuffer death. And if any perfon fhould attempt by forcery to difcover hidden treafure, or to reftore ftolen goods, or to provoke unlawful love, or to hurt any man or beaft, though the fame were not effected, he or fhe fhould fuffer imprifonment and pillory for the firft offence, and death for the fecond. Thefe acts continued in force till lately, to the terror of all ancient females in the kingdom; and many poor wretches were thus facrificed to the prejudice of their neighbours, and their own illufions: not a few having, by fome means or other, confeffed the fact at the gallows. But though fome of the tales that led to thefe penal ftatutes ftill exift among the uninformed vulgar, as the triumph of impofture over credulity, and as bugbears to children, inexcufably employed for this purpofe; all executions for this dubious crime are now at an end:—our legiflature having at length followed the wife example of Louis XIV. in France, who thought proper by an edict to reftrain the tribunals of juftice from receiving informations of witchcraft. (See Voltaire's Age of Lewis XIV. c. 29. Mod. Un. Hift. vol. xxv. p. 215.) Yet Vouglans (De Droit Criminel, 353. 459.) ftill reckons up forcery and witchcraft among the crimes punifhable in France. With us the above recited ftatutes againft conjuration and witchcraft are repealed; and no profecution fhall be carried on for the future againft any perfon for conjuration, witchcraft, forcery, or inchantment: but where perfons pretend to exercife any kind of witchcraft or conjuration, &c. or undertake to tell fortunes, or, from their fkill in any occult fcience, to difcover where goods ftolen or loft may be found; they fhall upon conviction be imprifoned a year, and ftand in the pillory once in every quarter, in fome market-town, and may be ordered to give fecurity for their good behaviour, by ftat. 9 Geo. II. c. 5.

CONKAIR, in *Geography*, a town of Hindooftan, in the province of Berar, fituated between a high rocky hill and the fouth bank of the Mahanuddee river, which rifes at a place called Sehowah, about 7 cofs S. of Conkair. The rajah of Conkair has built a fortrefs on the fummit of the hill, and mounted it with two guns.

CONKERE, a poft of Chinefe Tartary. N. lat. 44° 50′. E. long. 101° 49′.

CONLIE, a fmall town of France, in the department of the Sarthe, and chief place of a canton, in the diftrict of Le Mans, 12 miles N.W. from Le Mans. It has 1405 inhabitants. The canton reckons 16 communes, with 13,055 inhabitants upon a territorial extent of 220 kiliometres.

CONLIE'GE, a fmall town of France, in the department of Jura, and chief place of a canton in the diftrict of Lons le Saulnier, with 1201 inhabitants. The canton itfelf reckons 20 communes and 9089 inhabitants upon an extent of 142½ kiliometres.

CONLOBONGI, a town of the ifland of Borneo; 120 miles N. of *Banjer-Maffing*.

CONN, in *Sea Language*. See Cond.

Conn, *Lough*, in *Geography*, a lake of the county of Mayo, Ireland, which is at the foot of mount Neptune, and extends 9 miles in length, but not more than two in breadth. There is a great number of iflands in this lake, fome of which are well planted, and being very fertile in fine grafs, ferve for paftures to fheep and other cattle. That kind of trout called *Gillaroo*, is alfo found here in abundance. Dr. Shaw obferves of thefe, that they do not appear to be fpecifically different from the common trout, but by living much on fhell-fifh, and fwallowing fmall ftones at the fame time, their ftomachs acquire a much greater degree of thicknefs, and a kind of mufcular appearance, fo as to refemble a fort of gizzard. Lough Conn ftretches from N.W. to S.E. between the Killalla and Caftlebar.

CONNA, in *Botany*, Rheed. See Cassia *Fiftula*.

Conna, in *Ancient Geography*, a town of Afia Minor, in the Greater Phrygia. Ptolemy. The 6th council of Conftantinople places it in Pamphylia.

CONNAC, denotes in Arabia, Paleftine, Barbary, &c. the place, whether covered or not, where travellers or caravans halt or break off their journey for a time, in order to reft and refrefh themfelves and their beafts of burthen. Similar to this was the "malon," or inn (Gen. xlii. 27. xliii. 21, &c.) where the fons of Jacob opened their facks to give their affes provender. The appellation Connac in the Eaft correfponds with the πανδοχειον and καταλυμα in the Old or New Teftament, which are rendered inns or hofpitia. But excepting the caravanfaries which may in fome meafure anfwer to the πανδοχεια and καταλυματα, there are, properly fpeaking, no houfes of entertainment in Barbary; at leaft, in the fenfe ufually applied to inns or hofpitia, *i. e.* where travellers can be provided with lodgings, provifions, and other neceffaries for their money.

CONNAMARA, the name of a diftrict, in the county of Galway, Ireland, noted for the woollen ftockings knit there, and for the wild ftate of the country. It is in the barony of Ballinahinch, and an account of it will be found under that name. See Ballinahinch.

CONNARUS, in *Botany*, (Κονναρος, the name of a tree defcribed by Athenæus), Linn. Gen. 830. Schreb. 1116. Willd. 1268. Juff. 369, 452, 453. Clafs and order, *monadelphia decandria*. Nat. Ord. *Dumofæ*, Linn. *Terebintaceæ*, Juff.

Gen. Ch. *Cal.* one-leafed, with five fegments; or five-leaved. *Cor.* petals five, lanceolate, erect, equal. *Stam.* filaments ten, awl-fhaped, connected at the bafe, (in pairs, Lam.), alternately larger and fmaller; anthers roundifh. *Pift.* germ fingle (except in one fpecies), oblong, villous; ftyle cylindrical; ftigma obtufe. *Peric.* capfules gibbous, one-celled, either two-valved or dehifcent on one fide. *Seed* fingle, large.

Eff. Ch. Cal. five-cleft or five-leaved. Cor. five-petalled. Capf. one-celled. Seed fingle.

Species, 1. C. *afiaticus.* Ceylon Sumach. Willd. 2. (C. *monocarpus.* Linn. Mart. 1. Rhus zeylanicus trifoliatus phafeoli facie, floribus copiofis fpicatis; Burm. Zeyl. 199. tab. 89. Phafeolus arborefcens zeylanicus monocarpus; Rai. Supp. 438.) "Leaves ternate; leaflets roundifh, egg-fhaped, one-nerved, veined." A tree. *Leaves* alternate, petioled; leaflets acuminate, quite entire, fmooth, equal, petioled. *Racemes* erect, terminal. A native of the Eaft Indies. 2. C. *pentagynus.* Lam. 1. Willd. 3. (Cavan. Diff. 7. 376. tab. 223.) "Leaves ternate; leaflets roundifh, egg-fhaped, three-nerved; flowers pentagynous." A tree. *Branches* cylindrical, fmooth, leafy. *Leaves* alternate, acute, entire, fmooth, fomewhat coriaceous, finely veined underneath. *Flowers* fmall, numerous, in axillary and terminal fpikes, forming a kind of panicle; calyx villous on the outfide; piftils from three to five, villous, fhort, appearing united at the bafe; ftyles fhorter than the ftamens; ftigmas flat or truncated. Defcribed by La Marck from dried fpecimens without fruit, communicated by Sonnerat. A native of Madagafcar and Guinea. 3. C. *africanus.* Mart. 2. Lam. 3. Willd. 1. Vahl. Symb. 3. 86. Cavan. Diff. 7. 375. tab. 221. (Omphalobium indicum; Gært. vol. i. 253. tab. 46. fig. 3, and vol. ii. præf. p. 33.) "Leaves ternate; leaflets oblong, veined, acuminate." Willd. "Leaves ternate, leaflets egg-fhaped, acute at both ends, nerved underneath; flowers panicled, monogynous." Lam. A fhrub. *Branches* cylindrical, fmooth. *Leaves* alternate, petioled; leaflets four or five inches long, fmooth, even-furfaced above, nerved and veined underneath. *Flowers* fmall, numerous; panicle compound, oblong, terminal. *Capfules* oblong, almoft cylindrical, gibbous on one fide, pointed at both ends, pedicelled, two-valved. Lam. *Capfule* valvelefs, dehifcent on the gibbous or outer fide. *Seed* large, fomewhat kidney-fhaped, fmooth, fhining, dark chefnut-coloured, with an oblong pit on each fide; aril incomplete, flefhy-glandular, varioufly lobed, fo as to appear curled, its whole length clofely adhering to the lower and exterior part of the feed. Gært. 4. C. *pinnatus.* Lam. 2. Illuft. tab. 572. Willd. 5. Cavan. Diff. 7. 375. tab. 222. (Perimcurigil; Rheed. Mal. 6. 43. tab. 24.) "Leaves ternate and pinnated; leaflets oblong, veined; petals with two briftles at the bafe." Willd. A tree. *Root* perennial. *Leaflets* of the fame confiftence, and fimilarly veined with thofe of C. pentagynus. *Flowers* white, in terminal and axillary panicles; calyx villous on the outfide; petals lanceolate, with two remarkable briftles a little above the bafe, one on each fide, pointing downwards, acute and fomewhat divaricating; germ fingle, villous. *Capfules* oblong, gibbous one fide, fuddenly narrowed at the bafe, ending rather abruptly in a point, one-celled. *Seed* one. A native of the Eaft Indies; defcribed from fpecimens communicated to La Marck by Sonnerat. 5. C. *Santaloides.* Mart. 3. Willd. 4. Vahl. Symb. 3. 87. (Santaloides; Flor. Zey. 408.) "Leaves pinnated; leaflets egg-fhaped, acuminate; peduncles axillary, aggregate; flowers in racemes." A tree. *Branches* cylindrical, fmooth. *Leaves* unequally pinnated, fcattered, remote, petioled; leaflets fometimes an inch and half long, quite entire, perfectly fmooth, fhining above, reticularly veined underneath, on very fhort channelled petioles. *Peduncles* from four to fix together, half the length of the leaf, fmooth; partial ones fcattered, with three or four pedicelled flowers towards the top. A native of the Eaft Indies. 6. C. *mimofoides.* Mart. 4. Willd. 7. Vahl. Symb. 387. "Leaves pinnated; leaflets about twenty-one, oval-oblong, emarginate; racemes axillary." A tree. *Branches* cylindrical, villous towards the top. *Leaves* growing near the ends of the branches, alternate, approximating, on flightly villous petioles; leaflets oppofite or alternate, on very fhort petioles, inner ones fmaller, obtufe, fmooth, finely veined on the upper furface, paler underneath. *Peduncles* axillary, ufually three together, the length of the leaves, flightly hoary; pedicels fcattered, filiform, the loweft commonly two-flowered. *Flowers* fmall, with a minute bracte at the bafe of each pedicel. A native of the iflands of Nicobar.

Connarus *decumbens;* Willd. Vahl. See Hermannia *triphylla.*

Propagation and Culture. C. afiaticus is ufually propagated in this country by laying down the young branches, which, if tongued in the manner practifed for carnations, and duly watered, will put out roots in twelve months. They may then be cut off from the old plants, and planted in feparate fmall pots, which fhould be filled with light frefh earth and plunged into a moderate hot-bed. They fhould afterwards be placed in a dry ftove; but for about three months in fummer they will bear the open air in a fheltered fituation. The cuttings of this plant will fometimes take root, but without great care feldom fucceed.

CONNATA Folia. See Leaf.

CONNAUGHT, in *Geography,* the name of the weftern province of Ireland, which contains the counties of Galway, Mayo, Sligo, Leitrim, and Rofcommon. At the time of Strongbow's invafion, it was a diftinct kingdom, and its king was monarch of Ireland. This dignity continued until the reign of Henry III.; after which time, the province was divided amongft petty chieftains, fome of whom were of Englifh extraction, until the reign of queen Elizabeth, when the earl of Suffex, lord deputy, divided it into counties, A. D. 1562; and fir H. Sidney, lord deputy, eftablifhed a lord prefident of Connaught, A. D. 1567. In 1604, fir Arthur Chichefter, lord deputy, eftablifhed a circuit for judges of affize in Connaught. At prefent, the diftinction of provinces is not attended to in any public acts; and indeed, as calculated to keep up a provincial fpirit, which has often led to bitter animofities, it ought to be as much as poffible difcountenanced.

Connaught *Worms.* See Worm.

CONNAUX, in *Geography,* a town of France, in the department of the Gard, and diftrict of Uzés; three leagues N.E. of Uzés.

CONNE, Cone, or Coyne Lough, in the county of Down, Ireland. See Strangford.

CONNEAUT, and alfo Ashtabula, are fmall rivers of America, in the ftate of Ohio, which form good harbours for boats and fmall craft on the borders of lake Erie.

CONNECTICUT, one of the United States of America, called by the ancient nations *Quunihticut,* lying between 41° and 42° 2′ N. lat., and between 71° 20′ and 73° 15′ W. long.; extending in its greateft length 100 miles, and greateft breadth 72 miles; and comprehending about 4674 miles, or about 2,640,000 acres. It is bounded on the north by Maffachufetts; on the eaft by Rhode ifland; on the fouth by the Sound, which feparates it from Long ifland; and on the weft by the ftate of New York. Connecticut is divided into eight counties, *viz.* Fairfield, the chief towns of which are

are Fairfield and Danbury; New Haven, with a capital of the fame name; Middlefex, the chief towns of which are Middleton and Haddam; and New London, the chief towns of which are New London and Norwich; which four counties extend along the Sound from W. to E.: Litchfield, Hartford, Tolland, and Windham, each having a capital of the fame name refpectively, which four counties extend in the fame direction with the former on the border of the ftate of Maffachufetts. Thefe counties contain about 100 townfhips, which are fubdivided into parifhes, each of which has one or more places of public worfhip, fchool-houfes at convenient diftances, and a college at New Haven. See College. Each townfhip is a corporation, invefted with fufficient powers for its own regulation. The number of reprefentatives is fometimes 180; but more commonly about 160. The principal rivers in this ftate are Connecticut, Houfatonick, and the Thames, with their branches; which fee refpectively. The whole fea-coaft is indented with harbours, which are fafe and commodious; but the principal are thofe of New Haven and New London. This ftate fends feven reprefentatives to Congrefs. The inhabitants are almoft wholly of Englifh defcent, befides whom they have no Dutch, French, or Germans, and few Scots or Irifh. The original ftock, from which have fprung all the prefent occupiers of Connecticut, and the nnmerous emigrants from hence to every part of the United States, confifted of 3000 perfons, who fettled in the towns of Hartford, New Haven, Windfor, Guilford, Milford, and Weathersfield, about the years 1635 and 1636. In 1756 the population amounted to 130,611 perfons; in 1774 to 197,856; in 1782 to 202,877 whites, and 6273 Indians and negroes; in 1790 to 237,946, of whom 2764 were flaves; and by the cenfus in 1800, to 251,002, of whom 121,113 were free white males, 123,528 free white females, 5300 free perfons, except Indians, not taxed, and 951 flaves.

Connecticut, notwithftanding the changes of temperature to which it is fubject, is very healthful. The furface of the country exhibits mountains, hills, and vallies; and though it is very well watered, fome fmall parts of it are barren. Its chief productions are Indian corn, rye, wheat, oats, barley, and buck-wheat; flax in abundance, fome hemp, potatoes of feveral kinds, pumpkins, turnips, peas, beans, &c., together with fruits of all kinds which are common to the climate. The foil is well adapted for pafturage and mowing, fo that the farmers are enabled to feed a great number of neat cattle and horfes. This ftate carries on its chief trade with the Weft India iflands, in veffels from 60 to 140 tons. Its exports confift of horfes, mules, oxen, oak-ftaves, hoops, pine-boards, oak-planks, beans, Indian corn, fifh, beef, pork, &c.; and a large number of coafting veffels is employed in carrying the produce of Connecticut to the other ftates; from which they receive in return, rice, indigo, and money. But as New York is nearer, much of its produce, particularly that of the weftern parts, is carried thither; fuch as pot and pearl-afhes, flax-feed, beef, pork, cheefe, and butter, in large quantities. The value of the whole exported produce and commodities from this ftate, before the year 1774, was then eftimated at about 200,000*l.* lawful money, annually. In the year ending September 30, 1791, the amount of foreign exports was 710,340 dollars, befides articles carried to different parts of the United States to a great amount; in 1792 it was 749,925 dollars; in 1793, 770,239 dollars; in 1794, 806,746 dollars; and in 1804, 1,516,110 dollars, comprehending 1,486,882 domeftic and 29,228 foreign. This ftate owns and employs in the foreign and coafting trade more than 32,897 tons of fhipping. The farmers in Connecticut are generally clothed in plain, decent, homefpun cloth; and both their linens and woollens are domeftic manufactures, ftrong though coarfe; and many of their cloths are fine and handfome. This ftate has large orchards of mulberry trees, and filkworms have been reared with fuch fuccefs, that they promife a fupply of filk, not only to the inhabitants, but alfo for exportation. New Haven has linen and button manufactories; they have eftablifhed a woollen manufactory at Hartford, befides glafs works, a fnuff and powder mill, iron works, and a flitting mill. Iron works are alfo eftablifhed at Salifbury and Norwich, and in other parts of the ftate. Stafford has a furnace, at which are made large quantities of hollow ware, and other ironmongery, fufficient for the fupply of the whole ftate. Paper is manufactured at Norwich, Hartford, New Haven, and in Litchfield county. Ironmongery, hats, candles, leather, fhoes and boots are manufactured in this ftate.

Connecticut is laid out in fmall farms, from 50 to 300 and 400 acres each, which are held by the farmers in fee-fimple, and are generally well cultivated. The ftate is chequered with innumerable roads or highways, croffing each other in every direction; nor can a traveller pafs more than two or three miles, even in the moft unfettled parts, without finding a houfe or cottage, and a farm in fuch a condition of improvement as to afford neceffaries for the fupport of a family. The whole ftate, it is faid, refembles a well-cultivated garden, which by induftry produces the neceffaries and conveniences of life in great plenty, without its luxuries. To the agricultural mode of life prevailing in this ftate, which is favourable to temperance and health, and to the eafe with which a comfortable fubfiftence may be obtained, fo encouraging to early marriage, and alfo to the religious liberty that is maintained, we may afcribe the rapid advance of this ftate in population. Luxury has not yet found its way into this ftate, nor contaminated the manners of the people. The common mode of travelling, both for men and women, is on horfeback; in this ftate there are few coaches, but many chaifes and whifkeys. In the winter is ufed the fleigh, which is a vehicle drawn by two horfes, and carrying fix perfons in its box, which hangs on four pofts ftanding on two fteel fliders, or large fkaites. Dancing, fifhing, hunting, fkaiting, and riding in fleighs on the ice, are the chief amufements in this ftate. The men, in general, throughout this province, are tall, ftout, and robuft; the women are fair, handfome, and genteel; ftrictly virtuous, and well-informed. We may obferve, in general, that there is no part of the world in which the education of all ranks of people is more an object of attention than in this ftate. Almoft every town is divided into diftricts, each of which has a public fchool kept in it during a great part of the year. Somewhat more than one-third of the money arifing from a tax on the polls and rateable eftate of the inhabitants, is appropriated to the fupport of fchools in the feveral towns, for the education of children and youth. The law enjoins that a grammar-fchool fhall be kept in every county-town throughout the ftate. A certain gravity and ferioufnefs of deportment, accompanied with a degree of fhynefs and referve, appear in the firft intercourfe of the inhabitants with ftrangers; but after a fhort acquaintance, they become very familiar and inquifitive. Their hofpitality is exemplary and laudable. In their character there is a certain trait, which renders them lefs amiable; and that is their fondnefs for fettling even their trivial difputes "according to law;" and the prevalence of this litigious fpirit affords employment for a numerous body of lawyers. This party fpirit is, however, fubfiding; their public proceedings are conducted with calmnefs and candour; and as they are well informed

with

with regard to their rights, and judicious in the methods they adopt for fecuring them, the ftate enjoys a great fhare of political tranquillity. Another circumftance, favourable to internal peace and harmony, is the abatement of that rage for theological difputation which formerly prevailed. The religion, or at leaft the church government and difcipline, of this ftate, is fuch as feems to be peculiarly adapted to a republican government. Each church has a feparate jurifdiction, and claims authority to chufe its own minifter, to exercife judgment, and to enjoy religious inftitucions, within itfelf. The churches, however, amounting, fays Morfe, to about 200, of the congregational denomination, in which are about 20,000 communicants and 170 paftors, are not ftrictly independant of each other; they affociate for mutual convenience and benefit. The affociations have power to licence candidates for the miniftry, to confult for the general welfare, and to recommend the adoption of meafures by the churches, but have no authority to enforce them. Of thefe affociations there are eleven in the ftate, and they meet twice in a year. All thefe are combined in one general affociation formed in 1709, confifting of delegates from the feveral affociations which meet annually. All forms of religion that are confiftent with the peace of fociety are tolerated in Connecticut; and a fpirit of liberality and catholicifm is faid to be increafing. In this ftate there are few religious fects; the majority of the people confift of congregationalifts. Befides thefe there are epifcopalians and baptifts; the epifcopalian churches are refpectable, and are under the fuperintendance of a bifhop.

The conftitution of Connecticut is founded on its charter, which was granted by Charles II. in 1662, and on a law of the ftate. Agreeably to this charter, the fupreme legiflative authority of the ftate is vefted in a governor, deputy-governor, 12 affiftants or counfellors, and the reprefentatives of the people, ftyled the General Affembly. The governor, deputy-governor, and affiftants, are annually chofen by the freemen in the month of May. The reprefentatives (whofe number is not to exceed two from each town) are chofen by the freemen twice a year, to attend the two annual feffions, on the fecond Tuefday of May and October. The general affembly is divided into two branches, called the upper and lower houfes: the former is compofed of the governor, deputy-governor, and affiftants; and the latter confifts of the reprefentatives of the people. No law can pafs without the concurrence of both houfes. They have feveral law courts, of which the fuperior confifts of five judges. The general affembly only have power to grant pardons and reprieves; to iffue commiffions of bankruptcy; or to protect the perfons and eftates of unfortunate debtors. The feudal fyftem of defcents was never adopted in this ftate: the whole real eftate of inteftates is divided equally among the children, males and females; and all eftates given in tail muft be given to fome perfon then in being, or to their immediate iffue, and fhall become fee fimple eftates to the iffue of the firft donee in tail. The widow of an inteftate is entitled to a third part of the perfonal eftate for ever, and to her dower, or third part of the houfes and lands belonging to the inteftate at the time of his death, during her life. Attornies are admitted and qualified by the county courts. Before their admiffion to the bar, they muft ftudy two years with a practifing attorney in the ftate, if they have had a college education, and three years if they have not: their morals muft be unblemifhed, and they muft be examined by the attornies of the court of the county where they are admitted, and be by them recommended to the court. There are, upon an average, about 15 attornies to each county, and 120 in the whole ftate.

The American revolution, which fo effentially affected the government of moft of the colonies, produced no very perceptible alteration in the government of Connecticut. While under the jurifdiction of Great Britain, they elected their own governors, and all fubordinate civil officers, and made their own laws, in the fame manner, and with as little controul, as they now do.

The prefent territory of Connecticut, at the time of the firft arrival of the Englifh, was poffeffed by the Pequot, the Mohegan, Podunk, and many other fmaller tribes of Indians. The Pequots were numerous and warlike; and their country extended along the fea-coaft from Paukatuck to Connecticut river: and about the year 1630, this powerful tribe extended its conquefts over a confiderable part of Connecticut, Long Ifland, and a part of Narraganfet, the ancient Indian name of New London; the feat of the fovereign of the whole nation was Pequot. The Mohegans were numerous, and their territory extenfive; it comprehended moft of New London county, almoft the whole county of Windham, and a part of the counties of Tolland and Hartford. The Podunks inhabited Eaft Hartford, and the circumjacent country. In 1774 there remained of the defcendants of the ancient nations only 1363 perfons; moft of whom lived at Mohegan, between Norwich and New London. From the rapid decreafe of the Indians, it is concluded that their number in this ftate does not now exceed 400.

The firft grant of Connecticut was made by the Plymouth council to the earl of Warwick in 1630; and, in the following year, he affigned this grant to lord Say or Seal, lord Brook, and others. In 1633, an attempt was made on the Englifh fettlements by a number of Indian traders, who fettled at Windfor. In the fame year, a little before the arrival of the Englifh, fome Dutch traders fettled at Hartford, the remains of whofe fettlements are ftill vifible on the banks of Connecticut river. In 1634, lord Say and Seal, &c. fent over a fmall number of perfons, who built a fort at Saybrook, and made a treaty with the Pequot Indians for the lands on Connecticut river. A number of adventurers afterwards fettled in this province; and in 1644, they purchafed of the agent of lord Say and Seal, and lord Brook, their right in the colony of Connecticut for 1600*l.* Connecticut and New Haven continued two diftinct governments for many years; they extended their territories and rapidly increafed. At length, John Winthrop, efq., who had been chofen governor of Connecticut, was employed to folicit a charter, which was obtained from Charles II. in 1662. Some jealoufy fubfifted for a little while between this colony and that of New Haven; but in 1665 thefe two colonies formed an union, which has ever fince amicably fubfifted; and the charter of king Charles continues to be the bafis of their government. At the clofe of the revolution, Connecticut ceded all her charter claims weft of Pennfylvania to Congrefs, referving only a tract of land as wide as the ftate of Connecticut, and 120 miles in length; bounded eaft on the weftern line of Pennfylvania, and north by lake Erie, containing nearly four millions of acres. The ceffion was accepted by Congrefs, which eftablifhes to Connecticut her title to thefe lands. Morfe's Geog.

Connecticut, the moft confiderable river in the eaftern part of the United States, which rifes in the highlands which feparate the ftates of Vermont and New Hampfhire from Lower Canada. This river has been furveyed about 25 miles beyond the 45th degree of latitude to the head fpring of its northern branch; from which to its mouth it is upwards of 300 miles, purfuing its courfe through a fettled country, and having on its banks a great number of the moft flourifhing and pleafant towns in the United States.

It

It is from 80 to 100 rods wide, at the diſtance of 130 miles from its mouth. Its courſe between Vermont and New Hampſhire is generally S.S.W., and alſo through Maſſachuſetts, and part of Connecticut, until it reaches the city of Middleton; after which it runs in a S.S.E. direction to its mouth, fertilizing the lands through which it flows, though its navigation is much obſtructed by a great variety of falls. At its mouth alſo is a bar of ſand, which very much impedes its navigation; however this river is navigable to Hartford city, upwards of 50 miles from its mouth; and the produce of the country for 200 miles above it, is brought thither in boats, which are flat-bottomed, long and narrow, and ſo light as to be portable in carts. Before the conſtruction of locks and canals on this river, they were taken out at three different carrying places, all of which made 15 miles; but theſe obſtructions will, probably, be ſoon wholly removed. Sturgeon, ſalmon, and ſhad, are caught in plenty in their ſeaſon, from the mouth of the river upwards, excepting ſturgeon, which do not aſcend the upper falls; beſides a variety of ſmall fiſh, ſuch as pike, carp, perch, &c.

Connecticut is alſo the name of a ſtream in Long Iſland, in the ſtate of New York, which falls into a bay at the S. ſide of the iſland.

Connecting *Oil*. See Oil.

CONNECTION, or Connexion, a relation whereby one thing adheres to, or depends on another.

Euclid's propoſitions have ſuch a connection among themſelves, that the latter cannot ſubſiſt without the former.

Connection, or *continuity*, in the *Drama*, conſiſts in the joining of the ſeveral ſcenes together.

When the ſcenes of an act ſucceed one another immediately, and are ſo joined as that the ſtage is never left empty, the connection is ſaid to be obſerved.

CONNECTIVES, in *Grammar*, one of the four ſpecies under which, according to Mr. Harris, all words may be included. They are of two kinds, and as they connect ſentences or words, are called by the different names of Conjunctions and Prepositions. Hermes, p. 31, and 237.

CONNELSVILLE, in *Geography*, a town of America, in the county of Waſhington and ſtate of Pennſylvania, pleaſantly ſituated on the Yohiogany, ſettled about ten years, and containing about 80 houſes and 400 inhabitants.

CONNER, Ale. See Ale-*Conner*.

CONNERE', in *Geography*, a town of France, in the department of the Sarthe; 4 leagues E.N.E. of Le Mans.

CONNETABLE *ou Conneſtable de France*, conſtable of France. In the origin of this title, the connetable, who ſucceeded the grand ſénéchal of France, was conſidered as one of the firſt domeſtics of the French kings, in ſhort as maſter of the horſe. Afterwards he became the firſt officer of the crown, chief and conductor of the armies, firſt ſerjeant of the king for executing his orders and commands; for laying hands on the grandees, impriſoning them, and repreſenting them in juſtice. This employment became by degrees ſo eminent, that the marſhals of France were only lieutenants. This office was aboliſhed in the reign of Louis XIII. Anne de Montmorency, who loſt his head on a ſcaffold, was the laſt who filled it.

CONNETABLIE *de France*. This was a particular corps under the orders of the ſeigniors marſhals of France, and conſiſted of 48 guards on horſeback.

CONNIE, in *Geography*, a ſmall river of France, in the department of Eure and Loir, remarkable for being ſo completely dried up in winter, that the fiſh are obliged to hide themſelves in the cavities where there is a little water remaining; in ſummer, on the contrary, its ſtream is always copious.

CONNIVENTES Valvulæ, in *Anatomy*, are folds of the internal, or villous coat, of the ſmall inteſtine. See Intestine.

CONNOIE Bay, in *Geography*, a bay on the S. coaſt of Newfoundland; 50 miles E. of Cape Ray.

CONNOISSEUR, a French term, of late uſed in Engliſh: it literally denotes a perſon well verſed in any thing; being formed of the verb *connoitre, to know, underſtand.* Hence it comes to be uſed in our language for a critic, or perſon who is a thorough judge, or maſter in any way; particularly in matters of painting and ſculpture.

CONNON, in *Geography*, a river of France, called alſo *Aa*, which runs into the Beuvron, ſix miles S.E. of Beuvron.

CONNOR, Bernard, *in Biography*, a native of Dublin, in Ireland, where he was born in 1666, received his education at an academy in France, and at a proper age was ſent to Montpellier, where he was made doctor in medicine in the year 1690. He was ſoon after engaged to ſuperintend the education of two young Poliſh noblemen, with whom, after reſiding ſome time at Paris, he travelled over Italy, and the iſland of Sicily, and then went to Poland, where he was appointed phyſician to the king. This did not, however, detain him long in Poland, as we find him practiſing in London, and made fellow of the College of Phyſicians, and of the Royal Society, in the year 1696. He had publiſhed, the preceding year, "Diſſertationes Medico-Phyſicæ de Antris lethiferis, de Montis Veſuvii incendio, de ſtupendo oſſium coalitu. Oxoni, 8vo." He had ſeen, while in Italy, an eruption of Mount Veſuvius, and had viſited the Grotto del Cano, of both which he gives deſcriptions, and of a ſkeleton, in which the vertebræ, ribs, and oſſa innominata, were all firmly united. "Tentamen Epiſtolare de Secretione Animali," in which he attempts to account for the difference in the colour, taſte, and other ſenſible qualities of the humours, ſecreted from the blood. "Evangelium Medici, ſeu Medicina Myſtica de ſuſpenſis Naturæ legibus, Lond. 1697, 8vo.," and in 1698, in the latter part of which year he died, "A compendious Plan of the Body of Phyſic," apparently a text-book, from which he had given, or had propoſed giving, a courſe of lectures. To this work he added, a ſhort, but entertaining, account of Poland. Haller. Bib. Med. Eloy. Dict. Hiſt.

Connor, in *Geography*, a village in the county of Antrim, Ireland, that gives name to a biſhopric which was united to that of Down in 1454, and which extends over moſt of the county of Antrim. It contains 395,000 Iriſh acres, which are divided into 76 pariſhes; but from unions, there are only 40 benefices and 43 churches. The church of Liſburn was, by letters patent of James I., made the cathedral; that of Connor is in ruins. Connor is 97 Iriſh miles N. from Dublin, and 17 N. from Belfaſt. Beaufort.

Connor, a river of the iſland of Jamaica, which runs into the ſea, between Rocky point, and port Morant.

CONNTHAL. See Caverium.

CONO, in *Commerce*, a Florence wine meaſure of 10 barrels, each barrel being about 12 gallons.

CONOBEA, in *Botany*, Aubl. See Conopea.

CONOCARPODENDRON. See Protea and Pinus.

CONOCARPUS, (from κωνος, a *cone*, and καρπος, *fruit*) Linn. Gen. 236. Schreb. 321. Willd. 366. Lam. Ill. 353. Gært. 1052. Juſſ. 75. Conocarpe. Enc. Claſs and order, *pentandria*.

pentandria monogymia, Nat. Ord. *Aggregatæ*, Linn. *Elæagni*, Juff.

Gen Ch. *Cal.* one-leafed, fuperior, very fmall, five-cleft; fegments acute, erect. *Cor.* none (or five-petalled?) *Stam.* Filaments five or ten, awl-fhaped, erect; anthers globular. *Pift.* Germ inferior, compreffed, obtufe; ftyle fimple, fhort; ftigma obtufe. *Peric.* none; Linn. Schreb. Samara; Gært. Capfule very fmall; rounded, compreffed, convex and gibbous on the outfide, concave within, with a membranous margin on each fide, not dehifcent, one-celled. *Seed* folitary, inverfely egg-fhaped. Lam.

Eff. Ch. Corolla five-petalled or none. Seeds naked, folitary, inferior. Flowers aggregate. Willd.

Flowers aggregate. Calyx fuperior, five-cleft. Corolla none. Capfules many, one-feeded, affixed to a common axis, imbricated into a cone. Lam.

Sp. 1. C. *erecta*. Linn. Sp. Pl. 1. Mart. 1. Lam. 1. Willd. 1. Jacq. Amer. 78. tab. 22. fig. 1. Lam. Ill. tab. 126. fig. 1. Gært. tab. 177. (C. mangharia; Cates. Car. 2. tab. 33. C. foliis oblongis, floribus in caput conicum. Brown. Jam. 159. Alnus; Pluk. Alm. 18. tab. 240. fig. 3. Alni fructu laurifolia arbor; Sloan. Jam. 135. hift. 2, tab. 161. fig. 2. Rudbeckia laurifolia maritima; Amm. herb. 581. Innominata; Plum. MSS. Burm. Amer. tab. 144. fig. 2.) "Erect; leaves lanceolate." Linn. "Erect; leaves lanceolate; cones panicled, pedicelled." Lam. A tree, about thirty feet high. Younger branches angular. *Leaves* alternate from two inches and a half, to three inches long, one inch broad, acute, quite entire, fmooth, greafy to the touch, on fhort petioles, which have frequently two lateral glands near the bafe. *Flowers* greenifh yellow, fmall, in globular heads, on fhortifh pedicels; common peduncles longer, axillary and terminal, branching into racemes which altogether form a kind of panicle. *Capfules* umbilicated, pubefcent at their fummit, clofely imbricated into roundifh cones, about the fize of a pea. Jacquin attributes to his plant ten ftamens, twice as long as the calyx; but other fpecimens have only five, about the length of the calyx. They are probably different fpecies. A native of the Weft Indies, and the tropical coafts of America; where it is called button wood or button tree, by the Englifh, and mangle faragoza by the Spaniards. It is ufed for fire wood, but is of little value for any other purpofe. 2. C. *procumbens*. Linn. Sp. Pl. 2. Mart. 2. Lam. 2. Willd. 2. Jacq. Amer. 79. tab. 52. fig. 2. Pict. 42. tab. 260. fig. 22. (Rudbeckia fupina; Amm. herb. 581.) "Procumbent; leaves inverfely egg-fhapped." Linn. "Procumbent; leaves inverfely egg-fhaped; cones fomewhat racemed, feffile." Lam. A much branched fhrub, almoft entirely procumbent, following the irregularities of the rocks among which it grows. *Leaves* alternate, an inch or an inch and a half long, entire, fhining, on fhort petioles; petioles with an oblong gland on the edge near the bafe, on each fide. *Flowers* pentandrous and hexandrous, refembling thofe of the preceding fpecies, but fmaller, and producing cones of a loofer texture. A native of the ifland of Cuba. 3. C. *racemofa*. Linn. Syft. Nat. 3. Mart. 3. Willd. 3. Jacq. Amer. 80. tab. 53. Pict. 42. tab. 79. Brown. Jam. 159. n. 1. "Leaves lanceolate; egg-fhaped, fomewhat obtufe; fruit not aggregate." A lofty branching tree, fometimes dividing into three or four trunks clofe to the ground. Younger branches oppofite, red, fhining. *Leaves* oppofite, about three inches long, petioled, coriaceous, thickifh, fhining, greafy to the touch, deep green; petiole with two glands at the top. *Flowers* fmall, feffile, remote, in terminal panicles, compofed generally of three fimple, or fomewhat branched, loofe racemes, many of them abortive; petals five; ftamens ten, alternately fhorter. *Fruit* feparate; pericarp a coriaceous capfule, containing one or two feeds. *Seeds* compofed of two greenifh lamellæ, wrapped up into a round body, and involved in a very thin membrane. The lamellæ in the bafe of the pericarp become a round obtufe fhining body, forming the axis of the feed, deftined to put forth the roots; for when the capfule falls to the ground, it penetrates the crowned apex, and when the fibres take poffeffion of the foil, it conftitutes the rudiment of the future trunk; then the lamellæ increafing in bulk, burft the capfule, and become the radical leaves. A native of the Caribbee iflands, and the neighbouring continent, on fandy and muddy fhores; called by the Englifh white mangrove, and by the Spaniards mangle bobo, or foolifh mangle.

Obf. Juffieu, in his Genera Plantarum, queftions whether this fpecies be really a conocarpus. Gærtner obferves, that Juffieu's doubt is well founded. La Marck, accordingly, in the Encyclopedie Methodique, excludes it from the genus, promifing to defcribe it under manglier, one of the French names for the rhizophora of Linnæus. But Defrouffeaux, who, on the feceffion of La Marck, afterwards wrote that article, inftead of attending to his predeceffor's reference, and mifled by an ambiguity in the popular ufe of the French word, confiders it as fynonymous with conocarpus, and actually gives over again the character of that genus, with the defcription of La Marck's two acknowledged fpecies; entirely omitting the conocarpus racemofa of Linnæus, and not making any farther reference concerning it. This plant feems to be fui generis; for, although the account of the manner in which its feed germinates, which we have copied from profeffor Martyn's Miller, is obfcurely expreffed; it evidently belongs to Savigny's new natural order paleturier, publifhed in the Encyclopedie Methodique; but cannot be referred either to bruguiera or to rhizophora, the only two genera of that order, and both included in the rhizophora of Linnæus. See PALETURIER, BRUGUIERA, and RHIZOPHORA. La Marck's effential character of conocarpus is drawn up with a view to the exclufion of this fpecies, and Willdenow's to its admiffion; the latter, however, has very imperfectly fucceeded, for his defcription of C. racemofa, which fays exprefsly *flores remoti*, is obvioufly at variance with *flores aggregati* in his effential character.

CONOID, CONOIDES, in *Geometry*, a folid body, refembling a cone, except in this, that the flant fides from the bafe to the vertex are not ftraight lines, as in the cone, but curved.

The conoid is produced by the entire circumvolution of a conic fection around its axis; and according to the denomination of the fection from which it is generated, it is differently denominated: if, *v. gr.* the folid be produced by the motion of a parabola, it is called a *parabolic conoid*, or *paraboloid;* if by that of an hyperbola, an *hyperbolic conoid*, or *hyperboloid;* and an *elliptic conoid*, or a *fpheroid*, when produced by the rotation of an ellipfis round one of its axes. See each of thefe articles; and for determining their fuperficies and folidity; fee SUPERFICIES and SOLIDITY.

If a conchoid, *i.e.* any folid formed by the revolution of a conic fection about its axis, fuch as a fpheroid, paraboloid, or hyperboloid, be cut by a plane in any pofition; the fection will be fome conic fection, and all the parallel fections will be like and fimilar figures.

Let A B C (*Plate* I. *Conics*, *fig.* 10.) be the generating fection, or a fection of the given folid through its axis B D, and perpendicular to the propofed fection A F C,

 their

their common interfection being A C; let G H be any other line meeting the generating fection in G and H, and interfecting A C in E; and erect E F perpendicular to the plane A B C, and meeting the propofed plane in F. Then, if A C and G H be conceived to move continually parallel to themfelves, will the rectangle $AE \times EC$ be to the rectangle $GE \times EH$, always in a conftant ratio; but if G H be perpendicular to B D, the points G, F, H will be in the circumference of a circle whofe diameter is G H, fo that $GE \times EH$ will be $= EF^2$; confequently, $AE \times EC$ will be to EF^2, always in a conftant ratio; and therefore A F C is a conic fection, and every fection parallel to A F C will be of the fame kind with, and fimilar to it. Hence.

1. The above conftant ratio, which $AE \times EC$ has to EF^2, is that of KI^2 to IN^2, the fquares of the diameters of the generating fection refpectively parallel to A C, G H; that is, the ratio of the fquare of the diameter parallel to the fection to the fquare of the revolving axis of the generating plane. This will appear, by conceiving A C and G H to be moved into the pofitions K L, M N, interfecting in I, the centre of the generating fection.

2. It appears alfo that the axis A C and 2 E F of the fection, fuppofing E now to be the middle of A C, will be to each other, as the diameter K L is to the diameter M N of the generating fection.

3. If the fection of the folid return into itfelf, it will evidently be an ellipfe. This always happens in the fpheroid, except when it is perpendicular to the axis; which pofition is alfo to be excepted in the other folids, the fection being then always a circle; in the paraboloid, the fection is always an ellipfe, excepting when it is parallel to the axis; and in the hyperboloid, the fection is always an ellipfe, when its axis makes with the axis of the folid an angle greater than that which the faid axis of the folid makes with the afymptote of the generating hyperbola: the fection being an hyperbola in all other cafes, except when thofe angles are equal, and then it is a parabola.

4. If the fection be parallel to the fixed axis B D, it will be of the fame kind with, and fimilar to, the generating plane A B C; that is, the fection parallel to the axis, in a fpheroid, is an ellipfe fimilar to the generating ellipfe; in the paraboloid, the fection is a parabola fimilar to the generating parabola; and in an hyperboloid, it is an hyperbola fimilar to the generating hyperbola of the folid.

5. In the fpheroid, the fection through the axis is the greateft of the parallel fections; in the hyperboloid, it is the leaft; and in the paraboloid, all the fections parallel to the axis are equal to one another. For the axis is the greateft parallel chord line in the ellipfe, but the leaft in the oppofite hyperbolas, and all the diameters are equal in a parabola.

6. If the extremities of the diameters, K L, M N, be joined by the line K N, and A O be drawn parallel to K N, and meeting G E H in O, E being the middle of A C, or AE the femi-axis, and G H parallel to M N: then will E O be equal to E F, the other femi-axis of the fection. For, by fimilar triangles, K I : I N :: A E : E O. Or, upon G H as a diameter defcribe a circle meeting E Q, perpendicular to G H, in Q; and E Q is evidently equal to the femi-diameter E F.

7. If A P be drawn parallel to the axis B D of the folid, and meet the perpendicular G H in P, it will be evident that, in the fpheroid, the femi-axis E F = E O will be greater than E P; but in the hyperboloid, the femi-axis E F = E O, of the elliptic fection, will be lefs than E P, and in the paraboloid, E F = E O is always equal to E P.

Scholium. The analogy of the fections of an hyperboloid to thofe of the cone, is very remarkable; all the three conic fections being formed by cutting an hyperboloid in the fame pofitions as the cone is cut. Thus, let an hyperbola and its afymptote be revolved together about the tranfverfe axis, the former defcribing an hyperboloid, and the latter a cone circumfcribing it; then let them be fuppofed to be both cut by a plane in any pofition, and the two fections will be like, fimilar, and concentric figures: that is, if the plane cut both the fides of each, the fections will be concentric, fimilar ellipfes; if the cutting plane be parallel to the afymptote, or to the fide of the cone, the fections will be parabolas; and in all other pofitions the fections will be fimilar and concentric hyperbolas. That the fections are like figures appears from the foregoing corollaries. That they are concentric will be evident, when we confider that Cc is $= Aa$, producing A C both ways to meet the afymptotes in a and c. And that they are fimilar or have their tranfverfe and conjugate axes proportional to each other, will appear thus:—Produce G H both ways to meet the afymptotes in g and h; and on the diameters G H, gh, defcribe the femi-circles G Q H, g R h, meeting E Q R, drawn perpendicular to G H, in Q and R; E Q and E R being then evidently the femi-conjugate axes, and E C, E c, the femi-tranfverfe axes of the fections. Now, if G H and A C be conceived to move parallel to themfelves, $AE \times EC$ or CE^2 will be to $GE \times EH$ or EQ^2 in a conftant ratio, or C E to E Q will be a conftant ratio; and fince c E is as Eg, and a E as Eh, $aE \times Ec$ or cE^2 will be to $gE \times Eh$ or ER^2, in a conftant ratio; but at an infinite diftance from the vertex, C and c coincide, or E C $= Ec$, as alfo E G $= Eg$; confequently E Q = E R, and then C E to E Q will be $= c$E to E R; but as thefe ratios are conftant, if they be equal to each other in one place, they muft be always fo; and confequently CE : cE :: QE : E R. This analogy of the fections will not feem ftrange, when we confider that a cone is a fpecies of the hyperboloid; or a triangle a fpecies of the hyperbola, whofe axes are infinitely little. See Hutton's Menfuration, part iii. § 4.

The famous folid of the leaft refiftance, fir Ifaac Newton, M. Fatio, and the Marquis De l'Hopital, have demonftrated to be a conoid.

CONON, in *Biography*, the fon of Timotheus, and a celebrated general of Athens. He was one of thofe who fucceeded Alcibiades, after that celebrated commander had fallen into difgrace with his countrymen, and diftinguifhed himfelf in the Peloponnefian war. See Peloponnesus. In an engagement with Callicratidas, the Spartan general, he was defeated; but he afterwards obtained a complete victory, when his antagonift loft his life. About four hundred years before the Chriftian æra, Conon and Philocles with their fleets were attacked and defeated by Lyfander, the leader of the Spartans. So complete was this victory that Conon barely efcaped with his life, and fought refuge in the ifle of Cyprus, while Athens itfelf was reduced to a ftate of fervitude, and its conftitution deftroyed. In Cyprus, Conon ufed every means in his power to refcue his country from the ftate into which fhe had fallen; he applied to Artaxerxes, the Perfian monarch, for aid againft the Spartans; obtained his defires, and was appointed admiral of a large Perfian fleet, which Artaxerxes fent to fuccour the Athenians and other Greek ftates. He had not long been raifed to this honourable fituation, when the failors mutinied for want of

pay: the general haſtened to the court of Perſia, but was not ſuffered to approach the ſovereign, unleſs he ſubmitted to a ſpecies of adoration very unworthy of a noble and dignified mind; this he refuſed, and though denied an audience with his majeſty, his remonſtrances produced the deſired effect, and he was allowed to nominate his own treaſurers to the fleet. Conon reſumed his command, attacked the Spartan admiral Piſander, whom he killed with his own hand; the Spartans were defeated with the loſs of fifty ſhips, and the reſt were glad to ſeek ſhelter in one of their own ports. Conon, having thus obtained the dominion of the ſeas, returned to Attica with plans for reſtoring his country to its former honours. Scarcely had he begun his operations when he was accuſed of a miſapplication of the royal money, and was apprehended for that and other crimes, for which there appears to have been little or no foundation. He did not, however, ſurvive the accuſation; but the manner and particular time of his death are not known, though it was ſuſpected that he was baſely murdered in priſon. Plutarch. Univer. Hiſt.

Conon, a mathematician of conſiderable celebrity at Samos, flouriſhed about three centuries, and died about the year 223, B.C. He was a contemporary and friend of Archimedes, to whom he communicated his writings, and ſent ſome problems, which Archimedes received with approbation, wiſhing them to be publiſhed during the lifetime of their author, in order that from him they might receive a juſt demonſtration. Conon made many obſervations on the eclipſes of the ſun and moon, and gave the name to the conſtellation called Coma-Berenices. His death happened during the period when Archimedes flouriſhed, whoſe eulogium for his friend has come down to the preſent times: ſpeaking of his great genius, he aſks: "How many theorems in geometry, which to others ſeemed impoſſible, would, had Conon lived, have been brought to perfection?" Conon invented a ſpiral, the properties of which having been demonſtrated by Archimedes, it has obtained the name of Archimedes's ſpiral. He is referred to with reſpect in the writings of Propertius and Virgil. Hutton. Moreri. See Conic *Sections*.

Conon, Pope, was by birth a Thracian, and educated in Sicily; from this iſland he went to Rome, where he was ordained preſbyter. Upon the death of pope John V., the diſputes reſpecting a ſucceſſor ran ſo high, that for three months the papacy was vacant: the clergy eſpouſing the intereſts of one candidate, and the army declaring for another. At length Conon was fixed upon, who proved acceptable to all thoſe in whom the appointment was veſted. He aſcended the pontifical throne in the year 686, and died in about a year, but left behind him a character rarely attained by thoſe who have filled that high ſtation. His piety, learning, integrity, and ſuavity of manners, were exemplary, and juſtly celebrated. There was alſo a cardinal of this name, a native of Germany, and advanced to his high rank in the church by pope Paſcal II. He was the avowed and intrepid defender of the high claims of the Roman ſee, and, on this account, ſelected as a proper perſon to preſide at the council of Jeruſalem, in which Henry V., emperor of Germany, was excommunicated, for not ſubmitting to the pope's aſſumed right to the inveſtiture of biſhops and abbots. He was afterwards legate at the council of Soiſſons, in the year 1121, when the treatiſe of the celebrated Adelard, on the Unity of God, was condemned to be burnt. Conon, it is believed, might have been elected to the popedom on the death of Gelaſius, an honour which he declined for motives not now known. His own vote and intereſt he gave to Guy, archbiſhop of Vienne, who was elected pope, and aſſumed the name Callixtus II. Moreri.

CONONIS Aræ, in *Ancient Geography*, a place of Ethiopia, upon the Arabic gulf, according to Strabo; near port Malin.

CONONITES, in *Eccleſiaſtical Hiſtory*, the followers of Conon of Alexandria in the ſixth century, reſembling in their opinions the Severians, Theodosians, and Tritheists.

CONOPA, in *Ancient Geography*, a lake of Greece, in Etolia, afterwards called *Cygnæa*.—Alſo, a town of Greece, in Acarnania, according to Steph. Byz. and Polybius. Strabo ſays, that the town of Arſinoe, which he places in Etolia, had in former times been called *Conopa*.

CONOPEA, in *Botany*, (κωνωπεῖον, a veil or net to keep off gnats), Mart. (Conobea; Willd. Juſſ. 97. Aubl. Guian. 2. 639. tab. 257.) Claſs and order, *didynamia angioſpermia*. Nat. Ord. *Lyſimachiæ*, Juſſ.

Gen. Ch. *Cal.* perianth one-leafed, five-angled, permanent, five-cleft; ſegments ſomewhat egg-ſhaped, acuminate, erect. *Cor.* one-petalled, ringent; tube oblong, gradually widening; border two-lipped; upper lip erect, emarginate; lower lip trifid, the middle ſegment larger, concave. *Stam.* filaments four, attached, at the bottom, to the tube of the corolla; anthers arrow-ſhaped. *Piſt.* Germ roundiſh; ſtyle filiform, hairy; ſtigma two-lobed. *Peric.* Capſule roundiſh, one-celled, four-valved. *Seeds* numerous, ſmall, fixed to a roundiſh receptacle.

Eſſ. Ch. Calyx five-cleft. Corolla two-lipped. Capſule one-celled, four-valved, with many ſeeds.

Species. C. *aquatica*, a creeping plant, growing naturally near water, ſpreading over its ſurface, and the graſs near the banks, throwing out ſmall fibrous roots from the joints. *Stems* and branches ſquare, each angle bordered by a very ſharp ring. *Leaves* at each joint, oppoſite, embracing the ſtem, kidney-ſhaped, plaited at the nerves, undulated at the edge. *Flowers* blue, axillary, either ſolitary or in pairs; peduncle an inch long, ſlender; calyx with two long, narrow, pointed leaflets at the baſe. *Capſule* with four grooves, partly encloſed by the calyx. A native of Guiana.

CONOPEUM, in *Antiquity*, a ſort of canopy of network, which hung about beds, and was deſigned to keep away gnats or flies; it comes from κωνωψ, *a fly*. A piece of furniture of this kind is now uſed in the Eaſt; and Mr. Harmer (Obſ. on Scripture, vol. iv. p. 405.) ſuggeſts, that if it obtained there at ſo early a period as the time of Saul, it may ſerve to illuſtrate a paſſage of Scripture, *viz.* 1 Sam. xix. 12—17. This writer ſuppoſes that the word tranſlated "a pillow of goats-hair," meant a conopeum or guard againſt gnats. It is in one place tranſlated a "thick cloth," and in another a "ſieve;" and Harmer obſerves, that a cloth of a nature fit to be uſed as a ſieve, is juſt ſuch a thing as a conopeum, or fine net-work or gauze-like cloth. It appeared to be ſomething "relating to the head;" but a conopeum relates to the head as well as a pillow, being a canopy ſuſpended over the whole bed, or at leaſt ſo far as to ſurround the head, and ſuch upper part of the body as might be uncovered. That this kind of defence againſt gnats is now uſed in the Eaſt, Mr. Harmer has ſhewn, from the teſtimony of Maillet (Deſcript. de l'Egypte, lett. ix. p. 37.). The word occurs probably in the ſame ſenſe in 2 Kings. viii. 15.

CONOPEIUM, in *Ancient Geography*, a marſh of Aſia, near the mouth of the river Halys, according to Arrian.—Alſo, a particular part of the Palus Mæotis. Steph. Byz.

CONOPHORUS,

CONOPHORUS, in *Botany*, Petiv. Rai. See PROTEA *Nana*.

CONOPOLI, in *Geography*, a town of European Turkey, in the province of Livadia, 10 miles N.E. of Lepanto.

CONOPS, in *Entomology*, a genus of dipterous infects, the mouth of which is furnifhed with a projecting geniculate probofcis, and the antennæ clavated and pointed at the end.

The infects of this genus are remarkably active, and are found in gardens, where they fubfift on the nectareous juices of flowers; their larvæ are unknown. In the true conops, the head is large and nearly hemifpherical; the eyes large, and almoft oval; and the antennæ formed of three articulations, the middle one of which is long and cylindrical, the laft joint terminating in a little point.

The genus conops is divided in the Linnæan fyftem into two families; the firft of which includes thofe fpecies which have the fheath of the fucker fingle-valved, abbreviated, and inclofing a fingle briftle; the other thofe with the fheath confifting of two equal valves, and which is geniculated both at the bafe and in the middle. The latter are the myopæ of Fabricius. In the Fabrician Suppl. Ent. Syft. the Linnæan conops fubcoleoptratus is defcribed under the new genus, thereva.

Species.

* *Firft Section.*

VESICULARIS. Blackifh; hind head veficular, abdomen yellow with a black bafe. Fabr. Geoffr. Inhabits woods in Europe.

MACROCEPHALA. Black; four of the abdominal fegments edged with yellow; antennæ and legs rufous. Linn. Like the laft inhabits Europe, and is found in woods.

RUFIPES. Deep-black; abdomen at the bafe ferruginous; fegments edged with white; legs ferruginous. Fabr.

This fpecies is a native of Germany. The rib of the wing, and the antennæ are fufcous, front and poifers yellow.

ACULEATA. Deep-black; incifures of the abdomen yellow; thorax with two yellow dots on the anterior part. Linn. Fn. Suec. A native of the northern parts of Europe.

FLAVIPES. Gloffy-black; abdomen cylindrical; three of the fegments edged with yellow. Linn. Fn. Suec. This inhabits Europe, and has the legs fafciated with yellow, whence its name.

PICTA. Ferruginous; thorax black, varied with yellow, rib of the wing ferruginous. Fabr.

A native of the American iflands, defcribed from the cabinet of Smidt.

VITTATA. Abdomen cylindrical, hooked, and varied with ferruginous; an abbreviated fub-marginal black fillet on the wings. Fabr. Inhabits Kiel.

** *Second Section.*

FERRUGINEA. Ferruginous; abdomen cylindrical and incurved; front yellowifh. Linn. *Sicus ferrugineus*, Scop. Inhabits woods of Europe.

PETIOLATA. Antennæ black, the club red; head yellow; abdomen petiolate. Fabr. A native of Siberia.

ATOMARIA. Grey; abdomen ovate; wings fufcous, with crowded dots of white. Gmel. An European fpecies.

TESTACEA. Ferruginous; thorax black on the back. Fabr. *Stomoxoides*, Schaeffer. Found in Germany.

ATRA. Abdomen cylindrical and incurved; body black. Fabr. Inhabits woods of Denmark.

CINCTA. Teftaceous; abdomen hooked and fafciated with white. Fabr. A native of the Eaft Indies. Koenig.

BUCCATA. Ferruginous; abdomen hooked, grey; face veficular and white; wings clouded. Linn. Fn. Suec. *Sicus buccatus*, Scopoli. Inhabits woods of Europe.

ANNULATA. Thorax black; abdomen cylindrical, varied with yellow and black; bafe of the wings ferruginous; legs ferruginous and annulated with brown. Linn. A native of Europe.

FLAVA. Thorax black; bafe of the abdomen black on the back, with a black mark each fide, and the two next fegments with an oblique black fpot in the middle and at the fides. Lefk. An European fpecies.

CINEREA. Cinereous; mouth veficular and white; tail black. Fabr. Defcribed from a fpecimen in the cabinet of Dr. Allioni. It is a native of Italy.

DORSALIS. Ferruginous; thorax fufcous on the back; abdomen cylindrical and hooked; margin of the fegments white. Fabr. *Myopa teftacea*, Mant. Inf. Inhabits Germany. Smidt.

CONOPONDIABASSIS, in *Ancient Geography*, a name given by Pliny to an ifland at the mouth of the Danube, which the ancients called *Pfeudoftoma*.

CONORIA, in *Botany*, Juff. 287. (Conori; Lam. Encyc. Conohoria; Aubl. Guian. its name in its native country). Clafs and order, *pentandria monogynia*. Nat. Ord. *Berberides*, Juff.

Gen. Ch. *Cal.* one-leafed, deeply five-cleft; fegments lanceolate, acute. *Cor.* Petals five, ovate-oblong, erect, doubled, forming a tube, acute, expanding or reflexed at their fummit, attached to the receptacle of the piftil; accompanied by five interior, fmaller, erect, lanceolate, concave, petal-like bodies placed oppofite to them. (Nectaries?) *Stam.* Filaments five, very fhort, attached to the bafe of the petal-like bodies; anthers erect, oblong. *Pift.* Germ fuperior, roundifh; ftyle flender, zig-zag; ftigma capitate. *Peric.* unknown.

Sp. C. *flavefcens*. Aubl. Guian. tab. 95. A fhrub, three or four feet high, with numerous, fcattered, knotty, compound branches near the top. *Leaves* oppofite, on fhort petioles, egg-fhaped, acute, entire, fmooth, green above, reddifh underneath, the largeft of them fix inches long, and near three inches broad. *Flowers* yellowifh, alternate, in fpikes terminating the branches, and furrounded with fcales at the bafe; peduncles with two, fmall, oppofite fcales about the middle. A native of woods in Guiana.

CONOSPERMUM, in *Botany* (κωνος, a *cone*, and σπέρμα, *feed*, from the conical or top-fhaped figure of the feed). Smith Tr. of Linn. Soc. v. 4. 213. Clafs and order, *tetrandria monogynia*. Nat. Ord. *Proteæ*; Juff. Shuttlecock feed.

Gen. Char. *Cal.* none. *Cor.* monopetalous, ringent, four-cleft; tube fwelling; upper tip vaulted, undivided; lower, in three equal, fpreading fegments. *Stam.* four. Anthers feffile, fingle-celled, two in the hollow of the upper lip; two, which often feem abortive, at the bafe of the lower, remote from each other. *Pift.* Germen fuperior, inverfely conical, bearded at the fummit. Style filiform, bent, fhorter than the corolla. Stigma obtufe, curved. *Seed* folitary, naked, inverfely conical, its upper edge fringed with numerous, fpreading, fhining briftles, about its own length.

Eff. Char. Calyx none. Cor. of one petal, ringent, bearing the ftamens: its upper lip vaulted; under three-cleft. Stigma obtufe. Seed one, naked, crowned with briftles.

Obferv. Confidering the irregularity of the flower, and the inequality of pofition of the anthers, perhaps this genus might be placed in *didynamia gymnofpermia*, in which order it

it would add one to the very few genera that have lefs than four feeds; but it has no affinity to any already claffed there, being nearly allied to that tribe of *proteæ* whofe flowers are fimple, not aggregate: and as the anthers are all really feffile, it could not literally accord with the definition of the 14th clafs.

Sp. 1. C. *longifolium*. Smith Exot. Bot. v. 2. 45. t. 82. "Leaves linear, inclining to obovate, entire, fmooth, with a marginal nerve, and numerous tranfverfe veins." Sm. *Stem* fhrubby, rigid, branched, about three feet high, with round leafy branches, which are filky when young. *Leaves* alternate, feveral inches long, entire, fmooth, varying in breadth from a linear to a narrow obovate figure, tipped with a fmall point, and tapering at the bafe, into a longifh flender footftalk. Their margin is marked with a fine nerve, connected by tranfverfe veins with the midrib. *Stipulas* none. *Flower-ftalks* about the tops of the branches, axillary, much exceeding the leaves in length, each bearing a large bracteated downy corymbus, of white or blufh-coloured, feffile, cluftered flowers. *Bracteas* membranous, wedge-fhaped, pointed, fringed. *Corolla* about a quarter of an inch long, externally downy. *Seed* inverfely conical, or top-fhaped, brown, downy, crowned with a marginal row of fpreading reddifh briftles, and altogether refembling a fhuttlecock. A native of New South Wales, and other parts of New Holland; not yet brought to Europe. The flowers are ornamental, and the afpect of the whole fhrub not inelegant. 2. C. *ellipticum*. "Leaves elliptical, rough, edged." Sm. MSS. A more humble and divaricated fhrub than the former. *Branches* hairy when young, thickly clothed with *leaves*, which are about three quarters of an inch long, crowded, nearly feffile, elliptical, obtufe, entire, thick, and apparently fucculent when frefh, concave when dry, fingle-ribbed, veinlefs, roughifh underneath, efpecially at the edges, tipped with a minute point. *Flower-ftalks* fituated as in the foregoing, but fhorter, and more crowded; very downy, as is likewife the outfide of the corolla. *Seed* rather fmaller than the laft. Sent from New South Wales by John White, M.D. 3. C. *taxifolium*. "Leaves linear-lanceolate, oblique, fomewhat downy." Sm. MSS. *Branches* long and wand-like, very leafy, filky. *Leaves* imbricated, fcattered, feffile, nearly an inch long, linear-lanceolate, inclining to obovate, oblique, narrow, rigid, pointed, fingle-ribbed, veinlefs, thick-edged, entire, for the moft part clothed with fhort filky hairs, rarely fmooth. *Flowers* fituated as in the two fpecies juft defcribed, forming a denfe leafy corymbus at the end of each branch, but their ftalks are lefs compound. In general afpect and ftructure they feem, as well as the *feeds*, to agree precifely with thofe of C. *ellipticum*. Gathered alfo at New South Wales by Dr. White. 4. C. *ericifolium*. "Leaves awl-fhaped, keeled, fmooth." Sm. MSS. This has very much the habit of the laft, and their flowers and feeds exactly accord. Both feem to be rather herbaceous than fhrubby, though they have the hard rigid texture fo frequent in New Holland plants. This is the fmaller of the two. Its *leaves* are fcarcely more than half an inch long, imbricated, awl-fhaped, obtufe, keeled, and fomewhat triangular, tipped as in the laft with a fmall point, roughifh occafionally to the touch, but, as far as we can difcover, always deftitute of pubefcence, though the branches are filky. Gathered at New South Wales by Dr. White. 5. C. *reticulatum*. "Leaves wedge-fhaped, jagged, reticulated on both fides." Sm. MSS. The *ftems* appear to be herbaceous and procumbent, leafy, hairy, a few inches in length. *Leaves* about three inches long, alternate, erect, wedge-fhaped, entire at the fides, dilated and jagged at the extremity, veiny, beautifully reticulated on both fides, tapering down at the bafe into rigid, furrowed, hairy footftalks, about their own length, whofe bafes are dilated, and bordered with a membranous fheathing ftipula. *Flower-ftalks* terminal, two or three together, hairy, erect, fcarcely fo tall as the leaves, each bearing a loofe, bracteated, fimple fpike of downy, apparently white, flowers, whofe fegments are more obtufe than in the other fpecies. The moft remarkable character of C. *reticulatum* confifts in the exquifitely reticulated veins, prominent on both fides of the leaf, branching off from the main ribs and veins, and forming a fine regular uniform net-work over the whole furface, whofe interftices are commonly pentagonal, and not more in diameter than grains of common fand. The veins themfelves are finely hairy. For dried fpecimens of this moft beautiful fpecies we are indebted to Mr. A. Menzies, who difcovered it at King George's Sound, on the weft coaft of New Holland, lat. 35. Its fruit we have not feen, but there can be no doubt of its genus.

CONOSTEIN-*Engers*, or *Engers*, in *Geography*, a town of Germany, in the circle of the Lower Rhine, and electorate of Treves; 4 miles N. of Coblentz.

CONOTHATON, in *Ancient Geography*, an epifcopal fee of Afia, under the metropolis of Boftra.

CONOU, in *Geography*, a town of Perfia, in the province of Lariftan, on the coaft of the Perfian gulf; 66 miles E.S.E. of Lar.

CONOVIUM, in *Ancient Geography*, a town of the ifle of Albion, on the route from Segontium or Caernarvon to Deva or Chefter, according to Antonine's Itinerary. It was diftant 24 miles from Caernarvon, and is now called Caer-Rhyn.

CONQUASSATION, in *Pharmacy*, a fpecies of comminution, or a particular operation, by which moift concreted fubftances, fuch as recent vegetables, their fruits, lactefcent feeds, and the fofter parts of animals, are contufed and agitated in a mortar, until partly by their proper fucculence, or the affufion of fome liquor, they are reduced to a foft pulp. Metalline inftruments are not to be ufed for this purpofe, becaufe not only the manifeft, but alfo the latent falts of the fubftances, fubjected to this operation, acting on the inftruments, may derive an adventitious virulent quality from them, which will not only render fuch fubftances unfit for the intended purpofes, but alfo naufeous and hurtful when exhibited as medicines. James.

CONQUEROR, in French *Conquerant*. A captain or commander who has fubdued feveral cities or entire countries by force of arms. Alexander the Great, Julius Cæfar, Tamerlane, Mahomet II., &c. were conquerors.

CONQUES, in *Geography*, a fmall town of France, in the department of Aude, and chief place of a canton in the diftrict of Carcaffonne, with a population of 1591 inhabitants. That of the canton amounts to 5635, in 10 communes, upon an extent of one hnndred kiliometres.—Alfo, a fmall town of France, in the department of Aveyron, in the diftrict of Rhodez, with 806 inhabitants, 15 miles N. from Rhodez. The canton, of which it is the chief place, has 12 communes, with 6597 inhabitants, and meafures 187 kiliometres and a half.

CONQUEST, in French *Conquete*, the acquifition of a place, province, or entire country, by a fuperiority of arms, which compels the conquered to fubmit to the conqueror.

Conquest, in *Civil Jurifprudence*, is the acquifition of property in common by a number of perfons.

In fome countries, they confound acquifition with *conqueft*; but, according to the moft general acceptation, acquifition is the gaining of unappropriated goods before the efta-

blifhment

blifhment of a community; whereas, by the term *conqueft*, is ordinarily intended whatever is acquired by a number of perfons in community; or by fome one for all the others.

As it is more efpecially in the union of perfons by marriage, that a community of property takes place; it is in reference to them that we frequently ufe the word *conqueft*. There are, neverthelefs, conquefts alfo among other perfons who are in a tacit community or fociety; fuch as obtain by particular local cuftoms.

According to this fenfe of the word, it has been contended by feveral, that William I. claimed this kingdom; that is, not by right of arms, but by right of conqueft or acqueft; under promife of fucceffion made by Edward the Confeffor, and a contract entered into by Harold, to fupport his pretenfions to that fucceffion; and by old writers, conqueftus, acquifitio, and perquifitio, are frequently ufed as fynonymous terms.

In confequence of the prodigious flaughter of the Englifh nobility at the battle of Haftings, and the fruitlefs infurrections of thofe who furvived, fuch numerous forfeitures had accrued, that king William was able to reward his Norman followers with very large and extenfive poffeffions; which circumftance led the monkifh hiftorians, and fuch as have implicitly followed them, to reprefent him as having, by right of the fword, feifed on all the lands of England, and diftributed them among his own favourites. This fuppofition is grounded upon a miftaken fenfe of the word "conqueft," which, in its feodal acceptation, fignifies no more than "acquifition;" and hence many party writers have been led into a ftrange hiftorical miftake, and one, fays judge Blackftone, which upon the flighteft examination, will be found to be moft untrue. See Feodal *Tenure*.

What we call "purchafe," *perquifitio*, the feudifts called "conqueft," *conqueftus*, or *conquifitio*; both denoting any means of acquiring an eftate out of the common courfe of inheritance. This is ftill the proper phrafe in the law of Scotland; as it was among the Norman jurifts, who ftyled the firft purchafer (that is, the perfon who brought the eftate into the family, which at prefent owns it) the conqueror or *conquereur*. This is all that feems to have been meant by the appellation that was given to William the Norman, when his manner of afcending the throne of England was in his own charter, and in thofe of his fucceffors, and alfo by the hiftorians of the times, entitled *conqueftus*, and himfelf *conqueftor* or *conquifitor*; fignifying that he was the firft of his family who acquired the crown of England, and from whom, therefore, all future claims by defcent muft be derived; though now, from our difufe of the feodal fenfe of the word, together with the reflection on his forcible method of acquifition, we are apt to annex the idea of "victory" to this name of "conqueft," or "conquifitum," a title which, however juft with regard to the *crown*, the conqueror never pretended with regard to the *realm* of England; nor, in fact, ever had. See Purchase.

William the Norman, as we have already obferved, and as fome have maintained, claimed the crown by virtue of a pretended grant from king Edward the Confeffor; a grant which, if real, was in itfelf utterly invalid; becaufe it was made, as Harold well obferved, in his reply to William's demand, *abfque generali fenatus, et populi conventu et edicto;* and this alfo very plainly implies, that it was then generally underftood, that the king, with confent of the general council, might difpofe of the crown and change the line of fucceffion. William's title, however, was altogether as good as Harold's, who was a mere private fubject, and an utter ftranger to the royal blood. The conqueft, then, by William of Normandy, was, like that of Canute before, a forcible transfer of the crown of England into a new family; but, the crown being fo transferred, all the inherent properties of the crown were alfo transferred with it. For, the victory obtained at Haftings not being a victory over the nation collectively, but only over the perfon of Harold, the only right which the conqueror could pretend to acquire thereby, was the right to poffefs the crown of England, not to alter the nature of the government. And, therefore, as the Englifh laws ftill remained in force, he muft neceffarily take the crown fubject to thofe laws, and with all its inherent properties; the firft and principal of which was its defcendibility. See *Right of* Crown.

Some writers have reprefented William's conqueft as more extenfive and complete than it has been above ftated. Scarcely any of thofe revolutions, it is faid, which, both in hiftory and in common language, have been always denominated conquefts, appear equally violent, or were attended with fo fudden an alteration of power and property. The Roman ftate, which fpread its dominion over Europe, left the rights of individuals in a great meafure untouched; and thofe civilized conquerors, while they made their own country the feat of empire, found that they could derive the greateft advantage from the fubjected provinces, by fecuring to the natives the free enjoyment of their own laws, and of their private poffeffions. The barbarians who fubdued the Roman empire, though they fettled in the conquered countries, yet being accuftomed to a rude uncultivated life, found a part only of the land fufficient to fupply all their wants; and they were not tempted to feize extenfive poffeffions, which they knew how neither to cultivate nor to enjoy. But the Normans and other foreigners, who followed the ftandard of William, were fo far advanced in the arts as to know the value of a large property; and therefore having made the vanquifhed kingdom the feat of government, and having totally fubdued the natives, they pufhed the rights of conqueft, for the gratification both of their avarice and ambition, to the utmoft extremity. Except the former conqueft of England by the Saxons themfelves, who were induced, by peculiar circumftances, to proceed even to the extermination of the natives, it would be difficult to find, in all hiftory, a revolution more deftructive, or attended with a more complete fubjection of the ancient inhabitants. In the conduct of their conquerors, contumely was blended with oppreffion; and the natives were univerfally reduced to fuch a ftate of meannefs and poverty, that the Englifh name became a term of reproach, and feveral generations elapfed before one family of Saxon pedigree was raifed to any confiderable honours, or could fo much as attain the rank of baron of the realm. "Thefe facts," fays Mr. Hume (Hift. vol. i. p. 283, 8vo.) "are fo apparent from the whole tenor of the Englifh hiftory, that none would have been tempted to deny or elude them, were they not heated by the controverfies of faction; while one party was *abfurdly* afraid of thofe *abfurd* confequences, which they faw the other party inclined to draw from this event. But it is evident that the prefent rights and privileges of the people, who are a mixture of Englifh and Normans, can never be affected by a tranfaction which paffed 700 years ago; and as all ancient authors, who lived neareft the time, and beft knew the ftate of the country, unanimoufly fpeak of the Norman dominion as a conqueft by war and arms, no reafonable man, from the fear of imaginary confequences, will even be tempted to reject their concurring and united teftimony."

The

The Norman invaſion, and conqueſt, as it has been uſually denominated, were important events in the hiſtory of this country; and produced as great an alteration in our laws, as it did in our ancient line of kings:—and though the alteration of the former was effected rather by the conſent of the people, than by any right of conqueſt, yet that conſent ſeems to have been partly extorted by fear, and partly given without any apprehenſion of the conſequences which afterwards enſued. The alterations in our laws which then took place are enumerated by judge Blackſtone; and we ſhall here ſubjoin a ſummary of them. The *firſt* of theſe was the ſeparation of the eccleſiaſtical courts from the civil, which was effected in order to ingratiate the new king with the popiſh clergy, who had been for ſome time endeavouring, in every part of Europe, to exempt themſelves from the ſecular power. This was the more eaſily accompliſhed, becauſe, the diſpoſal of all the epiſcopal ſees being then in the breaſt of the king, he had taken care to fill them with Italian and Norman prelates. The *ſecond* alteration of the Engliſh conſtitution was more violent, and conſiſted in the depopulation of whole countries, for the purpoſes of the king's royal diverſion; and ſubjecting both them, and all the ancient foreſts of the kingdom, to the unreaſonable ſeverities of foreſt laws imported from the continent, by which the ſlaughter of a beaſt was made almoſt as penal as the death of a man. (See Forest and Game.) A *third* alteration in the Engliſh law was effected by narrowing the remedial influence of the county courts, the great ſeats of Saxon juſtice, and extending the *original* juriſdiction of all the king's juſticiars to all kinds of cauſes ariſing in all parts of the kingdom. (See Aula *regia.*) Hence all proceedings in the king's courts were ordained to be carried on in the Norman, inſtead of the Engliſh language; a badge of ſlavery as evident and ſignal as ever was impoſed upon a conquered people, which laſted till king Edward III. obtained a double victory, over the armies of France in their own country, and their language in our courts here at home. A *fourth* innovation was the introduction of the trial by combat, for the deciſion of all civil and criminal queſtions of fact in the laſt reſort. (See Combat.) The *laſt* and moſt important alteration, both in our civil and military polity, was the engrafting on all landed eſtates, a few only excepted, the fiction of feodal tenure; which drew after it a numerous and oppreſſive train of ſervile fruits and appendages; aids, reliefs, primer ſeiſins, wardſhips, marriages, eſcheats, and fines for alienation; the genuine conſequences of the maxim then adopted, that all the lands in England were derived from, and holden, mediately or immediately, of, the crown. See each article reſpectively, and Feodal *Tenure.*

"The nation at this period," ſays judge Blackſtone, "ſeems to have groaned under as abſolute a ſlavery as was in the power of a warlike, an ambitious, and a politic prince to create. The conſciences of men were enſlaved by four eccleſiaſtics, devoted to a foreign power, and unconnected with the civil ſtate under which they lived:—who now imported from Rome for the firſt time the whole *farrago* of ſuperſtitious novelties, which had been engendered by the blindneſs and corruption of the times, between the firſt miſſion of Auguſtin the monk, and the Norman conqueſt; ſuch as tranſubſtantiation, purgatory, communion in one kind, and the worſhip of ſaints and images; not forgetting the univerſal ſupremacy and dogmatical infallibility of the holy ſee. The laws too, as well as the prayers, were adminiſtered in an unknown tongue. The ancient trial by jury gave way to the impious deciſion by battle. The foreſt laws totally reſtrained all rural pleaſures and manly recreations. And in cities and towns the caſe was no better; all company being obliged to diſperſe, and fire and candle to be extinguiſhed by eight at night, at the ſound of the melancholy *curfew.* The ultimate property of all lands, and a conſiderable ſhare of the preſent profits, were veſted in the king, or by him granted to his Norman favourites; who, by a gradual progreſſion of ſlavery, were abſolute vaſſals to the crown, and as abſolute tyrants to the commons. Unheard of forfeitures, talliages, aids, and fines, were arbitrarily exacted from the pillaged landholders, in purſuance of the new ſyſtem of tenure. And to crown all, as a conſequence of the tenure by knight-ſervice, the king had always ready at his command an army of 60,000 knights, or *milites;* who were bound, upon pain of confiſcating their eſtates, to attend him in time of invaſion, or to quell any domeſtic inſurrection. Trade, or foreign merchandize, ſuch as it then was, was carried on by the Jews and Lombards; and the very name of an Engliſh fleet, which king Edgar had rendered ſo formidable, was utterly unknown to Europe; the nation conſiſting wholly of the clergy, who were alſo the lawyers; the barons, or great lords of the land; the knights, or ſoldiery, who were the ſubordinate land-holders; and the burghers, or inferior tradeſmen, who from their inſignificancy happily retained, in their ſocage and burgage tenure, ſome points of their ancient freedom. All the reſt were villeins or bondmen."

"From ſo complete and well-concerted a ſcheme of ſervility, it has been the work of generations for our anceſtors, to redeem themſelves and their poſterity into that ſtate of liberty, which we now enjoy:—and which therefore is not to be looked upon as conſiſting of mere encroachments on the crown, and infringements on the prerogative, as ſome ſlaviſh and narrow-minded writers in the laſt century endeavoured to maintain:—but as, in general, a gradual reſtoration of that ancient conſtitution, whereof our Saxon forefathers had been unjuſtly deprived, partly by the policy, and partly by the force, of the Norman." Blackſt. Com. Book iv. See Constitution.

Conquest, in the *Law of Nations*, is the acquiſition of ſovereignty by force of arms, by ſome foreign prince; who reduces the vanquiſhed under his empire. The right of conqueſt is derived from the laws of war; and when a people is ſubjected, the conduct of the conqueror is regulated by four kinds of law. Firſt, the law of nature, which dictates whatever tends to ſelf-preſervation; ſecondly, our reaſon, which teaches us to uſe others, as we would be treated ourſelves; thirdly, the laws of political ſociety, to which nature has not aſſigned any preciſe boundary; laſtly, the law which is derived from the particular circumſtances attending the conqueſt. Thus, a ſtate conquered by another will be treated in one of the four methods following: Either the conqueror will continue it under its own laws, and will only claim the exerciſe of civil and eccleſiaſtical ſovereignty; or he will impoſe a new form of government; or he will deſtroy the frame of their ſociety, and incorporate the inhabitants with others; or he will exterminate them. Ancient and modern hiſtory will ſupply numerous inſtances of theſe different modes of treatment. See Colony and Plantation.

The right of conqueſt is allowed by the law of nations, if not by that of nature; but in reaſon and civil policy it can mean nothing more than that, in order to terminate hoſtilities, a compact is either expreſsly or tacitly made between the conqueror and the conquered, that if they will acknowledge the victor for their maſter, he will treat them for the future as ſubjects, and not as enemies. *Puffend.* Ls. of Nat. viii. b. 24.

CONQUET, Le, in *Geography*, a pretty, rich, ſmall town of France, in the department of Finiſtere, with a good harbour, and excellent roads; 15 miles weſt from Breſt. It is one of the 84 maritime quarters into which modern France is divided, and the reſidence of a maritime ſyndic who ſuperintends this place, beſides Argenton, Lorſpoder, and Oueſſant.

CONQUISITORES. Among the Romans, theſe were commiſſaries or commiſſioners, charged by their functions with the raiſing of troops in the towns, and throughout the country; and obliged, at the ſame time, to make ſearch for thoſe who wiſhed or attempted to withdraw themſelves from the levy.

CONRAD, or Coenrads, Abraham, in *Biography*, an engraver and deſigner of Holland, who was born about 1620. The works of this artiſt, for the greater part, conſiſt of portraits, many of which are from his own drawings, and prove him to have poſſeſſed very conſiderable talents. His ſtyle of engraving is much varied in his different works: ſome of his prints very much reſemble thoſe of L. Voſtermans. Amongſt his beſt works the following may be enumerated: "Chriſtopher Love," *A. Conrad fec.* in fol.; "Jacob Triglande, Profeſſor of Theology to the Univerſity of Leyden," *Ab. Conradus fecit*, in fol.; "The Flagellation and the Crucifixion of Chriſt," two plates in folio, from Ab. Van Diepenbeck. Huber, Manuel des Arts.

Conrad I., emperor of Germany, was, previouſly to his attaining that high honour, duke of Franconia and Heſſe. On the death of Louis IV. king of Germany, A. D. 912, the nobility of the realm aſſembled at Worms, for the purpoſe of chooſing a ſucceſſor. They offered the crown to Otho, duke of Saxony, by whom, on account of his great age, it was not accepted. He requeſted them to turn their thoughts to the duke of Franconia, who was highly eſteemed for his great talents and excellent character. Upon this recommendation he was called to the vacant throne, though not with that unanimity which is calculated to ſecure general homage. The people of Lorrain were attached to Charles the Simple, whom they wiſhed to proclaim as their ſovereign: Conrad marched thither with great expedition, and by his preſence conciliated thoſe who were diſpoſed to reſiſt his authority. While he was thus engaged, Henry, duke of Saxony, ſon of Otho, joined by the dukes of Suabia and Bavaria, excited a rebellion. This, after ſurmounting ſeveral difficulties, he cruſhed, and gained a complete victory over his enemies. The Hungarians now made a dreadful irruption into his dominions, and, after marking their progreſs with fire and ſword, compelled him to purchaſe a peace on very diſgraceful terms: but, notwithſtanding all the exertions of his enemies, he retained the ſceptre, and conducted the affairs of the empire with conſiderable prudence till the time of his death. His conſtitution being broken by the fatigues to which he had been expoſed, and his health being much injured in conſequence of a wound which he had received in battle, he aſſembled the princes and ſtates of the empire, and ſeriouſly exhorted them to raiſe Henry, duke of Saxony, who had been his enemy, to the imperial throne. This is a rare inſtance, on the records of hiſtory, of a prince ſacrificing his private reſentment to the public good. He ſent the crown, ſceptre, and other regalia to his intended ſucceſſor; and after an active and reſpectable reign of ſeven years, he died, A. D. 918, in peace, with the conſciouſneſs of quitting life under the influence of Chriſtian principles.

Conrad II., emperor of Germany, was likewiſe duke of Franconia; he was ſurnamed The Salic, on account of his having been born on the banks of the river Sala, and was unanimouſly inveſted with ſupreme authority. He ſucceeded Henry II., and was crowned, according to ancient uſage, at Thonza. During the firſt two years of his reign, Conrad was chiefly employed in regulating the police, and other affairs of adminiſtration; but in the third, receiving intelligence that the Lombards had ſhaken off their allegiance, he was obliged to march into Italy. The rebels were ſoon reduced to obedience, and the king proceeded to Rome, where he was ſolemnly crowned by pope John, in preſence of Canute, king of England and Denmark, and Rodolphus, king of Burgundy. He was recalled to Germany, on account of an inſurrection, raiſed by the dukes of Suabia, Carinthia, and Worms, which he readily ſuppreſſed, and brought the offenders to the loweſt ſtate of ſubjection. By a decree of the empire, they were deprived of their dominions. The ſeven ſucceeding years were occupied by wars between the emperor, Poland, Bohemia, and Hungary: the detail of theſe would be uninteresting to our readers. The imperial arms were in general ſucceſsful; and on the demiſe of Rodolphus, Conrad acquired the peaceable poſſeſſion of the ſovereignty of Burgundy. A general revolt againſt the German dominions was planned in Italy, and fomented by many leading perſons: the emperor paſſed ſuddenly into that country, and ſeizing ſome of the principal malcontents, ſent them priſoners to Germany. He beſieged Milan, but without ſucceſs; and ſeverely chaſtiſed Parma. Being urged by the monks of Caſſino to protect them againſt the violence and oppreſſion of Pandulph, prince of Capua, he marched to that place, expelled the prince, and ſeized his country. Returning to Germany, he was ſeized with the gout in his legs, and died ſuddenly at Utrecht, in 1039, in the fifteenth year of his reign. He was univerſally revered as a juſt and magnanimous prince; and all thoſe who diſtinguiſhed themſelves in his ſervice had no reaſon to be diſſatisfied with the remunerations which they obtained. Among many inſtances of his munificence, it is ſaid that one of his attendants, who had loſt his leg in battle, received his boot-full of gold, which the emperor obſerved might defray the expence of his cure. He was interred in the cathedral church of Spires, which he had formerly founded and endowed.

Conrad III., another duke of Franconia and emperor of Germany, was nephew of the emperor Henry V., and elected to the imperial throne at Coblentz in 1138-9, as ſucceſſor to Lothaire II. This meaſure was warmly conteſted by Henry, duke of Bavaria, who poſitively refuſed to ſurrender the regalia, which had been depoſited in his hands by Lotharius. He was, however, at length compelled to ſubmit, with the loſs of his own dominions; and the diſappointment and chagrine which he ſuffered on the occaſion brought him to an early grave. Upon the death of this prince, his brother Guelph, with the aſſiſtance of the king of Sicily, made vigorous exertions for the recovery of the confiſcated duchies: a war enſued, and, after ſeveral indeciſive engagements, the duke was cloſely beſieged by the emperor in the caſtle of Weinſberg, celebrated for the conjugal fidelity and affection of the ladies; who, being permitted to leave the place with whatever they could carry, marched out, each with her huſband on her back. This inſtance of kindneſs and regard ſo much affected the emperor, that he readily came into terms with Guelph and his partizans. In this war we muſt look for the origin of the deſignations of the Guelphs and Ghibellines, which are ſo often referred to on the page of hiſtory. The troubles in Germany were immediately ſucceeded by a revolt of ſeveral of the

the towns of Italy, which threw off the fovereignty of the empire, and formed themfelves into independant republics. Conrad was now prevailed on to join a crufade againft the Saracens, and took the crofs from the hands of Bernard. He accordingly fet out for Paleftine, at the head of fixty thoufand men. Under his banners a troop of females rode in the attitude and armour of men; and the chief of thefe Amazons, from her gilt fpurs and bufkins, obtained the epithet of the "golden-footed dame." This expedition proved unfortunate: one half of his troops perifhed by ficknefs, occafioned, it is believed, through unwholefome provifions, furnifhed by the treachery of the Greek emperor, Manuel Comnenus. Conrad, with the remainder, joined Louis VII. king of France, in the fiege of Damafcus, exhibiting great prowefs, but without any fuccefs. The fiege was raifed, and the emperor returned to Germany, where he was overwhelmed with public calamity and private affliction, by another revolt of Guelph, and by the death of his eldeft fon. This laft event preyed on his mind, and evidently affected his health. Aware of his approaching end, he was anxious to provide for the fucceffion, and recommended his nephew, Frederic Barbaroffa, to the ftates of the empire, as a prince of known courage and tried talents. His recommendation was approved, and Conrad died in a fhort time after, at Bamberg, in the 14th year of his reign. He left one fon by his emprefs Gertrude, whofe tender age precluded him from taking any fhare in the government.

CONRAD IV., the laft emperor of Germany of this name, was duke of Suabia, and fon of the emperor Frederick II. He was declared fucceffor to his father in 1250, but pope Innocent IV. refufed to confirm the election. Conrad, notwithftanding the denunciations of the pontiff, marched into Italy, in order to take poffeffion of the kingdom of the two Sicilies, which had been bequeathed to him by his father. He took the city of Naples after an eight months' fiege: afterwards Capua and Aquino opened their gates to him. He did not long enjoy his fuccefs: in 1254, he fell fick, and died in the flower of youth, leaving one fon, named Conradin, who, at the early age of fourteen, was beheaded by the orders of Charles of Anjou; and in him ended the line of Suabia. Moreri. Univer. Hift. Gibbon's Rom. Empire.

CONRAD is a name diftinguifhed in literary hiftory, as well as among the princes of the earth; but as none of that appellation have become very illuftrious by their works, we fhall briefly notice them and their writings in a fingle paragraph. The firft was a German abbot of the Benedictine order, about the commencement of the tenth century: he wrote "A Continuation of the Hiftory of France;" and on that account has, by fome biographical writers, been fuppofed a Frenchman; by others, he has been confounded with Conrad of Cologne, who was author of the life of S. Wolphemius. Towards the conclufion of the eleventh century, *Conrad*, bifhop of Utrecht, flourifhed, to which office he had been raifed by his pupil, the emperor Henry. He is chiefly known by a work, entitled, "Apologia de Unitate Ecclefiæ confervanda, et Schifmate inter Henricum IV. Imp. ac Greg. VIII. Pont. Max." He wrote alfo a fpirited defence of the imperial right on the fubject of inveftitures. The bifhop was affaffinated in his palace, A. D. 1099, by a Friefland architect, in revenge for having inftructed him in the method of erecting maffy buildings on a fwampy foil, and afterwards employing a rival in conftructing the collegiate church of which the bifhop was founder.—*Conrad* of Sheurn, a German monk, lived in the thirteenth century, and was author of "A Chronicle," and of more than fifty volumes on different fubjects, chiefly hiftorical, of which John of Aventine made much ufe in compofing part of his annals. By his various writings, this monk obtained the honourable epithet of "philofopher."—*Conrad* of Lichtenau, abbot of Urfberg, in the thirteenth century, was author of "A chronological Hiftory," extending from Belus, king of Affyria, to the year 1449, which was afterwards continued, by an anonymous writer, to the reign of Charles V. It was originally printed at Strafburg, in 1537, and afterwards, with the continuation, in 1569, at Bafil. It created enemies, by fome reflections on the wars carried on between the German emperors and the popes. The fame author is faid to have written the lives of the faints, in 12 books; but they have not come down to us, and probably were never publifhed.—*Conrad* of Mentz flourifhed in the thirteenth century, and is known by a work, entitled, "Chronicum Rerum Moguntiarum," from the year 1140 to 1250, which was firft publifhed in 1535, and has undergone feveral different impreffions.—About the fame period lived *Conrad* of Marpurg, who was the firft perfon of Germany that received the infamous commiffion of inquifitor from the papal fee; an office which he executed with fo much cruelty, that at length he fell a facrifice to the indignation of popular clamour. He wrote "The Life of the Princefs Elizabeth of Thuringia," who has obtained a place among the faints.—*Conrad* is the name of two Dominican monks, natives of Saxony, in the fourteenth century. One was a member of the chapter of his order in that province, and the other appointed by the pope vicar-general of Saxony, in the year 1350. The former publifhed, among many other things, "A Commentary on the Book of Job;" "A Concordance to the Bible;" "The Student's Dream;" and "A common-place Book for the Ufe of Preachers."—*Conrad* of Afti, a Piedmontefe Dominican monk, was author of "Commentaria in Jus Canonicum," and other pieces. He died in the year 1470.—In the fixteenth century appeared *Conrad Leontinus*, a learned German Ciftertian monk, who appears to have been well acquainted with the beft writers in profane and facred literature, and to have maintained an intimate correfpondence with the moft learned men of his time. He publifhed, in the year 1507, at Bafil, "Nicholas de Lyra's Commentary on the Bible, with marginal Notes."—There were feveral others of this name, but it is needlefs to mention them all. *Conrad* of Mur, canon of the church of Zurich, lived in the thirteenth century, and is known for his treatife on the facraments, and the lives of the popes: and *Conrad* of Saxony wrote "A Chronicle," and fome hiftorical works, to which no date is affigned. Moreri.

CONRI, FLORENCE, a Francifcan friar, was born in the province of Connaught, about the year 1560, and was fent at an early age into Spain, as a ftudent in theology and the philofophy of the times. When he had finifhed his ftudies, he travelled into the Low Countries, where he acquired great reputation among the Catholics, by his affiduity and zeal in illuftrating and defending the doctrines of St. Auguftine. He was author of feveral tracts on theological fubjects, among which were "The Mirror of the Chriftian Life;" an "Irifh Catechifm," printed at Louvain, in 1626; and "Tractatus de Statu parvulorum fine Baptifmo decedentium ex hac Vita," Lovanii, 1624. As a politician, he was fixed on to conciliate his countrymen to the meafures of the court of Spain, when Philip III. attempted the conqueft of Ireland, during the reign of Elizabeth. On the failure of that enterprize he efcaped from the

the country, and fpent the remainder of his life in the Low Countries, and at Madrid, fupported by a penfion from Spain, in recompence for the fervices which he intended, but which proved ineffectual. He died at Madrid, in the year 1629. Moreri.

CONRINGIUS, Herman, a philofopher of great talents, and almoft univerfal learning, born at Norden in Eaft Friefland in November, 1606, received his education at Heimftadt, where he was made doctor in medicine in 1636, and foon after advanced to the chair of profeffor in that fcience. He was alfo, in fucceffion, appointed profeffor in phyfics, law, and politics. For his profound knowledge in the laws of nations and politics, he was confulted, and made phyfician and aulic counfellor to Chriftina, queen of Sweden, to the king of Denmark, and to feveral of the German princes and electors. Of his capacity for thefe employments abundant proof may be found in his numerous works in philofophy, medicine, and hiftory, which were long held in great repute, though now referred to rather from curiofity than for their utility. In all of them, however, there is a wonderful difplay of learning. In his philofophy he was a follower of the fchool of Ariftotle, as he proclaims in the firft of his publications, *viz.* "De Calido innato, de Morte, et Vita, et de Origine Formarum, libri, omnia ad Ariftotelis Sententiam elaborata," Lug. Bat. 1631, 8vo., republifhed with additions in 1640, 43, and 46; "De Germanicorum Corporum Habitûs antiqui et novi Caufis, Differtatio," Helmft. 1645, 4to. This has been frequently reprinted. The author has fome ingenious conjectures on the caufes of the diminifhed ftature, and altered complexion, and habit of body, of the Germans, which he fhews from indifputable documents had taken place among thefe people. The ancient Germans were fair, with blue eyes, and abundant yellow hair, "robuftis nato parentibus, fero veneri fe dediffe, inque conjugio caftos vixiffe, et fuas vires confervaffe integriores, et pleniores filiis impretiiffe, &c. &c. An entire change in their mode of living, the ufe of ftoves, of tobacco, &c. he conceives to have gradually undermined their conftitutions, and to have produced the changes he ftates to have taken place. An edition of this work was printed at Francfort, with notes, by Philip Burgfhaw, 8vo. 1727. "De Hermetica Ægyptiorum vetere, et Paracelfica nova Medicina," Helmft. 1648, 4to.; reprinted, with additions, 1669: a work abounding with ingenious and learned fpeculations, but little now attended to. "Introductio in univerfam Artem Medicam, ejufque fingulas Partes," 1654; re-edited by Schelhammer, 1687; and again by Hoffman, 1726, 4to.; containing an hiftory and bib. medica, with obfervations on the principal fects and writers in medicine, befides numerous differtations on particular difeafes, as dropfy, pleurify, &c. Conringius is faid to have been remarkably dimunitive in ftature, but of great vivacity, and enjoying a ftrong memory. He retained the fituation of fenior of the univerfity of Helmftadt to the time of his death, which happened on the 12th of December, 1681. His character is contained in the following epitaph:

Hoc tumulo
Clauditur regum principumque confiliarius,
Juris naturalis gentium publici doctor,
Philofophiæ omnis peritiffimus, practicæ et theoreticæ,
Philologus infignis, orator, poeta, hiftoricus, medicus, Theologus,
Multas putas his conditas.
Unus eft Hermannus Conringius, fæculi miraculum,
Pofuit Henricus Meibomius.

Haller Bib. Eloy Dict. Hift.

CONSABURUS, in *Ancient Geography*, a town of Spain, towards the fouth-weft of Althæa Olcadum.

CONSANGUINEO, Writ de, in *Law*. See Assise *de Mort d'Anceftor*.

CONSANGUINEUS Frater. See Consanguinity.

CONSANGUINITY, the relation of kinfhip, between perfons of the fame blood, or fprung from the fame root; or, as it is defined by writers on thefe fubjects, "*Vinculum perfonarum ab eadem ftipite defcendentium*;" *i. e.* the connection or relation of perfons defcended from the fame ftock or common anceftor. This confanguinity is either *lineal*, when it fubfifts between perfons, of whom one is defcended in a direct line from the other; as between A. B. and his father, grandfather, great grandfather, and fo upwards in the direct afcending line; or between A. B. and his fon, grandfon, great grandfon, and fo downwards in the direct defcending line. Every generation, in this lineal direct confanguinity, conftitutes a different degree, reckoning either upwards or downwards: thus, the father of A. B. is related to him in the firft degree, and fo likewife is his fon; his grandfire and grandfon in the fecond; his great grandfire and great grandfon in the third. This is the only natural way of reckoning the degrees in the direct line, and therefore univerfally obtains, as well in the civil and canon, as in the common, law. Confanguinity is *collateral*, when relations defcend from the fame ftock or anceftor, but do not defcend one from the other. See Collateral.

It is eafy to compute, by the rules of progreffion, how many lineal anceftors any man has within a certain number of degrees. Thus, it would appear that a perfon, at the 20th degree, or the diftance of 20 generations, hath above a million of anceftors: and if a fimilar calculation be made of collateral kindred at the diftance of 20 degrees forward, on the fuppofition that each couple of anceftors leave, one with another, two children, the number will be 274877906944: as in the following tables:

Table I.

Lineal Degrees.	Number of Anceftors.
1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256
9	512
10	1024
11	2048
12	4096
13	8192
14	16384
15	32768
16	65536
17	131072
18	262144
19	524288
20	1048576

In forming this table, it is evident that each perfon has two anceftors in the firft degree, and that the number is doubled at every remove, becaufe each of his anceftors has alfo two immediate anceftors of his own. In order to find the number of anceftors at any particular degree, we need only

only to find a power of 2, the index of which is the number of degrees; *e. g.* $\overline{2|}^{5}$, $\overline{2|}^{10}$, $\overline{2|}^{15}$, &c. will give the correſponding number reſpectively. Or, the number of anceſtors at any even degree may be had by ſquaring the number of anceſtors at half that number of degrees: thus 16, the number of anceſtors at 4 degrees, is the ſquare of 4, the number of anceſtors at two; 256 is the ſquare of 16; 65536 of 256; and the number of anceſtors at 40 degrees would be the ſquare of 1048576, or upwards of a million of millions. Theſe powers are eaſily found by means of logarithms. See Progression.

Table II.

Collateral Degrees.	Number of Kindred.
1	1
2	4
3	16
4	64
5	256
6	1024
7	4096
8	16384
9	65536
10	262144
11	1048576
12	4194304
13	16777216
14	67108864
15	268435456
16	1073741824
17	4294967296
18	17179869184
19	68719476736
20	274877906944

It is obvious that in this table the numbers in the progreſſion increaſe much more rapidly than thoſe of the former table; for though the firſt born is 1, the ratio of the progreſſion is 4; that is, there is one kinſman (a brother) in the firſt degree, who makes, together with A. B., the *propoſitus*, as he is called, the two deſcendants from the firſt couple of anceſtors; and in every other degree, the number of kindred muſt be *quadruple* of thoſe in the degree which immediately precedes it. For, ſince each couple of anceſtors has two deſcendants, who increaſe in a duplicate ratio, it will follow that the ratio in which all the deſcendants increaſe downwards, muſt be double that in which the anceſtors increaſe upwards; but the anceſtors increaſe upwards in a duplicate ratio; therefore the deſcendants muſt increaſe downwards in a double duplicate; that is, in a quadruple ratio. This calculation may be formed by a more compendious proceſs, *viz.* by ſquaring the couples, or half the number of anceſtors at any given degree, which will furniſh the number of kindred we have in the ſame degree, at equal diſtance with ourſelves from the common ſtock, beſides thoſe at unequal diſtances. Thus, in the 10th lineal degree, the number of anceſtors is 1024; its half, or the couples, amount to 512; the number of kindred in the 10th collateral degree amounts, therefore, to 262144, or the ſquare of 512. Or, it will be ſeen in the table that $\overline{4|}^{3} = 64$, the number of kindred in the 4th collateral degree; $\overline{4|}^{4} = 256$, the number in the 5th degree; $\overline{4|}^{6} = 1024$, the number in the 6th degree, &c. and therefore if the number of degrees be denoted by n, $\overline{4|}^{n-1}$, will be the number of kindred in the degree expreſſed by n; which is eaſily obtained by the aid of logarithms in any degree, however remote. If any one will be at the trouble of recollecting the ſtate of the ſeveral families within his own knowledge, and of obſerving how far they agree with this account; that is, whether, on an average, every man has not one brother or ſiſter, four firſt couſins, ſixteen ſecond couſins, and ſo on; he will find that the preſent calculation is very far from being overcharged.

From the records of ſcripture we learn, that there is one couple of anceſtors belonging in common to us all, from whence the whole race of mankind is deſcended; and hence we deduce, as an obvious and undeniable conſequence, that all men are in ſome degree, however remote, related to each other. For, indeed, if we only ſuppoſe each couple of our anceſtors to have left, one with another, two children; and each of thoſe children on an average to have left two more; (and, without ſuch a ſuppoſition, the human ſpecies muſt be daily diminiſhing) we ſhall find that all of us have now ſubſiſting nearly 270 millions of kindred in the 15th degree, at the ſame diſtance from the ſeveral common anceſtors as we ourſelves are; beſides thoſe that are one or two deſcents nearer to or farther from the common ſtock, who may amount to as many more. And, if this calculation ſhould appear incompatible with the number of inhabitants on the earth, it is becauſe, by intermarriages among the ſeveral deſcendants from the ſame anceſtor, a hundred or a thouſand modes of conſanguinity may be conſolidated in one perſon, or he may be related to us a hundred or a thouſand different ways.

The method of computing theſe degrees in the canon law (Decretal. 4. 14. 3 & 9.) which our law has adopted (Co. Litt. 23.) is as follows: We begin at the common anceſtor, and reckon downwards; and in whatſoever degree the two perſons, or the moſt remote of them, is diſtant from the common anceſtor, that is the degree in which they are related to each other. Thus, Titius and his brother are related in the firſt degree; for, from the father to each of them is counted only one; Titius and his nephew are related in the ſecond degree; for the nephew is two degrees removed from the common anceſtor; *viz.* his own grandfather, the father of Titius. See Blackſt. Comm. vol. ii.

Marriage is prohibited by the church to the fourth degree of conſanguinity incluſive; but, by the law of nature, conſanguinity is no obſtacle to marriage, except it be in the direct line. See Marriage.

Conſanguinity terminates in the ſixth and ſeventh degree, excepting in the ſucceſſion to the crown; in which caſe, conſanguinity is continued to infinity.

The civilians call *fratres conſanguinei*, thoſe born of the ſame father; in oppoſition to *fratres uterini*, who are only born of the ſame mother. See Descent.

According to the common opinion, thoſe were not allowed to complain of an inofficious teſtament, *i. e.* of being diſinherited without cauſe; excepting from the turpitude of the perſon appointed heir in their place. But Van Water endeavours to ſhew the contrary; and urges, that the *conſanguinei* might plead inofficioſity, even where the teſtament was not made in favour of a perſon incapable. See Kindred.

CONSAR, in *Geography*, a town of Perſia, in the province of Irak; 52 miles N.W. of Iſpahan.

CONSARBRUCK, or Conz, a town of Germany, in the electorate of Treves, ſituated at the conflux of the Saar and the Moſelle; 2 miles S. of Treves.

CONSBACH, a town of Sweden, in South Gothland; 32 miles N. of Wardberg.

CONSCIENCE, in *Ethics*, a ſecret teſtimony or judgment of the ſoul, or as ſome have defined it, a diſtinct faculty or power of the mind, by which it gives its approbation

tion to things it does that are naturally good; and reproaches itſelf for thoſe that are evil. Or, conſcience is a dictate of the underſtanding power, concerning moral actions; conſidered as it has the knowledge of laws; and conſequently as conſcious of what is to be done, or not done, with regard to the legiſlator.

In the more popular ſenſe of the word, conſcience is a judgment, either true or falſe, whereby we pronounce a thing good or evil. This makes what we call the inner *forum*, or tribunal. Accordingly, it ſhould be conſidered, not as a mere intellectual light, or informing faculty, a dictate of the practical underſtanding (as the ſchools call it), which directs, admoniſhes, and influences us, in what we *are to do;* but as it *acts* back upon the ſoul by a reflection on what we *have done;* and is, by that means, the ſource and cauſe of all that joy, or dejection of mind, of thoſe internal ſenſations of pleaſure or pain, which attend the practice of great virtues or great vices.

Some divines maintain, that conſcience is infallible; and hold it to be that immutable law whereby God will judge men: they deny that the underſtanding can be the ſource of errors, and lay them all at the door of the will. A man, ſay they, may ſecure himſelf from error, by forbearing to judge of things till he have a clear and diſtinct perception of them.

Some of the ſchoolmen diſtinguiſh between the conſcience antecedent to an action, and that conſequent to it: the firſt, called *antecedent* conſcience, determines what is good, and what evil; and conſequently preſcribes what is to be done, and what avoided. *Conſequent* conſcience is a kind of ſecondary or reflex judgment, with regard to the goodneſs, &c. of things, already done or committed.

The *rule* of conſcience is the will of God, ſo far as it is made known to us, either by the light of nature, or by that of revelation. With reſpect to the knowledge of this rule, conſcience is ſaid to be *rightly informed*, or *miſtaken; firm*, or *wavering*, or *ſcrupulous*, &c. With reſpect to the conformity of our actions to this rule when known, conſcience is ſaid to be *good*, or *evil*, &c.

In a moral view, it is of the greateſt importance that the underſtanding be well informed, in order to render the judgment or verdict of conſcience a ſafe directory of conduct, and a proper ſource of ſatisfaction. Otherwiſe, the judgment of conſcience may be pleaded, and it has actually been pleaded, as an apology for very unwarrantable conduct. Many atrocious acts of perſecution have been perpetrated, and afterwards juſtified, under the ſanction of an erroneous conſcience. It is alſo of no ſmall importance, that the ſenſibility of conſcience be duly maintained and cheriſhed; for want of which men have often been betrayed into criminal conduct without ſelf-reproach, and have deluded themſelves with falſe notions of their character and ſtate.

Dr. Reid (See his "Eſſays on the active Powers of Man," p. 252, &c.) has made the following obſervations on that power of the mind, which we call conſcience. 1. Like all our other powers, it comes to maturity by inſenſible degrees, and may be much aided in its ſtrength and vigour by proper culture. 2. Conſcience is peculiar to man. We ſee no veſtige of it in brute animals; and it is therefore one of thoſe prerogatives by which we are raiſed above them. Conſcience is evidently intended by nature to be the immediate guide and director of our conduct, after we arrive at the years of underſtanding. Other principles may urge and impel; but this only authoriſes. Other principles ought to be controlled by this: this may be, but never ought to be controlled by any other, and never can be with innocence. From theſe obſervations it evidently follows, that the moral faculty of conſcience is both an active and an intellectual power of the mind. As an active principle, it ſometimes concurs with other active principles, ſometimes oppoſes them, and ſometimes is the ſole principle of action. As an intellectual principle, we have by it, and by it alone, the original conceptions of right and wrong in human conduct, in their different degrees and different ſpecies.

Philoſophers in lieu of the word *conſcience*, which ſeems appropriated to theological matters, frequently uſe that of *conſciouſneſs*; which ſee.

The power of conſcience has been remarked in all ages of the world, and under all diſpenſations of religion; and hiſtory, both ſacred and profane, furniſhes innumerable examples, that are eminently inſtructive. One remarkable inſtance of this kind occurs in the hiſtory of Joſeph and his brethren (ſee Gen. chap. xlii. and particularly v. 21.) Another is preſented to us in the account which the evangeliſt Matthew has given us of the feelings and reflections of Herod the tetrarch, when he heard of the fame of Jeſus, after he had occaſioned the death of John the Baptiſt. (See Matth. xiv. 1, 2, 3.) Biſhop Atterbury has admirably pourtrayed the ſtate of Herod's mind, in his excellent ſermon on this ſubject. (Sermons, vol. iv. Serm. 4.) Many inſtances of a ſimilar kind occur in profane hiſtory. We ſhall content ourſelves with ſelecting one, and ſhall give it in the words of the elegant preacher already cited. "Tiberius, that complete pattern of wickedneſs and tyranny, had taken as much pains to conquer theſe fears (referring to the fears of futurity before deſcribed) as any man, and had as many helps and advantages towards it, from great ſplendour and power, and a perpetual ſucceſſion of new buſineſs, and new pleaſures: and yet, as great a maſter of diſſimulation as he was, he could not diſſemble the inward ſenſe of his guilt, nor prevent the open eruptions of it upon very improper occaſions. Witneſs that letter which he wrote to the ſenate from his impure retreat at Capreæ. Tacitus has preſerved the firſt lines of it; and there cannot be a livelier image of a mind filled with diſtraction and deſpair than they afford us: *Quid, ſcribam vobis, P. C. aut quomodo ſcribam, aut quid omnino non ſcribam hoc tempore, Dei me Deæque pejus perdant, quàm perire quotidie ſentio, ſi ſcio!* that is, "What, or how, at this time, I ſhall write to you, fathers of the ſenate, or what indeed I ſhall not write to you, may all the powers of heaven confound me yet worſe than they have already done, if I know or can imagine!" And *his* obſervation upon it is well worthy of *ours*, and very appoſite to our preſent purpoſe: "In this manner (ſays he) was this emperor puniſhed by a reflexion on his own infamous life and guilt; nor was it in vain that the greateſt maſter of wiſdom (he means Plato) affirmed, that were the hearts of tyrants once laid open to our view, we ſhould ſee there nothing but ghaſtly wounds and bruiſes; the conſciouſneſs of their own cruelty, lewdneſs, and ill conduct, leaving as deep and bloody prints on their minds, as the ſtrokes of the ſcourge do on the back of a ſlave. Tiberius (adds he) confeſſed as much, when he uttered theſe words; nor could his high ſtation, or even privacy and retirement itſelf, hinder him from diſcovering to all the world the inward agonies and torments under which he laboured." Thus that excellent hiſtorian. We cannot forbear ſubjoining the following fact, related by Mr. Fordyce in his "Dialogues on Education" (vol. ii. p. 401), as a real occurrence which happened in a neighbouring ſtate not many years ago. A jeweller, a man of good character and conſiderable wealth, having occaſion, in the way of his buſineſs, to travel at ſome diſtance from the place of his abode, took along with him a ſervant, in order to take care of his portmanteau. He had with him ſome of his beſt

beft jewels, and a large fum of money, to which his fervant was likewife privy. When the mafter had occafion to difmount on the road, the fervant, watching his opportunity, took a piftol from his mafter's faddle and fhot him dead on the fpot; he then rifled him of his jewels and money, and hanging a large ftone to his neck, threw him into the neareft canal. With this booty he made off to a diftant part of the country, where he had reafon to believe that neither he nor his mafter were known. There he began to trade in a low way at firft, that his obfcurity might fcreen him from obfervation, and in the courfe of feveral years feemed to rife, by the natural progrefs of bufinefs, into wealth and confideration; fo that his good fortune appeared at once the effect and reward of induftry and virtue. Of this he counterfeited the appearance fo well, that he grew into great credit, married into a good family, and by laying out his hidden ftores difcreetly, as he faw occafion, and joining to all an univerfal affability, he was admitted to a fhare in the government of the town, and rofe from one poft to another, till at length he was chofen chief magiftrate. In this office he maintained a fair character, and continued to fill it with no fmall applaufe, both as a governor and a judge; till one day as he fat on the bench with fome of his brethren, a criminal was brought before him who was accufed of murdering his mafter. The evidence came out full, the jury brought in their verdict that the prifoner was guilty, and the whole affembly waited the fentence of the prefident of the court (an office which that day belonged to him); with great fufpence. In the mean while he manifefted an unufual diforder and agitation of mind, and his colour often changed; at length he arofe from his feat, and coming down from the bench, placed himfelf juft by the unfortunate man at the bar. "You fee before you (faid he, addreffing himfelf to thofe who had fat on the bench with him) a ftriking inftance of the juft retaliation of heaven, which this day, after 30 years' concealment, prefents to you a greater criminal than the man juft now found guilty." He then proceeded to make an ample confeffion of his guilt, and of all its aggravations. "Nor can I feel (continued he) any relief from the agonies of an awakened confcience, but by requiring that juftice be forthwith done againft me in the moft public and folemn manner." We may eafily fuppofe the amazement of the whole affembly, and efpecially of his fellow-judges. However, they proceeded, upon this confeffion, to pafs fentence upon him, and he died with all the fymptoms of a penitent mind.

Conscience, *Court of.* See Court.

CONSCIOUSNESS, in *Logic* and *Metaphyfics*, is the mind's perception of its own exiftence, faculties, and operations; and, in this view of it, it is one of the fources of judgment, and one fpecies of evidence. Confcioufnefs, fays Dr. Reid, (Effays on the Intellectual Powers of Man, p. 578,) is an operation of the underftanding of its own kind, and cannot be logically defined. The objects of it are our prefent pains, our pleafures, our hopes, our fears, our defires, our doubts, our thoughts of every kind; in a word, all the paffions, and all the actions and operations of our own minds, while they are prefent. We may remember them when they are paft: we are confcious of them only while they are prefent. It is, therefore, a *firft* principle that every thing exifts of which we are confcious. When a man is confcious of pain, he is certain of its exiftence; when he is confcious that he doubts, or believes, he is certain of the exiftence of thefe operations. And his conviction of the reality of thefe operations is not the effect of reafoning: it is immediate and intuitive. The exiftence, therefore, of the paffions and operations of our minds, of which we are confcious, is a firft principle, which nature requires us to believe upon her authority. Indeed, this is the only principle of common fenfe, which has never been directly called in queftion, and which retains its authority with the greateft fceptics. Mr. Hume, after annihilating body and mind, time and fpace, action and caufation, and even his own mind, acknowledges the reality of the thoughts, fenfations, and paffions of which he is confcious. From this fource of confcioufnefs we derive all that we know, and indeed all that we can know, of the ftructure, and of the powers of our own minds; from which we may conclude, that no branch of knowledge ftands upon a firmer foundation; for furely no kind of evidence can go beyond that of confcioufnefs. Some have confounded confcioufnefs and reflection, though they are effentially diftinct. The former is common to men at all times, but is infufficient to give us clear and diftinct notions of the operations of which we are confcious, and of their mutual relations, and minute diftinctions. The fecond, or attentive reflection upon thefe operations, making them objects of thought, furveying them attentively, and examining them on all fides, is fo far from being common to all men, that it pertains to very few.

Another firft principle, in relation to the fubject of this article is, that the thoughts of which any one is confcious are the thoughts of a being which he calls *himfelf*, his *mind*, his *perfon*. "If any man afks a proof of this," fays Dr. Reid, "I confefs I can give none; there is an evidence in the propofition itfelf, which I am unable to refift. Shall I think, that thought can ftand by itfelf without a thinking being? or that ideas can feel pleafure or pain? My nature dictates to me that it is impoffible. And that nature has dictated the fame to all men, appears from the ftructure of all languages; for in all languages men have expreffed thinking, reafoning, willing, loving, hating, by perfonal verbs, which from their nature require a perfon who thinks, reafons, wills, loves, or hates. From which it appears, that men have been taught by nature to believe that thought requires a thinker, and reafon a reafoner, and love a lover."

"Here," continues Dr. Reid, "we muft leave Mr. Hume, who conceives it to be a vulgar error, that befides the thoughts we are confcious of, there is a mind which is the fubject of thofe thoughts." If the mind be any thing elfe than impreffions and ideas, it muft be a word without a meaning. The mind, therefore, according to this philofopher, is a word which fignifies a bundle of perceptions; or when he defines it more accurately, "It is that fucceffion of related ideas and impreffions, of which we have an intimate memory and confcioufnefs." Whence it follows that "I am," fays our author, "that fucceffion of related ideas and impreffions, of which I have the intimate memory and confcioufnefs. But who is the I that has this memory and confcioufnefs of a fucceffion of ideas and impreffions? Why, it is nothing but that fucceffion itfelf."

Identity of confcioufnefs, according to Mr. Locke, conftitutes identity of perfon. For a farther difcuffion of this fubject, fee Identity.

CONSCRIPT, Conscriptus, a popular term in the Roman hiftory, ufed in fpeaking of fenators, who were called *confcript* fathers, *patres confcripti;* becaufe their names were written in the regifter, or catalogue of the fenate.

Livy, lib. i. cap. 1. tells us, that when Brutus filled up the places of the fenators cut off by Tarquin, with others chofen out of the equeftrian order, thofe new fenators only had the appellation given them of *patres confcripti.*

CONSCRIPTS

CONSCRIPTS alfo denote men raifed to recruit the Imperial and French armies. All men capable of bearing arms in Hungary and Bohemia, have been ufually enregiftered and obliged to march wherever their fervices were called for. The confcripts in France, during the laft and prefent war, have been raifed on fimilar principles.

The militia of Great Britain comes likewife in fome meafure under this denomination or defcription, with this difference, that the men have been raifed by ballot, and do not leave their native country, unlefs they voluntarily offer their fervices for that purpofe.

CONSECRATION, the act of converting or fetting apart, any profane, or common thing, to a pious purpofe; with certain ceremonies, prayers, benedictions, &c. appropriate to it.

Confecration is the reverfe of facrilege and profanation, which confift in perverting a thing fet apart for a pious purpofe, to a profane and popular one.

The bifhop confecrates a church, or a chalice; the pope confecrates medals, agnus dei's, &c. and grants indulgences to thofe who bear fuch about them with devotion. The confecration, or dedication, of a church is an epifcopal ceremony, confifting in a great number of benedictions, with afperfions and unctions of chrifm, &c. on the walls, both within fide and without. The form for confecrating churches, chapels, and church-yards, or places of burials, in England, may be feen in Wilkins's Concilia Magnæ Britanniæ, &c. vol. iv. p. 668. It directs that the bifhop and clergy, of whom there are to be at leaft two, fhall enter the church or chapel in their feveral habits, and, as they walk up from the weft to the eaft end, repeat alternately the 24th Pfalm; the bifhop beginning, "The earth is the Lord's," &c. with the "Gloria patri." When they are come to the Lord's table, the bifhop fitting in his chair fhall have the inftrument of dedication, donation, and endowment of the church or chapel, church-yard, or burial-place, prefented to him by the founder, or fome proper perfon, which he fhall caufe to be read by his regifter, or other officer; and then the inftrument fhall be laid on the table, and he fhall ftand on the north fide of it, and turning to the congregation, deliver an addrefs to them, which is followed by fuitable prayers. One of the priefts then reads the fervice of the day, introducing proper pfalms and leffons: after which, the bifhop proceeds to the communion fervice, and inftead of the collect of the day, ufes one proper to the occafion. When the Epiftle and Gofpel are read, they are fucceeded by the Nicene creed and the fermon; and then the bifhop is to proceed with the fervice of the communion. When the fervice in the church is finifhed, the bifhop and clergy with the people fhall go into the church-yard, and make ufe of a prayer for the occafion. See *ubi fupra.*

The cuftom of confecrating perfons, temples, altars, veftments, utenfils, &c. is very ancient; and all the ceremonies thereof are prefcribed under the old law. When thofe confecrations relate to men, they are properly called *ordinations*; excepting thofe performed to bifhops and kings, which ftill retain the name of *confecration*. Thofe which only confift in a ceremony inftituted by the church, are more properly called *benedictions*. When they regard churches, altars, veffels, &c. they are properly called *dedications*.

In the trial of archbifhop Laud, A. D. 1644, it was one of the charges alleged againft him by the commons, that he had traiteroufly endeavoured and practifed "to alter and fubvert God's true religion by law eftablifhed in this realm, and wifhed them to fet up popifh fuperftition and idolatry, and to reconcile us to the church of Rome." One branch of this charge was his introducing and practifing certain popifh innovations, and fuperftitious ceremonies, not warranted by law, nor agreeable to the practice of the church of England fince the reformation. In proof of this charge, the managers, on the part of the commons, infifted on his countenancing the fetting up of images in churches, church-windows, and other places of religious worfhip. See IMAGE.

Another popifh innovation charged on the archbifhop was, his fuperftitious manner of confecrating chapels, churches, and church-yards, fuch as had been practifed in Creed-church, and in the church of St. Giles's in the Fields. The managers objected further, his confecrating altars with all their furniture, as pattens, chalices, altar-cloths, &c. even to the knife that was ufed for cutting the facramental bread; and his dedicating the churches to certain faints, together with his promoting annual revels, or feafts of dedication, on the Lord's day, in feveral parts of the country, by which that holy day was profaned, and the people encouraged in fuperftition and ignorance. With refpect to the confecration of churches, the archbifhop replied, that the practice was as ancient as Mofes, who confecrated the tabernacle, with all its veffels and ornaments; that the temple was afterwards confecrated by Solomon; that as foon as Chriftian churches began to be built, in the reign of Conftantine the Great, they were confecrated, as Eufebius teftifies concerning the church of Tyre, (E. H. l. x. c. 3.), and fo it has continued to the prefent time. Befides, if churches were not confecrated, they would not be holy, &c. &c. As to the manner of confecrating Creed-church, St. Giles's, &c. his grace confeffed that, when he came to the church-door, that paffage in the Pfalms was read, "Lift up your heads, O ye gates, even lift them up, ye everlafting doors, that the king of glory may come in;" that he kneeled and bowed at his entrance into the church, as Mofes and Aaron did at the door of the tabernacle; that he declared the place holy, and made ufe of a prayer like one in the Roman pontifical; that afterwards he pronounced divers curfes on fuch as fhould profane it, but denied his throwing duft into the air, in which he faid, the witneffes had forfworn themfelves; for the Roman pontifical does not prefcribe throwing duft into the air, but afhes; and he conceived there was no harm, much lefs treafon in it. As the confecrating of churches, and alfo dedicating them to God, has been of ancient ufage, fo has the confecration of altars and their furniture; and fuch confecrations are neceffary, for elfe the Lord's table could not be called holy, nor the veffels belonging to it, as they ufually are; yea, there is an holinefs in the altar, which fanctifies the gift, which it could not do, unlefs itfelf was holy; if there be no dedication of thefe things to God, no feparation of them from common ufe, then there can be no fuch thing as facrilege, or difference between our holy table and a common one. And as to the form of confecrating thefe things, the archbifhop alleged, that he had it not from the Roman pontifical, but from bifhop Andrews.

The managers for the commons replied, that if the temple was confecrated, it was by the king himfelf, and not by the high-prieft; and if the tabernacle was confecrated, it was by Mofes, the civil magiftrate, and not by Aaron the high-prieft; but we read, they faid, of no other confecrating the tabernacle and its utenfils, but anointing them with oil, for which Mofes had an exprefs command; nor of any other confecrating the temple, but of Solomon's making an excellent prayer in the outward court, not in the temple itfelf, and of his hallowing the middle court by offerings and peace-offerings; and it is obfervable, that the cloud and glory

glory of the Lord filled the temple, so that the priests could not stand to minister before Solomon made his prayer, which some call his consecration. But if it should be allowed that the temple was consecrated in an extraordinary manner, we have no mention either in Scripture, or in Jewish writers, of the consecration of their synagogues, to which our churches properly succeed. And, after all, it is no conclusive way of arguing, to derive a Christian institution from the practice of the Jewish church, because many of their ordinances were temporary, and abolished by the coming of Christ. Moreover, it is said, that from the beginning of Christianity, we have no credible authority for consecrating churches for 300 years. Eusebius, in his life of Constantine the Great, does indeed mention his consecrating a temple which he built over our Saviour's sepulchre at Jerusalem; but how?—with prayers, disputations, preaching, and exposition of scripture, as he expressly defines it (cap. 45.) Here were no processions, no knocking at the doors by the bishop, crying, "Open ye everlasting doors;" no casting dust or ashes into the air, and pronouncing the ground holy; no reverencing towards the altars, nor a great many other inventions of later ages. These were not known in the Christian church, till the very darkest times of popery; nay, in those very dark times, we are told by Otho, the pope's legate, in his Ecclesiastical Constitutions, that in the reign of king Henry III., there were not only divers parish churches, but some cathedrals in England, which had been used for many years, and yet never consecrated by a bishop. But the archbishop's method of consecrating churches, it is said, evidently appears to be a modern popish invention; for it is agreed by Gratian, Platina, the Centuriators, and others, that the popes Hyginus, Gelasius, Silvester, Felix and Gregory, were the first inventors and promoters of it; and it is no where to be found but in the Roman pontifical, published by command of pope Clement VIII. (De Ecclesiæ dedicatione, p. 209, 280.) for which reason it was exploded and condemned by our first reformers, and particularly by bishop Pilkington, in his comment upon Haggai (ch. i. v. 7, 8.) and archbishop Parker, who (in his Antiq. Brit. p. 85, 87.) expressly condemns the archbishop's method of consecration, as popish and superstitious. (See ALTAR.)

The archbishop, however, says, that if churches are not consecrated, they cannot be holy; whereas many places that were never consecrated are styled holy, as the most holy place, and the holy city Jerusalem; and our homilies say, that the church is called holy, not of itself, but because God's people resorting thither are holy, and exercise themselves in holy things; and it is evident that sanctification, when applied to places, is nothing else but a separation of them from common use to a religious and sacred purpose, which may be done without the superstitious method abovementioned; and though the archbishop avers, that he had not his form of consecration from the Roman pontifical, he acknowledges that he had it from bishop Andrews, who could have had it no where else.

As for the consecration of altars, pattens, chalices, altar-cloths, and other altar-furniture, its original is no higher than the Roman missal and pontifical, in both which there are particular chapters and set forms of prayer for this purpose: but to imagine that these vessels may not be reputed holy, though separated to an holy use, unless they are thus consecrated, is destitute of foundation in reason or scripture, and contrary to the practice of the church of England, and the opinion of our first reformers. As to the practice of *dedication*, &c. see DEDICATION. Neal's Hist. of the Puritans, vol. ii. ch. 5. 4to.

CONSECRATION *of the Pope*, a ceremony which is particularly described by cardinal Rasponi, in his book concerning the church of the Lateran; and which is also related by father Bonanni, in his medallic history of the popes; and by Lenfant, in his history of the council of Constance. "Before the usage of the conclave was introduced by Gregory the tenth," says cardinal Rasponi, "the cardinals, three days after the obsequies of the former pope, convened in the Lateran church, where, after the invocation of the Holy Spirit, and the celebration of mass, they proceed to the election of a pope. The election being made, the first cardinal deacon invested the pope elect in his pontifical habits, and announced the name which he chose to take;" for it has been the custom now, for several centuries, that the pope should assume a new name on being elected. "Afterwards, two cardinals, the most eminent in dignity, one on his right hand, the other on his left, conducted him to the altar, where he prostrated himself in adoration of God, whilst they sang the *Te Deum*. After the *Te Deum*, the cardinals seated the pope in a marble chair, which was behind the altar, under a sort of dome, or vault, where the pope, being set, admitted the cardinals, the bishops, and some others, to kiss his feet, and to receive the *kiss of peace*. Then the pope rising, the cardinals conducted him through the portico to another chair, bored like what is called in French, *selle percée*. This chair was thence very properly named *stercoraria*, the stercorary. It was formerly placed before the portico of the patriarchal basilic, and is now to be seen in the cloister of that basilic. The use of these chairs, however, was afterwards abolished by Leo the tenth, probably for this, amongst other reasons, because the perforated chair was become connected with the fabulous story of the female pope. That, however, is not a protestant fable, as some persons ignorantly pretend, for it was current long before the days of Luther. But the continuance of the use of that chair preserved the memory of the story, and might appear to the credulous an evidence of its truth. Whilst the pope sat on the stercorary, the choir sang these words of scripture: Suscitat de pulvere egenum, et de stercore erigit pauperem, ut sedeat cum principibus, et solium gloriæ teneat. Psalm, cxiii. 7. The last clause is not in the psalm. *He raiseth the poor out of the dust, and lifteth the needy off the dunghill, that he may set him with the princes of his people, and that he may possess the throne of glory.* The intention of this ceremony, it was said, was to insinuate to the pope the need there is of the virtue of humility, which ought to be the first step of his greatness. After remaining some time in this chair, the pope received from the hands of the chamberlain three deniers, which he threw to the people, pronouncing these words: *Silver and gold I have none for my pleasure, but what I have I give you.* Afterwards, the prior of the Lateran basilic, and one of the cardinals, or one of the canons of that basilic, took the pope between them, and whilst they walked in the portico, shouts of acclamation were raised near the basilic, and the election was declared, with the name which the pope had taken. In this manner they conducted the pope to the basilic of St. Sylvester, where, being placed before this basilic in a chair of porphyry, the prior of the basilic put into his hands a *ferula*, in sign of correction and government, and the keys, to denote the power which God gave to St. Peter, prince of the apostles, of opening and shutting, of binding and loosing, and which passes (according to our historian) successively to all the Roman pontiffs. Thence the pope, carrying the ferula, and the keys, went to place himself in another chair, resembling the former; and after remaining there some time, restored the ferula and the keys to the prior, who girt him with a girdle of red silk, giving him a purse

purſe of the ſame colour and ſtuff, wherein there were twelve precious ſtones, and a ſmall bit of muſk. Onuphrius, in his treatiſe on the baſilic of the Lateran, ſays, that it was the prior of this baſilic who gave theſe things to the pope. His ſitting in the two chairs denoted the primacy which St. Peter conferred on him, and the power of preaching the goſpel conferred by St. Paul. The girdle ſignified continence and chaſtity, the purſe denoted the treaſure, out of which the poor were to be nouriſhed, the twelve precious ſtones repreſented the power of the twelve apoſtles, which reſides totally in the pontiff; in fine, the muſk denoted the fragrancy of good works, according to that ſaying, *We are to God a ſweet ſavour of Chriſt.* In this chair the pope elect admitted the miniſters of the palace to kiſs his feet, and to receive the kiſs of peace. There, too, ſeveral pieces of ſilver were delivered to him by the chamberlain, to the value of ten pence. Theſe he threw to the people at three different times, pronouncing theſe words, *He hath ſcattered*; *he hath given to the poor*; *his righteouſneſs remaineth for ever.* All this being done, the pope elect went next Sunday, attended by all the orders of the ſacred palace, and the principal people of the city, to the baſilic of the Vatican, and there, before the confeſſion of St. Peter, he was ſolemnly conſecrated by the biſhop of Oſtia, to whom this office ſpecially belongs. After this function, the archdeacon and the ſecond deacon gave the pall to the pope, the archdeacon pronouncing theſe words, *Receive the pall, which is the plenitude of the pontifical office, to the honour of Almighty God, of the moſt happy virgin his mother, of the bleſſed apoſtles St. Peter and St. Paul, and of the holy Roman church.*"

After this deſcription, cardinal Raſponi adds theſe words: "This is what was done when the pontiff was announced or proclaimed in the church of the Lateran; but when the election was made in the Vatican, the pope, immediately after being conducted to the altar by two cardinals, or after having performed his adoration, and offered a ſecret prayer, kneeling, was placed in a chair behind the altar, where he admitted the cardinal biſhops, and the others, during the ſinging of the *Te Deum*, to kiſs his feet, and to receive the kiſs of peace. The following Sunday they aſſembled in the ſame church, and the pope, crowned according to the cuſtom of his anceſtors, went to the Lateran palace; but before entering it, he ſeated himſelf in the *ſtercorary*, where, ſitting down thrice, according to cuſtom, he was introduced by the cardinals into the baſilic, diſtributing money to the populace. There he aſcended a throne behind the altar, where he admitted the canons of the baſilic to kiſs his feet, and to receive the kiſs of peace: which being done, he went to place himſelf in the chairs that were before the oratory of St. Sylveſter, where all was performed that has been recited above. But if it happened that the pope was created out of Rome, all the clergy, when he made his entry into that city, and before entering the gate of the Lateran, went to meet him without the gate, in pontifical habits, with the ſtandard of the croſs and cenſers; and, entering thus into the Lateran church, they obſerved, though in an order ſomewhat different, all the ceremonies mentioned above. And if the pope, coming to Rome after his conſecration, went to the church of St. Peter, the ſame rites were uſed there as in the Lateran church, except only that he did not receive the canons of St. Peter to kiſs his feet in the portico, and that he did not ſit down on the *ſtercorary*, which is not in that church. For this reaſon, the next day after maſs, he went without the tiara to the Lateran palace, and before entering the baſilic, he placed himſelf on the ſtercorary, with the accuſtomed ceremonies."

Consecration, or, as it is more uſually called, Benediction *of the waters*, denotes a ceremony annually practiſed in the Greek church, on the 6th of January, or, as we denominate it, Twelfth-day. For this ceremony at St. Peterſburg, a ſort of wooden chapel or tabernacle, painted green, and ſtuck round with boughs of firs, is conſtructed on the ice of the Neva, between the Admiralty and the Imperial palace. This little building is covered with a dome, reſting on eight ſmall columns, on which ſtands the figure of John the Baptiſt, with the croſs in his hand, amidſt bulruſhes; the inſide of the edifice being decorated with paintings, repreſenting the baptiſm of Jeſus, his transfiguration, and other tranſactions of his life. From the centre of the dome is ſuſpended, by a chain, a monſtrous large holy-ghoſt of wood, over the aperture in the ice, round which are ſpread rich carpets. This little temple is entirely ſurrounded with paliſadoes, which are alſo ornamented with fir-branches; the ſpace within being likewiſe covered with carpets. A ſort of gallery round the building communicates with a window of the palace, from which the imperial family come forth to attend the ceremony; though for ſeveral years paſt (ſays Mr. Tooke) the empreſs and her grandchildren only ſaw the ſolemnity from the windows of the palace. The ceremony begins immediately when the regiments of guards have taken their ſtation on the river. Then the archbiſhop appears amid the ſound of church-bells and the firing of the cannon of the fortreſs, and proceeds along the carpets, attended by his train of biſhops and other eccleſiaſtics, into this little church, where, ſtanding at the hole in the ice, he dips his crucifix three times in the water, at the ſame time repeating prayers, and concludes with a particular one to the great ſaint Nicholas; which done, the water is accounted bleſſed. The prelate then ſprinkles with it the whole ſurrounding multitude, and the banners of all the regiments which are at that time in Peterſburg. When the conſecration is ended, he retires: and now the people preſs in crowds to the hole in the ice, where they drink it with pious avidity; mothers, notwithſtanding the cold, dip their naked babes in the ſtream, and men and women pour it on their heads; every one holds it a duty to take home a veſſel of the water, in order to purify their houſes, and for the cure of certain diſeaſes, for which it is affirmed to be a powerful ſpecific: during which four popes, one at each corner of the aperture, chant a ſort of litany for the occaſion. Tooke's Life of Cath. II. vol. i. p. 180.

Consecration, in *Eccleſiaſtical Law*, is one of the ways by which a benefice may be vacated; the others being by death, by ceſſion, by reſignation, and by deprivation. Thus, when a clerk is promoted to a biſhopric, all his other preferments are void the inſtant he is conſecrated; but there is a method, by the favour of the crown, of holding ſuch livings *in commendam;* which ſee.

Consecration is particularly uſed for the benediction of the elements in the euchariſt.

The Romaniſts define it, the converſion of the bread and wine into the real body and blood of Jeſus Chriſt: and that this is the ſentiment of their church, is evident from the prieſt's elevating the hoſt immediately after conſecration, for the people to adore it. See Elevation, Host, &c.

There is a great controverſy between the Latin and Greek churches, touching the words of conſecration; the common opinion among the Romaniſts, agreeable to St. Thomas and the ſchoolmen, is, that the conſecration of the bread and wine conſiſts in theſe words, *This is my body; this is my blood.* The Greeks, on the contrary, attribute the change of the elements to a certain prayer, which they call the *invocation of the Holy Ghoſt*, rehearſed after the words, *This is*

my body; this is my blood; which the Greeks maintain are only neceſſary in the proceſs of the conſecration, as they contain the hiſtory of the inſtitution; not as they contribute any thing to the change.

Consecration *of various animals,* was common among the ancient Greeks and Romans. Suetonius mentions the conſecration of a great number of horſes by Julius Cæſar, when he paſſed the Rubicon; and Euſtathius obſerves, that it was common among the Greeks to conſecrate whole herds of cattle, and ſeveral ſorts of fowls, eſpecially geeſe and peacocks, to their gods; giving ſuch animals their liberty, and forbidding all perſons to touch or moleſt them. Athenæus remarks, that they paid the ſame reſpect to fiſhes, particularly thoſe beſt adapted to the palate; and Pliny takes notice, that the dolphin of Octavius Anicius had this favour conferred upon him. Ælian likewiſe relates, that they ſometimes put necklaces about the necks of their fiſhes, and then turned them looſe to their proper element. The Romans alſo had their magical conſecrations: it being cuſtomary for their emperors to offer ſacrifices, repeat charms, and diſpoſe ſtatues in certain places, imagining that ſuch magical operations would hinder barbarians from entering their dominions. Thus Marcus Antoninus endeavoured to fortify himſelf againſt the invaſion of the Marcomanni; and ſome have thought that the palladium of Troy, and the vocal ſtatue of Memnon, were of this kind. Macrobius has given us a particular deſcription of the conſecration of the Roman pontiffs, to the following purport: they dug a pit in the earth, into which the perſon to be conſecrated was let down, dreſſed in prieſtly veſtments, and the pit was covered with a plank bored almoſt full of holes; a bull, crowned with garlands of flowers, was placed on this plank, and his throat being cut, the blood poured through the plank on the prieſt, who received it on his head and face. On aſcending from the pit, covered with blood, he received the ſalutation of *Pontifex.*

Consecration, among *Medaliſts,* is the ceremony of the *apotheoſis* of an emperor; or his tranſlation into heaven, and reception among the gods. See Apotheosis.

On medals, the *conſecration* is thus repreſented: on one ſide is the emperor's head, crowned with laurel, ſometimes veiled; and the inſcription gives him the title of *divus:* on the reverſe is a temple, a buſtum, an altar, or an eagle taking its flight towards heaven, either from off the altar, or from a cippus: at other times the emperor is ſeen in the air, borne up by the eagle; the inſcription always, consecratio.

Theſe are the uſual ſymbols: yet on the reverſe of that of Antoninus, is the Antonine column. In the apotheoſis of empreſſes, inſtead of an eagle there is a peacock. As to the honours rendered theſe princes after death, they were explained by the words *conſecratio*, *pater*, *divus*, and *deus.* Sometimes around the temple or altar are put, *memoria felix*, or *memoriæ æternæ:* for princeſſes, *æternitas*, and *ſideribus recepta:* on the ſide of the head, *dea*, or Θεα. See Medal.

CONSECTARY, a propoſition that follows, or is deduced, from ſome preceding definition, lemmata, axioms, concluſions, or the like. Some rather chooſe to call it a *conſequence:* and others a *corollary*, &c.

CONSECUTIVE Chords, in *Muſic*, are ſuch as immediately ſucceed each other in compoſition or performance. See Music, *Plate* IV. Holder truly obſerves, when ſpeaking of the rule in compoſition, which diſallows a ſucceſſion of octaves or fifths, except by contrary motion, that in ſtrictneſs the ſame applies to all conſecutive intervals whatever; but that the intermixture of major and minor thirds, and major and minor-ſixths in the ſcale, renders the occurrence of conſecutive major-thirds, major-ſixths, minor-thirds or minor-ſixths, very rare and inoffenſive in their cloying effect upon the ear, compared with thoſe of fourths, fifths, or octaves, if care is not taken by the compoſer to prevent the ſucceſſion of the latter, except in contrary motions.

CONSECUTIVELY, Consecutivé, in the *School Philoſophy*, is ſometimes uſed in oppoſition to *antecedently*, and ſometimes to *effectively*, or *cauſally*.

Thus, ſay the ſchoolmen, the corruption of one thing is the generation of another, not *effectively*, but *conſecutively:* that is, ſince matter cannot be without form, it is neceſſary, that the generation of one thing follow upon the corruption of another.

CONSEDIA, in *Ancient Geography*, a place of Gallia Lyonnenſis, ſituated, according to the Itinerary of Antonine, between *Condate* and *Fanum Martio*.

CONSEIL de guerre, Fr. *Council of War.* This is compoſed of the general in chief, and the general officers of the army, which he commands, whether it be held for the purpoſe of deliberating among themſelves on the meaſures they ought to purſue in a difficult conjuncture, of an offenſive or defenſive nature or otherwiſe; or for ſome act of military juſtice; or for accepting, regulating, ſtipulating, or refuſing articles of a propoſed capitulation; or for eſtabliſhing rules and regulations for the police and diſcipline of the troops; or, in fine, for judging of any military crime or offence.

Conseil *de Guerre ſecret*, Fr. A ſecret council of war. A ſecret council held by the king and his miniſters for deliberating on a defenſive, offenſive, or federative war.

CONSENT *of* Parts, in the *Animal Economy.* See Sympathy.

CONSENTES, in *Mythology*, derived from the old Latin *conſo*, *to counſel*, denote twelve ſuperior deities among the Romans, or the "dii majorum gentium," who were apprehended to belong to the council of Jupiter. They were comprehended by Ennius in the following diſtricts:

> "Juno, Veſta, Minerva, Ceres, Diana, Venus, Mars,
> Mercurius, Jovis, Neptunus, Vulcanus, Apollo."

Thoſe which were eſteemed the ſuperior deities, and were the principal objects of the Pagan worſhip, had been men, according to Cicero (Taſcul. Diſput. lib. i. c. 12, 13.); and this was taught even in the myſteries. Varro mentions twelve deities under the ſame denomination, who ſuperintended agriculture. Lib. i. De Re Ruſtica.

Theſe conſentes had a temple at Piſa in Italy; and they had their common altar at Athens, as Plutarch (in Nicia) informs us. Ariſtophanes ſays, it was uſual to ſwear by them. In ancient inſcriptions they are thus marked; J.O.M. *i. e. Jovi optimo maximo*, Cæterisq. Dis Consentibus. They were alſo called "Dii magni," "cæleſtes," or "nobiles;" and are repreſented as occupying a different part of heaven from the inferior gods, who are called "Plebs."

CONSENTIA were feaſts inſtituted in honour of theſe deities.

Consentia, in *Ancient Geography*, *Coſenza*, a town of Italy and capital of the country of the Brutii by whom it was built. It was ſituated on the ſmall river Crathis. Alexander, king of Epirus, ſurpriſed it in his expedition into Italy. See Cosenza.

CONSEQUENCE, in *Logic*, the concluſion of a reaſoning, or argument.

The

The two premiſes of a ſyllogiſm being granted, the conſequence muſt alſo be granted.

In a more reſtrained ſignification, conſequence is uſed for the relation or connexion between two propoſitions, whereof one follows, or is inferred, from the other.—Thus: *It is an animal, and therefore feels.*

CONSEQUENT, the laſt propoſition of an argument; being ſomething deduced or gathered from a preceding argumentation. An enthymeme only contains two propoſitions, the *antecedent* and *conſequent:* if the *antecedent* be abſurd, the *conſequent* muſt be ſo too.

Consequent, in a more preciſe ſenſe, is uſed for the propoſition which contains the concluſion, conſidered in itſelf, and without any regard to the *antecedent:* in which ſenſe, the *conſequent* may be true, though the *conſequence* be falſe.

Consequent *of a ratio*, in *Arithmetic*, the latter of the two terms of a ratio; or that to which the antecedent is referred. See Proportion.

Thus, in $a : b$, or a to b, b is the conſequent, a the antecedent.

CONSEQUENTS, in *Rhetoric*, are alſo uſed to ſignify ſuch things, as being allowed, neceſſarily, or very probably, infer their antecedents. Thus with reſpect to a ſubſtance, it is corruptible, and therefore material.

CONSEQUENTE, in the *Italian Muſic*, is uſed to ſignify concords, or thoſe intervals which afford pleaſure, be they either perfect, as the fifth and eighth, or imperfect, as the third, ſixth, &c. See Octave.

CONSEQUENTIA, in *Aſtronomy*, is oppoſed to *antecedentia;* and a motion *in conſequentia* is a motion in the order of the ſigns of the zodiac.

CONSEQUENTIAL Damages, in *Law*. See Damage.

CONSEQUENZA, *Ital.* a term in *Muſic*, uſed by Zarlino and other old authors, inſtead of *Fuga;* but P. Martini makes it ſynonymous with *Riposta*, or reply to a ſubject given.

CONSERANS, or Conferans, in *Geography*, the name, before the revolution, of a country in France, in Gaſcony, and the dioceſe of a biſhop, who reſided at St. Liſier, the capital; it was bounded on the eaſt by Foix, on the ſouth by Catalonia, and on the north and weſt by Comminges.

CONSERVATION, in *Ontology*, denotes giving duration, or continuance in exiſtence to all creatures, in contradiſtinction to creation, which gives exiſtence to all created ſubſtances. Some of the ancient ſchoolmen have repreſented conſervation as a continued creation; to which it has been objected that as God, whenever he creates a ſubſtance, muſt create it with all the properties, modes, and accidents which belong to it, it will follow, that he muſt at the ſame time create or give being to, all their ſinful thoughts and inclinations, and even their moſt criminal and abominable actions; or, in the moſt complete ſenſe of the term, be the author of ſin. Watts's Philoſ. Eſſ. Eſſ. xi § 4.

CONSERVATIVE Suture. See Suture.

CONSERVATOR, an officer eſtabliſhed for the ſecurity and preſervation of the privileges granted to ſome cities and communities; or, a perſon who has a commiſſion to judge of, and decide, the differences ariſing among them. In moſt catholic univerſities, there are two *conſervators*; the *conſervator* of royal privileges, or thoſe granted by kings; and the *conſervator* of apoſtolical privileges, or thoſe granted by the pope. The firſt takes cognizance of perſonal and mixed cauſes between the regents, ſtudents, &c. and the latter of ſpiritual matters between eccleſiaſtics.

Anciently there were appointed *conſervators* of treaties of peace between princes; and theſe conſervators became judges of the infractions made on a treaty, and were charged with procuring ſatisfaction to be made. They were uſually the feudatories of the ſeveral powers. In lieu of conſervators, princes now have recourſe to other indifferent princes to guarantee their treaties. See Guarantee.

Conservator *of the peace*, in our *Ancient Cuſtoms*, was a perſon who had an eſpecial charge, by virtue of his office, to ſee the king's peace kept.

Till the erection of juſtices of the peace by king Edward III. there were ſeveral perſons who by common law were intereſted in keeping the ſame: ſome having that charge as incident to other offices; and others ſimply, or of itſelf, called *cuſtodes*, or *conſervators of the peace.* Thoſe that were ſo by virtue of their office ſtill continue; but the latter are ſuperſeded by the modern juſtices.

The chamberlain of Cheſter is ſtill a *conſervator* in that county: by virtue of his office. 4 Inſt. 212.

Sheriffs of counties at common law are conſervators of the peace; and conſtables, by the common law, were conſervators, but ſome ſay they were only ſubordinate to the conſervators of the peace, as they now are to the juſtices.

The king's majeſty is, by his office and dignity royal, the principal conſervator of the peace within all his dominions; and may give authority to any other to ſee the peace kept, and to puniſh ſuch as break it: hence it is uſually called "the king's peace." The lord chancellor, or keeper, the lord treaſurer, the lord high ſteward of England, the lord mareſchal, the lord high conſtable of England, (when any ſuch officers are in being,) and all the juſtices of the court of King's Bench (by virtue of their offices,) and the maſter of the rolls (by preſcription) are general conſervators of the peace throughout the whole kingdom, and may commit all the breakers of it, or bind them in recognizances to keep it. The other judges are only ſo in their own courts. The coroner is alſo a conſervator of the peace within his own county; as is alſo the ſheriff; and both of them may take a recognizance or ſecurity for the peace. Conſtables, tithing-men, and ſuch like, are alſo conſervators of the peace within their own juriſdiction; and may apprehend all breakers of the peace, and commit them till they find ſureties for their keeping it.

Thoſe that were, without any office, ſimply and merely conſervators of the peace, either claimed that power by preſcription, or were bound to exerciſe it by the tenure of their lands; or, laſtly, were choſen by the freeholders in full county court before the ſheriff; the writ for their election directing them to be choſen "de probioribus et potentioribus comitatus ſui in cuſtodes pacis." But when queen Iſabel, the wife of Edward II., had contrived to depoſe her huſband by a forced reſignation of the crown, and had ſet up his ſon Edward III., in his place, this being an unprecedented meaſure, cauſed an alarm; and, therefore, in order to prevent any inſurrections, and diſturbance of the peace, the new king ſent writs to all the ſheriffs of England, vindicating the manner of his obtaining the crown, and commanding each ſheriff to keep the peace throughout his bailiwick, on pain and peril of diſinheritance and loſs of life and limb. Soon after it was ordained in parliament, that for the better maintaining and keeping of the peace in every county, good men and lawful, who were no maintainers of evil, or barretors in the country, ſhould be aſſigned to keep the peace. Thus, and at this time, the election of conſervators of the peace was taken from the people, and given to the king; ſuch aſſignment being conſtrued to be

be by the king's commiffion. Neverthelefs, they were ftill called only confervators, wardens, or keepers of the peace, till the ftatute 34 Edw. III. c. 1. gave them the power of trying felonies; and then they acquired the more honourable appellation of juftices. Blackft. Comm. vol. i. See Justice.

Conservator *of the truce and fafe conducts; confervator induciarum & falvorum regis conductuum*, was an officer appointed in every fea-port, under the king's letters patent. His charge was to enquire of all offences committed againft the king's truce and fafe conducts, upon the main fea, out of the franchifes of the cinque-ports, as the admirals were wont to do, and fuch other things as are declared in ftatute 2 Hen. V. ft. 1. cap. 6.

Two men learned in the law of the land were joined to fuch confervators, for hearing and determining according to that law the fame treafons, when committed within the body of any county. The above-cited ftatute, fo far as it made thefe offences amount to treafon, was fufpended by 14 Hen. VI. c. 8., and repealed by 20 Hen. VI. c. 11., but revived by 29 Hen. VI. c. 2., which gave the fame powers to the lord chancellor, affociated with either of the chief juftices, as belonged to the confervators of truce and their affeffors; and enacted that, notwithftanding the party be convicted of treafon, the injured ftranger fhould have reftitution of his effects, prior to any claim of the crown. See Safe *Conduct*.

CONSERVATORIO, *Ital.* a title given in Italy to almoft all charity-fchools; but chiefly to thofe where children are taught mufic, and are otherwife educated with a view to that profeffion. The *confervatorios* of the city of Venice have been much celebrated by all travellers previous to the revolution: it had four of thefe fchools: the *Ofpidale della Pietà*, the *Mendicanti*, the *Incurabile*, and the *Ofpidaletto a S. Giovanni e Paulo*, at each of which there was a performance every Saturday and Sunday evening, as well as on great feftivals. At thefe, the performers, both vocal and inftrumental, were all girls; the organ, violins, flutes, violoncellos, baffoons, and even double-bafes, kettle-drums, and French-horns, were fupplied by females. Each of thefe eftablifhments was a kind of foundling hofpital for natural children and orphans, under the protection of feveral nobles, citizens, and merchants, who, though the revenue is very great, yet contribute annually to its fupport. Thefe girls are maintained here till they are married, and all thofe who have talents for mufic are taught by the beft mafters of Italy.

There were three confervatorios in the city of Naples, for the education of boys who were intended for the profeffion of mufic, of the fame kind with thofe of Venice, for girls. As the fcholars in the Venetian confervatorios have been juftly celebrated for their tafte and neatnefs of execution, fo thofe of Naples have long enjoyed the reputation of being the firft *contra-puntifts*, or compofers in Europe. It is from thefe feminaries that Italy, and all Europe, have been delighted with the genius and talents of the two Scarlattis, Vinci, Leo, Pergolefi, Porpora, Farinelli, Cafarelli, Gizziello, Durante, Jomelli, Perez, Piccini, Trueta, Anfoffi, Sacchini, Paefiello, and innumerable others of the firft eminence among compofers and performers both vocal and inftrumental.

CONSERVATORY, in *Gardening*, a place conftructed fomewhat in the manner of the green-houfe, but more fpacious and elevated, and finifhed in a neater and more perfect manner; being defigned for containing and preferving the more rare and curious forts of exotic plants, as well as for affording amufement by being provided with walks laid with fome fort of neat material, according to the tafte of the proprietor, in a ferpentine or other irregular manner between the plants.

Houfes of this nature fhould have dry and rather elevated fituations, at a fmall diftance from the refidence, and be ranged in fuch a manner as to have the benefit of the fun as much as poffible during the day. They muft likewife be provided with flues for the purpofe of communicating fire heat when it may be neceffary, and alfo valves and other contrivances for the introduction of frefh air when wanted, and to afford due ventilation.

The fides, ends, and roofs, muft be formed with glafs, as in the green-houfe, in order to admit light freely, and at the fame time protect the plants.

It has been generally confidered as fynonymous with green-houfe, but its principle or effential difference confifts in this, that in the latter the trees and plants are either in tubs or pots; and placed on ftands or ftages through the winter till they are removed into fome fheltered fituation abroad for the fummer; while in the former the ground plan is laid out in beds and borders made up of the fineft compofitions of foils or of earthy materials that can be procured, three or four feet in depth; in which the trees and plants, taken out of their tubs or pots, are regularly planted, in the fame manner as hardy plants in the open air. And inftead of taking out the plants in the fummer, as in the green-houfe, the whole of the glafs roof is taken off, and the plants expofed to the open air; when on the approach of autumn-frofts the lights are again put on, and remain fo till the ftate of the feafon is fuch as that they can be removed again without danger from cold.

In cafes of neceffity, it is evident however that thefe buildings may alfo be ufed as green-houfes by introducing ftages inftead of beds, in which cafe the glafs-roof fhould be fixed. Other conveniences may be attached to them, fuch as retiring rooms, feed rooms, aviaries, &c. Some buildings of this fort are, according to the editor of Miller's dictionary, formed fo as to have one of the wings facing the fouth-eaft, and the other the fouth-weft, fo that from the time of the fun's firft appearance upon any part of the building, until it goes off at night, it may be conftantly reflected from one part to the other, and the cold winds be alfo kept off from the front of the centre building. In the area of the adjoining rooms or wings, many of the more tender exotic plants may be placed in the fummer feafon and in the fpring before the plants can be fet out. The beds and borders of this area may be full of anemonies, ranunculufes, early tulips, &c. which will be paft flowering, and the roots fit to take out of the ground, by the time the plants are taken out of the houfe. In the centre of this area may be a fmall bafon of water, which will be very convenient for watering the plants, not only on account of its nearnefs, but becaufe the water will be foftened and warmed by the reflection from the glaffes. And the wing facing the fouth-eaft fhould always be preferred for the warmeft, or bark-ftove, becaufe the fun, at its firft appearance in the morning, fhines directly upon the glaffes, and warming the air of the houfe, gives new life to the plants, after the long nights of the winter feafon.

It is alfo farther obferved, that in thefe buildings, if there are not fheds running behind them their whole length, the walls fhould not be lefs than three bricks thick, and if they are even more it will be better, becaufe where the walls are thin and expofed to the open air, the cold will penetrate; and when the fires are made the heat comes out through the walls, fo that it will require a larger quantity of fuel to maintain a proper temperature of warmth in the houfes; and in general, the clofer and better thefe houfes are built, the lefs fuel will be required to warm them, fo that the

first expence in building them properly will be the cheapest, where the after expence of fires is taken into the account.

The ground plan and elevation of an elegant and very convenient improved house of this sort may be seen in the appropriate plate.

Conservatory is sometimes used for a place to preserve snow and ice. See Phil. Transf. N° 8. p. 140. See Ice-*House*.

CONSERVE, in *Pharmacy*, &c. a dry confect, or form of medicine, or food, contrived to preserve the flowers, leaves, roots, peels, or fruits of several simples, as near as possible to what they were when fresh-gathered; and to give them an agreeable taste.

Conserves are compositions of recent vegetable matters and sugar beaten together into an uniform mass. Vegetables whose virtues are soon lost by drying, may be preserved in this manner for a considerable time unimpaired, the sugar preventing the natural decomposition and moulding which would otherwise take place.

The preparation of the conserves is as simple as possible. The sugar is first ground to fine powder, and then mixed by long beating (not by solution) with the vegetable pulp or other material. No heat or other mode of preparation is employed, so that the vegetable matter remains as nearly as possible in the state in which it existed in the plant at the moment of gathering. The conserves directed by the London college are those of hips, roses, sloes, arum and squills. Of these the two last alone can be considered as active medicines; and the arum is exhibited with peculiar efficacy in this form, as its pungency to the palate is a little sheathed, whilst its internal stimulating powers remain unaltered.

The *conserve of arum*, or cuckow-pint, is a composition of arum bruised, half a pound, and double refined sugar, $1\frac{1}{2}$ pound, beaten together in a mortar. Those who hold in veneration the integrity and experience of Sydenham, will have no doubt of the effects of this medicine in rheumatic cases. This conserve may be given to adults in doses of a dram.

The *conserve of the hip*, or "conserva cynosbati," is formed by mixing one pound of hips with 20 ounces, by weight, of double refined sugar, powdered. This pulp should be separated with great care from the rough prickly matter inclosing the seeds; a small quantity of which, retained in the conserve, is apt to occasion an uneasiness at the stomach, a pruritus about the anus, and sometimes vomiting.

The *conserve of the sloe*, "conserva pruni sylvestris," is prepared by putting the sloes in water upon the fire, that they may soften, taking care that they do not burst; then taking them out of the water, pressing out the pulp, and mixing it with three times its weight of double refined sugar.

The *conserve of squills*, "conserva scillæ," is made by beating together in a mortar one ounce by weight of fresh squill with five ounces by weight of double refined sugar. This conserve is directed to be prepared in a small quantity, in order to guard against its variation in strength. It may be given to adults, from half a dram to two scruples, or more; especially when fresh.

For the *conserve of sea-worm-wood*, the outer rind of the *Seville orange*, *wood-sorrel*, and of the *red rose;* pluck the leaves from the foot-stalks, and the unblown petals from the calyx, cutting off the heels: take off the outer rind of the oranges with a grater: when you have thus prepared them, bruise them with a wooden pestle in a marble mortar; and then beat them up with three times their weight of double-refined sugar, until they are mixed. The sugar should be powdered by itself, and passed through a sieve, before it is mixed with the vegetable mass; otherwise it cannot be properly incorporated. Rose buds, and some other vegetables, are usually prepared for mixing with sugar by a small wooden mill, contrived for that purpose. All the conserves are to be kept in close vessels, especially those of arum and squill.

With regard to fruits, as currants, &c. they set them on the fire to make them yield their juice, then drain and strain them, and thicken what comes from them over the fire, and add to it the sugar. This last sort of conserve is particularly called a *jelly;* which see.

CONSERVES, Fr. in *Military Language*. See Counter-guard, or *contre-garde*, the names by which this work is usually and best known.

CONSET's Bay, in *Geography*, a bay on the N.E. coast of the island of Barbadoes, N. of Conset's point, which is a cape, 10 miles N.E. of Bridge-town.

CONSETTI, Antonio, in *Biography*, an historical painter, native of Modena, where he enjoyed considerable reputation, in the last century He was born in the year 1686, and is said to have been successively the disciple of his countrymen Francesco Stringa, and Donato Creti of Bologna, from whose precepts and example he acquired a correct style of drawing, and facility of composing. Unfortunately, however, his colouring is destitute of those charms of union and softness, which captivate the eye at first sight. The principal part of the life of this artist was spent in the state of Modena, where his pictures are by no means uncommon, and where he died in 1766. Lanzi. Storia Pittorica.

CONSIDERATIO Curiæ, in *Law*, terms often occurring in law proceedings, and where matters are determined by the court. "Ideo consideratum est per curiam," *i. e.* therefore it is considered and adjudged by the court. *Consideratio curiæ*, &c. denotes the judgment of the court.

CONSIDERATION, the material cause, or *quid pro quo*, of any contract, and without which no contract is obligatory or binding.

This consideration is either *expressed*; as if a man bargain to give ten guineas for a horse, or to sell his land for a certain sum, or to grant it in exchange for other lands, &c.; or when a person agrees for a stipulated sum to do a thing: or *implied*, when the law itself enforces a consideration; as if a man coming into an inn, take meat, drink, and lodging for himself and horse, the law presumes he intends to pay for them, though there be no express contract between him and his host: and if he discharge not the house, the host may stop his horse.

Considerations may be regarded either as pertaining to *contracts* generally, or to *deeds* in particular. As to *contracts*, consideration may be defined to be the reason which moves the contracting party to enter into the contract. The civilians hold, that in all contracts, either express or implied, there must be something given in exchange, or something that is mutual or reciprocal. This thing, which is the price or motive of the contract, is called the consideration; and it must be a thing lawful in itself, or else the contract is void. A *good* consideration is that of blood or natural affection between near relations; the satisfaction accruing from which the law esteems an equivalent for whatever benefit may move from one relation to another. (3 Rep. 83. 1 Inst. 271. 1 Rep. 176.) This consideration may sometimes, however, be set aside, and the contract become void, when it tends in its consequences to defraud creditors or other third persons of their just rights. But a contract for any *valuable* consideration, as for marriage, for money for work done, or for other reciprocal considerations, can never be impeached

 peached

peached at law; and, if it be of a fufficient adequate value, is never fet afide in equity: for the perfon contracted with has then given an equivalent in recompence, and is therefore as much an owner, or a creditor, as any other perfon. Thefe valuable confiderations are divided by the civilians into four fpecies. 1. *Do, ut des;* as when I give money or goods on a contract to receive in return money or goods: of this kind are all loans of money upon bond, or promife of repayment, and all fales of goods, in which there is an exprefs contract to pay fo much for them, or elfe the law implies a contract to pay as much as they are worth. 2. *Facio, ut facias;* as when I agree with a man to do his work for him, provided that he will do mine for me; or if two perfons agree to intermarry; or to do any other pofitive acts on both fides: or, to forbear on one fide on confideration of fomething done on the other, as that in confideration A, the tenant, will repair his houfe, B, the landlord, will not fue him for wafte: or, for mutual forbearance on both fides. 3. *Facio, ut des;* as, when a man agrees to perform any thing for a price, either fpecifically mentioned, or left to the determination of the law to fet a value on it. Thus, when a fervant hires himfelf to his mafter for agreed wages, he contracts to ferve his mafter for that fpecific fum: or, otherwife, if he be hired generally, he is under an implied contract to perform this fervice for its reafonable worth. 4. *Do, ut facias;* as, when I agree with a fervant to give him fuch wages upon his performing fuch work, which is the laft fpecies inverted; for *fervus facit, ut herus det,* and *herus dat, ut fervus faciet.*

A confideration of fome fort or other is fo abfolutely neceffary to the forming of a contract, that a *nudum pactum,* or agreement to do or pay any thing on one fide, without any compenfation on the other, is totally void in law; and a man cannot be compelled to perform it. (Dr. and Stud. l. 2. c. 24.) Thus, if one man promifes to give another 100 *l.*, nothing is contracted for or given on the one fide, and therefore nothing is binding on the other. And, however a man may or may not be bound to perform it, in honour or confcience, which the municipal laws do not decide; thofe laws will certainly not compel the execution of what he had no vifible inducement to engage for; and, therefore, our law has adopted the maxim of the civil law, that "ex nudo pacto non oritur actio." But any degree of reciprocity will prevent the pact from being nude; nay, if even the thing be founded on a prior moral obligation (as a promife to pay a juft debt, though barred by the ftatute of limitations), it is no longer *nudum pactum.* And as this rule was principally eftablifhed to avoid the inconvenience that would arife from fetting up mere verbal promifes, for which no good reafon could be affigned, it therefore does not hold in fome cafes, where fuch promife is authentically proved by written documents. For if a man enters into a voluntary bond, or gives a promiffory note, he fhall not be allowed to aver the want of a confideration in order to evade the payment; for every bond from the folemnity of the inftrument, and every note from the fubfcription of the drawer, carries with it an internal evidence of a good confideration. Courts of juftice will therefore fupport them both, as againft the contractor himfelf; but not to the prejudice of creditors or ftrangers to the contract. Plowd. 308, 309. Hard. 4. 1 Ch. Rep. 157. Ld. Raym. 760. Fonblanque, Treat. Eq. 334. *n.*). See CONTRACT.

With regard to *deeds,* it may be obferved, that they muft be founded upon good and fufficient confideration; not upon an ufurious contract (ftat. 13 Eliz. c. 8.); nor upon fraud or collufion, either to deceive purchafers *bona fide* (ftat. 27 Eliz. c. 4.), or juft and lawful creditors (ftat. 13 Eliz. c. 5.); any of which bad confiderations will vacate the deeds, and fubject fuch perfons as put the fame in ufe, to forfeitures, and often to imprifonment. A deed alfo, or other grant made without any confideration, is, as it were, of no effect; for it is conftrued to enure or to be effectual, only to the ufe of the grantor himfelf. (Park. § 533.). The confideration may be either a *good* or a *valuable* one. A good confideration is fuch as that of blood, or of natural love and affection, when a man grants an eftate to a near relation; being founded on motives of generofity, prudence, and natural duty. A valuable confideration is fuch as money, marriage, or the like, which the law efteems an equivalent given for the grant (3 Rep. 83.); and is therefore founded in motives of juftice. Deeds made upon good confideration only, are confidered as merely voluntary, and are frequently fet afide in favour of creditors, and *bona fide* purchafers. See DEED.

A mere voluntary curtefy will not be a good confideration of a promife; but the value and proportion of the confideration is not material for maintaining an action, whether it be a penny or 100 *l.*; but a jury will give damages proportionable to the lofs. (Hob. 5. 10 Rep. 76.) A confideration that is void in part, is void in the whole; and if two confiderations be alleged, and one of them is found falfe by the jury, the action fails. (Hob. 126. Cro. Eliz. 848.) But if there be a double confideration for the grounding of a promife, for the breach of which an action is brought; though one of the confiderations be not good, yet if the other be good, and the promife broken, the action will lie upon that breach; for one confideration is fufficient to fupport the promife. (1 Lill. 297.) A confideration muft be lawful, to ground an *affumpfit.* (2 Lev. 161.) Where confiderations are valuable, and confift of two or more parts, there the performance of every part ought to be fhewn. (Cro. Eliz. 579.) In cafe a deed of feoffment be made of lands, or a fine and recovery be paffed, and no confideration is expreffed in the deed, &c. for the doing thereof, it fhall be intended by the law, that it was made in truft for the ufe of the feoffer or conufor; for it fhall be prefumed he would not part with his land without a confideration; and yet the deed fhall be conftrued to operate fomething, and that which is moft reafonable. (4 Lill. Abr. 299.) Blackft. Com. vol. ii. Jacob's Law Dict. by Tomlins.

CONSIGLIONE, in *Geography,* a town of the ifland of Sicily, in the valley of Mazar; 19 miles S. of Palermo.

CONSIGNE, Fr. parole or counter-fign. When ufed in the mafculine gender, it alfo means a perfon formerly paid by the French government for refiding conftantly in a garrifoned town in order to take cognizance of all perfons that entered by the gates or went out of them. He had a place allotted to him, and regularly delivered a report to the governor or commandant of the place.

CONSIGNE'. A perfon who could not pafs the poft, or quit the houfe, to which the order of his fuperior had configned him.

CONSIGNMENT, or CONSIGNATION, the depofiting any fum of money, bills, papers or commodities, in fure hands; either by order of a court of juftice, in order to their being delivered to the perfons to whom they are adjudged; or voluntarily, in order to their being remitted to the perfons they belong to, or fent to the places they are deftined for.

CONSIGNMENT *of goods,* is the delivering or making them over to another. Thus goods are faid to be configned to a

factor,

factor, when they are fent to him to be fold, &c. or when a factor fends back goods to his principal, they are faid to be configned to him.

CONSILINUM, in *Ancient Geography*, a town of Italy, in a gulf between Brutium and Zephyrium, according to P. Mela. Frontinus fays, that it was a Roman colony, and places it in Lucania.

CONSILIUM, *dies confilii*, in *Law*, was a time allowed for the accufed to make his defence, and to anfwer the charge of the accufer. It is now ufed for a fpeedy day appointed to argue a demurrer; which the court grants after a demurrer joined, on reading the record of the caufe. See IMPARLANCE.

CONSIMILI CASU. See CASU.

CONSISTENCE, a ftate of reft, wherein things capable of growth or decreafe, continue for fome time at a ftand, without either.

This term is particularly ufed with regard to trees, for the time, or age, beyond which they do not grow, and yet at which they do not decline.

Thus we diftinguifh three ftates or ftages of a tree; its growth, confiftence, and return: and thefe are common to all trees, even fruit trees.

The confiftence of an oak is from fifty to a hundred and fixty years: fome, however, hold, that their confiftence only commences from a hundred years; afferting that they grow till that time, and that they continue in that ftate of perfection to two hundred years of age.

CONSISTENCE, in *Phyfics*, is that ftate of a body wherein its component particles are fo connected, or entangled among themfelves, as not to feparate or recede from each other.

Confiftence only differs from continuity in this, that confiftence implies a regard to motion or reft, which continuity does not; it being fufficient to denominate a thing continuous, that its parts are contiguous to each other.

When ufed relative to a difeafe, it imports the crifis or acme thereof: when applied to the humours, excrements, or excretions, it imports their ftate as to thicknefs or thinnefs.

CONSISTENCE is particularly ufed with regard to bodies confidered as they are more foft, or more hard, more liquid, or more dry.

Forms of medicines, as electuaries, lambatives, bolufes, fyrups, unguents, &c. differ chiefly in confiftence.

Not only the gratefulnefs, but alfo the operation, of medicines, depend in fome meafure on their confiftence; for medicines of a thick confiftence are taken into the ftomach, and penetrate into the body with greater difficulty than fuch as are thin and liquid; and it requires more trouble to fwallow a thick than a thin medicine: for this reafon thick medicines are generally naufeous and ungrateful; and this is the reafon why cathartic bolufes are often diffolved in fome agreeable liquor, fince in this form they are more grateful than in any other: for this reafon alfo apozems are generally clarified by whites of eggs, or a ftrainer.

On the contrary, a thick confiftence is on fome occafions more to be defired; in ulcers of the afpera arteria, and œfophagus, for inftance, where we muft give medicines made up with gum tragacanth, or other fubftances of a like nature, which by their vifcidity fix the medicines, as it were, longer to the part affected.

CONSISTENT *Bodies*, is a term ufed by Mr. Boyle, for fuch as we ordinarily call *firm*, or *fixt bodies*; in oppofition to *fluid* ones.

That author has a particular effay on the *atmofphere of confiftent bodies*; wherein he fhews, that all, even folid, hard, ponderous and fixed bodies, do exhale or emit effluvia to a certain fpace all around them.

CONSISTENTES, in *Church Hiftory*, a kind of penitents who were allowed to affift at prayers, but could not be admitted to receive the facrament.

CONSISTORIAL *Advocate*. See ADVOCATE.

CONSISTORY, or *Roman* CONSISTORY, denotes the college of cardinals: or the pope's fenate, and council, before whom judiciary caufes are pleaded.

Du-Cange derives the word from *confiftorium*; i. e. *locus ubi confiftitur*; ufed chiefly for a veftible, gallery, or antechamber, where the courtiers wait for admiffion; and called *a confiftente multitudine*.

The confiftory is the firft court, or tribunal of Rome: it never meets but when the pope pleafes to convoke it: the pope prefides in it in perfon, mounted on a magnificent throne, and habited in his *pontificalia*; on the right are the cardinal bifhops and priefts, and on the left the cardinal deacons.

The place where it is held, is a large hall in the apoftolical palace, where princes and ambaffadors of kings are received. The other prelates, prothonotaries, auditors of the rota, and other officers, are feated on the fteps of the throne: the courtiers fit on the ground; ambaffadors on the right, and confiftorial and fifcal advocates behind the cardinals.

Befides the public confiftory, there is alfo a private one, held in a retired chamber, called the chamber of *papegay*; the pope's throne here being only raifed two fteps high.

Nobody is here admitted but the cardinals, whofe opinions are collected, and called *fentences*. Here are firft propofed and paffed all bulls for bifhoprics, abbeys, &c. Hence bifhoprics, and abbeys, are faid to be confiftorial benefices; in regard, they muft be propofed in the confiftory, the annates be paid to the pope, and his bulls taken.

Anciently they were elective; but by the concordat, which abolifhes elections, they are appointed to be collated by the pope alone, on the nomination of the prince.

CONSISTORY was alfo the name of a court under Conftantine, where he fat in perfon, and heard caufes: the members of this court were called *comites*.

CONSISTORY is alfo ufed among the reformed, for a council or affembly of minifters and elders, to regulate their affairs, difcipline, &c.

CONSISTORY, or *Court Chriftian*, in the *Englifh Laws*, is a council of ecclefiaftical perfons, or the place of juftice in an ecclefiaftical or fpiritual court.

Every archbifhop and bifhop has a confiftory-court, held, before his chancellor or commiffary, who is the judge, and fuppofed to be fkilled in the civil and canon law, either in his cathedral, or in fome other convenient place of his diocefe, for ecclefiaftical caufes, arifing within their refpective diocefes. In places of the diocefe, far diftant from the bifhop's confiftory, the bifhop appoints a commiffary, *commiffarius foraneus*, to judge in all caufes within a certain diftrict, and regifter to enter his decrees, &c. (2 Rol. Abr. 286. Seld. Hift. Tithes, 413, 414.) The fpiritual court was anciently, in the time of the Saxons, joined with the county or hundred court; and the original of the confiftory court,

court, as divided from thofe courts, is found in a law of the Conqueror, quoted by lord Coke.

From this court there lies an appeal to the archbifhop of each province refpectively, by virtue of ftat. 24 Hen. VIII. c. 12.

CONSOLATION, one of the places in *Rhetoric*, wherein the orator endeavours to abate and moderate the grief or concern of another.

In confolation, a principal regard is to be had to the circumftances and relations of the parties. Scaliger confiders this exceeding well, De Arte Poetica. "The confolator, fays he, is either a fuperior, an inferior, or an equal; with regard, either to preferment, honour, wealth, wifdom, or age. Livia is therefore to comfort Ovid, in a manner very different from that wherein Ovid comforts Livia. Thus, as to authority, a father and fon, Cicero and Pompey, are to conduct their confolations very differently: fo in wealth; as if a client fhould undertake to comfort Craffus: in wifdom; as when Seneca comforts Polybius and his mother: as to age, there need no examples."

"A fuperior may interpofe his authority, and may even chide; a wife man may even difpute; fentences will become him. An inferior is to fhew refpect and affection, and own he had this from fome wife or learned perfon: an equal to appeal to their common friendfhip."

CONSOLE, in *Architecture*, a bracket or projecting body commonly in the fhape of the letter S, which is ufed to fupport a cornice, vafe, buft, ftatue, or even a column, as in the barbarous architecture of the Diocletian palace at Spalatro. Corbel is effentially the fame thing as confole, but is generally confined to the defcription of Gothic building.

CONSOLIDA, in *Botany*, Major; Bauh. Pin. See SYMPHYTUM *officinale*.

CONSOLIDA *media*; Bauh. Pin. See AJUGA.

CONSOLIDA *paluftris*; Taber. See SENECIO *paluftris*.

CONSOLIDA *regalis*; Bauh. Pin. Taber. Mons. See DELPHINIUM.

CONSOLIDATION, in *Law*, the combining and uniting of two benefices into one; ftat. 37 Hen. VIII. cap. 21. which union is to be by the affent of the ordinary, patron, incumbent, &c. and to be of fmall churches lying near together.

The term is borrowed from the civil law; where it properly fignifies an union of the poffeffion, or occupation, with the property. Thus, if a man hath by legacy *ufufructum fundi*, and afterwards buys the property, or fee-fimple, of the heir; this is called a confolidation.

CONSOLIDATION, in *Surgery*, is the procefs of nature, by which a folution of continuity is united, either in a foft or hard part of the body; and, as this procefs was formerly fuppofed to be within the controul of furgeons, the remedial applications employed for that purpofe were denominated *confolidating medicines*, or *farcotics*. Of this kind were the different balfamic and refinous unguents, with all the ftimulating compofitions containing turpentine. The furgeon may certainly vary the ingredients of his dreffings in fuch a manner as to change the furface of a fore, and, in many cafes, fo as to occafion a healing procefs; but, after all, he acts only as the hand-maid of nature, and is unable to advance one ftep towards the confolidation of a wound, unlefs there be a previous tendency in the part to heal.

Warm ftimulating applications will indeed caufe a flow of blood to the part whereon they are applied; and by exciting the healthy action of blood-veffels, as well as by increafing the fenfibility of the fkin or adjacent ulcerated furface, they may promote fuppuration, and even contribute to effect a cure, where it feemed unlikely before. In this fenfe of the term, therefore, we may admit the exiftence of confolidating remedies.

CONSONANCE, in *Grammar*, denotes a like cadence, or clofe of words, periods, &c.

Confonances are ordinarily faults in difcourfe, efpecially in Englifh profe: though the ancients make a figure of them, which they call ὁμοιοτέλευτον. Too great a confonancy in the rhymes has always an ill effect.

CONSONANCE, in *Mufic*, fignifies the union or agreement of two founds produced at the fame time, and in this fenfe, it includes all forts of mufical intervals, which naturally divide themfelves into three kinds, *viz.* 1ft. Concords, or fuch as produce an agreeable and pleafing effect upon the ear; fee that article. 2d. Imperfect or tempered concords, which are intervals nearly related to concords in refpect to their pofition in the fcale, as explained when we were treating of perfect concords, and alfo in partaking fomewhat of the pleafing effect of the concords to which they belong, when not too much tempered; thefe are alfo further diftinguifhed by the phenomena of BEATS, fee that article; and IMPERFECT *Concords*: and 3d. Difcords, which are intervals that have a grating or difagreeable jarring effect upon the ear, or fometime a fluttering roughnefs when nearly equal to an imperfect concord, or to certain intervals in the fcale, as the tones major and minor, the tritone, femidiapente, and others, as mentioned in relating Dr. Robifon's experiments upon the concords. See DISCORD and FLUTTER. Confonance, confidered as fignifying a found arifing from feveral others founding together, whether agreeable or difagreeable to the ear, may be divided into *concord* and *difcord*. On this principle, Dr. Holder defines *confonancy*, "A paffage of feveral tunable founds through the medium, frequently mixing and uniting in their undulated motions, caufed by the well-proportioned commenfurate vibrations of the fonorous bodies, and confequently arriving fmooth and fweet, and pleafant to the ear; as, on the contrary, *diffonancy*, he maintains to arife from difproportionate motions of founds, not mixing, but jarring and clafhing as they pafs, and arriving in the ear grating and offenfive."

This notion of a confonance exactly quadrates with that we have already laid down for a *concord*. Accordingly, moft authors confound the two together; though fome of the more accurate diftinguifh them; making confonance to be what the word implies, a mere *founding of two or more notes together*, or *in the fame time*; in contradiftinction to the motion of thofe founds *in fucceffion*, or one after the other.

In effect, the two notions coincide; for two notes, thus played in confonance, conftitute a concord; and two notes that pleafe the ear in confonance, will likewife pleafe it in fucceffion. Notes in confonance conftitute harmony, as notes in fucceffion conftitute *melody*.

In the popular fenfe, confonances are either *fimple* or *compound*, &c. The moft perfect confonance is unifon; though many, both among the ancients and moderns, difcard it from the number of confonances; as conceiving confonance an agreeable mixture of different founds, grave and acute; not a repetition of the fame found.

The fecond confonance is the octave; then the fifth, the fourth, the thirds, and the fixths: the reft are multiples, or repetitions of thefe.

Confonance is fometimes ufed by writers in the fame fenfe with concord, and thus, fuch are faid to be variable, and the term imperfect is prefixed when applied to intervals which have a major and a minor of *the fame name*, as thirds and

and fixth, and perfect when applied to concords which never change their name, as the fifth, fourth, and octave; the absurdity of this use of the words perfect and imperfect is so apparent, that we wish to see them disused, and discountenanced in elementary books on music, in order that these terms may exclusively apply to intervals correctly tuned or perfect in respect of their accordance, or the reverse: there was an impropriety in originally assigning one name to the thirds and to the sixth, which naturally have no nearer relation to each other, than the fourth and fifth, or octave and unison, or even so much; but these being established in use, may safely remain, without our continuing to confound and reverse all ideas of perfection and imperfection, in consequence only of this defect in the musical nomenclature.

Consonances are said, by Dr. Smith, (Harmonics, p. 19.) to be *pure,* where none of the equal times between the pulses of the acuter sound are subdivided by any intermediate pulse of the graver; and *interrupted* when any of those equal times are interrupted by one or more pulses of the graver sound. See CYCLE.

CONSONANT, in *Grammar*, a letter which cannot be perfectly sounded by itself; but joined with a vowel, forms an articulate sound, by a particular motion or contact of the parts of the mouth: and hence the name *con-sonant*, q. d. *quæ sonant cum alia.*

A consonant, considering it philosophically, is nothing else but the modification of a sound, produced by means of the organs of the voice, not a production of sound itself: thus, v. gr. the sounds signified by the characters, *a*, *e*, *i*, *o*, *u*, &c. are differently modified when we say *ab*, than when we say *ac* or *ca*, *ad* or *da*; and those modifications are called *consonants.*

Accordingly, Dr. Wilkins (Essay towards a real Character, p. 366.) defines consonants to be those letters, in the pronouncing of which the breath is intercepted, by some collision or closure, among the instruments of speech: and for this reason, he says, they are styled "*clausæ literæ*," in contradistinction to vowels, which are "*apertæ*." See VOWEL.

Consonants are divided into *single*, as *b*, *m*, *q*, &c. and *double*, as *x* in *axillary*, corresponding to the ξ of the Greeks.

Consonants have been also divided into *mutes* and *semi-vowels.* The mutes are such as cannot be sounded *at all* without a vowel, and all of which begin their sound with a consonant; as *b*, *d*, *g*, *k*, *p*, *q*, *t*, and *c* hard, being expressed *be*, *de*, *te*, &c. The semi-vowels have of themselves an imperfect sound, and all begin with a vowel; as *l*, *m*, *n*, *r*, *f*, *s*, &c, being sounded *ef*, *el*, *em*, &c. Four of these, viz. *l*, *m*, *n*, *r*, are distinguished by the name of *liquids*, from their readily uniting with other consonants, and flowing, as it were, into their sounds. The mutes, as some writers have described them, are those consonants whose sounds cannot be protracted; and the semi-vowels are those whose sounds can be continued at pleasure, partaking of the nature of vowels, from which they derive their name. The mutes may again be subdivided into *pure*, being those whose sounds cannot be at all prolonged, as *k*, *p*, *t*; and *impure*, whose sounds may be continued for a short time, as *b*, *d*, *g*. The semi-vowels may be subdivided into *vocal* and *aspirated:* the former being formed by the voice, and the latter by the breath. The vocal, which are eleven, are *l*, *m*, *n*, *r*, *v*, *w*, *y*, *z*, *th* flat, *zh*, *ng*; and the aspirated, five in number, are *f*, *h*, *s*, *th* sharp, *sh*. The vocal semi-vowels may be subdivided into *pure*, which are formed entirely by the voice, and *impure*, which are such as have a mixture of breath with the voice. Of the pure there are seven, viz. *l*, *m*, *n*, *r*, *w*, *y*, *ng*; and four of the impure, viz. *v*, *z*, *th* flat, *zh*. The popular writer, whose "Grammar" we are now citing, has given the following list, exhibiting the sounds of the consonants, which are twenty-two in number.

b	*as heard in*	bay, tub.
d	——	day, sad.
f	——	off, for.
v	——	van, love.
g	——	egg, go.
h	——	hot.
k	——	kill, oak.
l	——	lap, all.
m	——	my, mum.
n	——	no, on.
p	——	pit, map.
r	——	rat, far.
s	——	so, less.
z	——	zed, buzz.
t	——	to, mat.
w	——	wo.
y	——	ye.
ng	——	ing.
sh	——	shy, ash.
th	——	thin.
th	——	then.
zh	——	vision.

Mr. Murray adds, that several letters marked in the English alphabet, as consonants, are either superfluous, or represent, not simple, but complex sounds. C, *e. g.* is superfluous in both its sounds; the one being expressed by *k*, and the other by *s*. G, in the soft pronunciation, is not a simple but a complex sound; as *age* is pronounced *adge*. *J* is unnecessary, because its sound, and that of the soft *g*, are in our language the same. Q, with its attendant *u*, is either complex, and resolvable into *kw*, as in *quality*; or unnecessary, because its sound is the same with *k*, as in *opaque*. X is compounded of *gs*, as in *example*, or of *ks*, as in *expect*. See Murray's English Grammar, p. 4, &c. ed. 8.

Dr. Wilkins (ubi supra) disapproves of the common division of consonants into *semi-vowels* and *mutes*; and prefers the distribution of them into three kinds, *viz.* spiritous or breathed, semi-spiritous or half-breathed, and non-spiritous or breathless. By the former he means such consonants as require to the framing of them a more strong emission of the breath, either through the nose or mouth; and he distinguishes those that are formed by expiration through the nose into sonorous, as *m*, *n*, *ng*, and mute, as *hm*, *hn*, and *hng*: the sonorous being such as require some vocal sound for framing them, and the mutes being other letters of the same configuration, pronounced by a strong emission of the breath, without any vocal sound. The spiritous consonants that are formed by breathing through the mouth are also of two kinds, *viz.* sonorous, as *v*, *dh*, *l*, *r*, *z*, *zh*; and mute, as *f*, *th*, *hl*, *hr*, *s*, and *sh*.

Semi-spiritous or half-breathed consonants are such as are accompanied with some kind of vocal murmur, as *b*, *d*, *g*; whereas those are denominated non-spiritous or breathless which are wholly mute, as *p*, *t*, *c*. Thus, *b* and *p* are framed when the breath is intercepted by the closure of the lips; the first of them being more soft, with some kind of murmur; the other more hard, and wholly mute. Again, *d* and *t* are commonly framed by an appulse or collision of the top of the tongue against the teeth or upper gums; the first being more soft and gentle, with some kind of murmur; the other wholly mute. Moreover, *g* and *c* are framed more inwardly, by an interception of the breath towards the throat by the middle or root of the tongue, with such

such a kind of difference between them as subsists in the two former cases. The consonants already enumerated belong to the class of those that are simple; but those that are called compound are usually distinguished into such as are aspirated, and such as are double: the former seem to be blended with *h*, and are usually so written; and the latter are compounded of some of the other letters, but for the sake of dispatch and brevity in writing, they are in several languages expressed by single characters, and reckoned in the alphabet as if they were distinct species of simple letters: such in the Latin alphabet are *q* and *x*, and the double letter *z*, whose power is the same as *ds* or *ts*. The consonant *q* is allowed to be a compound of *c* and *u*; but what is the true original of *j* consonant, and that power attributed to *ch* in the words *charity*, *cheese*, &c. have not been so well ascertained. It is plain that neither of them is a single letter, because in the prolation of them we do not end with the same sound with which we began: it seems, however, to be plain that *j* consonant is a compound of *d* and *zh*, and *ch* of *t* and *sh*. As for the other three consonants that are reckoned in the common alphabet, *k*, *w*, *y*, Dr. Wilkins thinks them unnecessary. If *c*, he says, be used always according to its proper power, *k* must be superfluous; and therefore the Welsh, who use *c* for only one kind of sound, have no *k*. And as for the letters *w* and *y*, their power is the same with that of the vowels *ȣ* and *ι*, as will evidently appear when they are rapidly pronounced before any other vowel by way of diphthong, so as to make but one syllable, *ȣ*ar or war, *ȣ*im or swim, *ι*es or yes, *ι*oke or yoke. Upon the whole, Dr. Wilkins enumerates 34 simple letters, 8 of which are vowels, and 26 consonants, besides 24 diphthongs. See LETTER.

According to some writers, the most natural division of consonants is that of the Hebrew grammarians; who have been imitated in this respect by the grammarians of other oriental languages: these divide the consonants into five classes, with regard to the five principal orders of the voice; which all contribute, it is true, but one more notably than the rest, to certain modifications, which make five general kinds of consonants. Each kind, or class, comprehends several consonants, which result from the different degrees of the same modification, or from the different motions of the same organs.

These organs are the *throat*, *palate*, *tongue*, *teeth*, and *lips*; whence the five classes of consonants are denominated *guttural*, *palatal*, *lingual*, *dental*, and *labial*.

We account sixteen consonants in the English alphabet, viz. *b*, *c*, *d*, *f*, *g*, *k*, *l*, *m*, *n*, *p*, *q*, *r*, *s*, *t*, *x*, *z*; to which there are three others to be added, viz. the *h*, and *j* consonants, and *v* consonant, which make the whole number of consonants nineteen: one whereof is guttural, viz. the aspirate *h*; five palatal, viz. *c*, as when pronounced before *a*, *o*, and *u*, as in *cavern*, *corn*, *curiosity*; *g*, as in *Geneva*; *j* consonant in *julep*; *k* in *kernel*; and *q* in *query*. To these some have added *w* and *y*, which are really consonants when they begin a word or syllable; although in every other situation they are called vowels. That they are consonants when used as initials seems to be evident, from their not admitting the article *an* before them, and from their following a vowel without any hiatus or difficulty of utterance; that in other situations they are vowels appears from their regularly taking the sound of other vowels.

The four *lingual* consonants are *d*, *l*, *n*, *t*; the four *dental* are *r*, *s*, *x*, *z*. the three last whereof are *hissers*; and five *labial*, *b*, *f*, *m*, *p*, and *v* consonant.

With regard to which division it may be observed, that though the *g* be modified in three different manners, as it comes before an *a*, an *o*, or an *u*; yet it is still a consonant of the palate; that the *j* consonant differs in nothing but its figure from the *g* before *e* or *i*; that *k* has the same pronunciation with the *c*; that *x* comprehends the sound of two letters in its sound, viz. *c* or *k*, and *s* or another *c*, as in *Alexander*, and *Alexis*, which we pronounce as if wrote *Alecsander* and *Aleccis*, or *Alecsis*; and that the *c* before an *e* or *i*, is no consonant of the palate, because in that case it loses its proper sound, and assumes the hissing sound of the *s*.

The abbot Dangeau thinks the nature of the division of the Hebrew grammarians to be very reasonable; but he does not acquiesce in the distribution they have made of them: to find a natural and just division of the consonants, he observes, no regard must be had to the characters that represent them; nor any thing be considered but their sound, or the modification they give the sound.

On this principle, the same author finds in the French five *labial* consonants, *b*, *p*, *v*, *f*, and *m*; five *palatal* ones, *d*, *s*, *g*, *k*, *n*; four *hissers*, *s*, *z*, *j*, *ch*; two *liquids*, *l* and *r*; two that run into and mix with each other, as *ll*, and *gn*; which last, however, is peculiar to the French language; and the *h* aspirate.

He adds, 1. That *m* and *n* are properly two nasal consonants; the *m*, a *b* passed through the nose, and the n a *d*, in like manner, pronounced through the nose; and, in effect; people with a cold pronounce *barket* for *market*, *leed* for *need*, &c.

2. That among the consonants, some are weak, others strong; their difference consisting in this, that the former are preceded with a small emission of the voice, which softens them, which the latter have not. The weak are *b*, *c*, *d*, *g*, *z*, *j*; the strong, *p*, *f*, *t*, *k*, *s*, *ch*.

It may be here observed, that when we speak of a person's talking *through the nose*, it must be understood in a sense quite different from what the words seems naturally to import: since the nose in this case concurs less to the pronunciation than when we do not speak through the nose; in regard the air, not being able to make its way through the nose, is returned into the mouth, where it forms a dull obtuse sound, called *nasal*.

From the whole we may conclude, that the excess of consonants in one language above another only consists in this, that there are more modifications of sound received and established in the one than in the other: for all men, having the same organs, may form the same modifications; so that it is entirely owing to custom, nothing to nature, that the English have not the ϑ of the Greeks, the *ain* and *heth* of the Hebrews, the *ch* of the Germans, the *gn* of the French, the *gl* of the Italians, the *ll* of the Welsh, &c.

Also, that the Chinese have no *r*, the Iroquois no labial consonants, the Hurons have abundance of aspirates, and the Arabs and Georgians abundance of double consonants: which last is owing to this, that they make several organs concur strongly and equally to the modification of a sound; whereas, in the rest, only one organ is moved very strongly and sensibly, and the rest weakly.

It is hence also visible, that in all languages the aspirates, or guttural letters, are real consonants; since the throat modifies the sound as much as the palate, tongue, or lips.

Lastly, to find all the consonants that may be formed in any language, there needs nothing but to observe all the modifications that the sounds of speech will admit of, by which we shall have all the consonants practicable.

Dr. Hunter (Edinb. Trans. vol. ii.) in his investigation of the manner in which consonants are formed, distinguishes them in two different respects, viz. by the operation of the

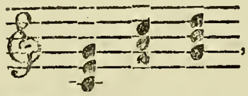
the breath which is employed to make them audible. There are *five* positions, he says, by which the vocal sound is to be articulated: the *first* is formed by the close junction of the lips, so that no breath is suffered to transpire, and the just modification of this position is that called *oral*, when the passage of the breath or sound by the nose is stopped, and thus are formed the letters *p* and *b*; and the second modification, termed the *nasal*, is formed by opening the communication, or exit, by the nose, and suffering the sound or breath to pass that way; in which case the letter *m* is sounded. The *second* position is formed by the application of the under lip to the fore-teeth of the upper jaw, which do not form an absolute interruption to the breath, but suffer it to pass in an audible manner, by means of the restraint with which it is made to pass: and then are produced the letters *f* and *v*. The *third* position is formed by a similar application of the tongue to the fore-teeth, and a similar expression of the breath; these producing the two consonants θ and *th*. The *fourth* position is formed by the application of the point or fore part of the tongue to the root of the same teeth, or fore part of the palate, which position may be variously modified; as by applying the tongue closely to the palate, so as to form an absolute interruption of the breath, in a manner similar to that of the first position, which may be called the *mute* modification, and which seems to form the consonants *t* and *d*. 2. The tongue is not kept closely fixed to the palate, but suffers the breath to be expressed in an audible manner, similar to those of the second and third positions: this may be termed the *sibilating* modification, and is that by which are expressed *s* and *z*. 3. The passage of the breath between the point of the tongue and the palate is opened alternately in a quick and tremulous vibration: this may be denominated the *vibratory* modification, and serves to form the letter *r*. 4. The passage of the breath or sound is not interrupted in any degree, but it is made to pass in a very peculiar manner through the mouth; for this purpose the tongue is closely applied to the fore part of the palate, but it is retracted on each side so as to leave an open space, and then a passage is preserved for the breath, which goes under the tongue and out of the mouth: this may be termed the *liquid* modification, and serves to form the sonorous letter *l*. 5. The lateral passages opened for the breath in the last modification are shut, and the sound at the same time is suffered to escape by the nasal passage, as in the second modification of the *first* position: this may be denominated the *nasal* modification, and produces the letter *n*. The *fifth* position is formed in all respects like the *fourth*, but only by a different part of the tongue and palate, and has the same number of modifications, which correspond in their nature, and may be denominated in the same manner. Thus, the letters *k* and *g* are formed in the *mute* modification; *sh* and *j* in the *sibilating;* the guttural or Northumbrian *r* in the *vibratory;* the Spanish *ll*, or the French *l mouillée*, in the *liquid;* and the guttural *n* or the English *ng* in the *nasal* modification. Having thus explained the several positions of the organ, with their different modifications, Dr. Hutton proceeds to illustrate the formation of the consonants, and articulations of voice, by the action of the breath and sound. In all the positions of the articulating organ, he says, there is either employed the simple aspiration of the breath, or a sound produced in the wind-pipe, and modified in the articulating organ. Thus, in all the positions, and in several of their modifications, there are produced two distinct articulators, according either as sound is emitted along with the articulation, or only the breath employed without any other sound. Hence proceeds the distinction of mutes and consonants among the articulators of voice.

But in each of these distinctions of mutes and consonants, it is necessary to make a sub-distinction, according as the articulator is either perfect or imperfect, whether as a mute or as a consonant. Each of these, the author explains in the following manner: The perfect mute can only take place in those positions in which the breath is absolutely interrupted by the close or impervious organ; which does not happen in the second and third positions, and only in some of the modifications of the fourth and fifth. This mute articulator is formed, either by interrupting the vocal sound with the close position, in which case it is a final articulator; or by beginning to express the vocal sound in this close position, when it forms, upon opening the passage, an initial articulator. Of this kind there are just three articulators, corresponding to the three positions in which the organ may be absolutely closed, in relation to the exit of the breath: these are *p* in the *first* position, *t* in the *fourth*, and *k* in the *fifth* position. The imperfect mute is formed by emitting a guttural sound, or that of the wind-pipe, in these three positions of the mute articulator. The sound here is extremely limited; for it is necessarily restricted to that quantity of breath which may be expelled through the sounding wind-pipe in compressing the air, or distending the cavity of the close organ. These short sounded articulators may therefore be termed imperfect mutes. The *b*, *d*, and *g*, are the three imperfect mutes, corresponding to the three absolute mutes, *p*, *t*, and *k*, of the *first*, *fourth* and *fifth* positions. In the sibilating articulators of the *second* and *third* positions, and of the second modification of the *fourth* and *fifth* positions, the breath may be continually emitted, either with the simple expiration, or attended with the guttural sound. This, then, forms two cases of articulation, differing from each other, and also from the other two cases of mute articulation; seeing that in the present case, whether the consonant be formed with a guttural sound, or only an audible aspiration, it is a continued thing, and is not necessarily terminated, as in the mutes, by the close position of the organ. Now, as in the case of mutes, we have the distinction of perfect and imperfect, with regard to that species of letter, so, in the case of consonants, we have a species which is perfect, and one which is imperfect. The imperfect species of consonant-articulators is formed in the four sibilating positions and modifications just now mentioned, *viz.* the *f* in the *second* position, the θ in the *third* position, the *s* in the sibilating modification of the *fourth*, and the *sh* in that of the *fifth* position. To perfect those four consonants, we have merely to add the guttural sound to the continued expiration, and we then produce of the *f* the *v*, of the θ the *th*, of the *s* the *z*, and of the *sh* the *j*. We have now only remaining the *nasal* modification of the *first* position, which gives the consonant *m;* the *vibratory* modification of the *fourth* and *fifth* positions, which give two species of the letter *r;* the *liquid* modifications, which give two species of the letter *l;* and the *nasal* modifications of those two last positions, which give two species of the letter *n*. In none of all these is formed a distinct articulator, by means of the simple aspiration; consequently all these are perfect consonants. Our author observes, that the letter *h* is a general articulator, which is formed in many different positions of the vocal organ. Diphthongs and consonant-vowels, or rather articulating vowels, are formed in the following manner: the diphthong, by sounding both vowels equally in the time of one; the consonant-vowel again, by an unequal division of this time, or by sliding quickly from the po-

sition

ſition of the two extreme vowels *i* and *u*, to the vocal ſound which is to be thus articulated. See Vowel.

Consonant, is a term in *Muſic*, which Dr. Callcott in his Muſical Grammar applies to the concords, octave, fifth, fourth, thirds major and minor, and ſixths major and minor. The conſonant triads, or common chords, according to the ſame author are,

in the major mode , and in the minor mode . See Triad.

CONSORT, *Queen*. See Queen.

CONSOUND, in *Botany*. See Symphytum and Solidago.

CONSOW, in *Geography*, a town of Poland, in the palatinate of Sandomirz; 28 miles S.E. of Radom.

CONSPIRACY, in *Law*, is taken for a combination or confederacy to do ſomething evil, or illegal: though in the original ſenſe of the word, and in its uſe in other languages, it ſignifies merely an agreement, whether for good, bad, or matters indifferent.

In our ſtatutes and law books, *conſpiracy*, in a general ſenſe, is frequently confounded with *maintenance*. and *champarty*.

Conspiracy, in its ſpecial ſignification, is uſed for a confederacy of two, at leaſt, falſely to indict one, or procure him to be indicted of felony; who, after acquittal, ſhall have writ of conſpiracy. See 33 Edw. I. ſtat. 2. 7 Hen. V. 18 Hen. VI. c. 12. The term is now commonly uſed for the unlawful combination of journeymen to raiſe their wages, or to refuſe working, except on certain ſtipulated conditions; an offence particularly provided for by ſtat. 2 & 3 Ed. VI. c. 15. revived, continued, and confirmed by ſtat. 22 & 23 Car. II. c. 19 (now expired); which enacts, among other things, that "if any artificers do conſpire, that they ſhall not do their work but at a certain price, or ſhall not take upon them to finiſh what another hath begun, or ſhall do but a certain work in a day, or ſhall not work but at certain times, every perſon ſo conſpiring ſhall forfeit for the firſt offence, 10*l*. or be impriſoned 20 days; for the ſecond, 20*l*. or be pilloried; and for the third, 40*l*. or be pilloried, loſe an ear, and become infamous." This ſtatute appears to be yet in force, though it be not frequently reſorted to for remedy in this caſe; the proceeding being uſually by indictment for conſpiracy.

By the common law all conſpirators wrongfully to prejudice a third perſon are highly criminal. 1 Hawk. P. C. c. 72. § 2. ſtat. 5 Eliz. c. 4. Journeymen confederating and refuſing to work unleſs for certain wages, may be indicted for a conſpiracy, although the ſtatutes which regulate their work and wages do not direct this mode of proſecution; for the offence conſiſts in the conſpiring, and not in the refuſal: and all conſpiracies are illegal, though the ſubject-matter of them may be lawful. Thus alſo, a bare conſpiracy to do a lawful act to an unlawful end is a crime, though no act be done in conſequence of it. 8 Mod. 321. The fact of conſpiring need not be proved on the trial, but may be collected by the jury from collateral circumſtances. 1 Black. Rep. 392. Stra. 144. And if the parties concur in doing the act, although they were not previouſly acquainted with each other, it is conſpiracy. 1 Hawk. P. C. c. 72. § 2. Writ of conſpiracy lies for him that is indicted of a treſpaſs, and acquitted, though it was not felony; alſo upon an indictment for a riot. 2 Mod. 306. 5 Mod. 405. Writ of conſpiracy lies where a man is falſely indicted of any crime which may prejudice his fame or reputation; and though it doth not import ſlander, if it endanger his liberty, or the indictment be injurious to his property, &c. 3 Salk. 97.

But though a conſpiracy to charge falſely be indictable, yet the party ought to ſhew himſelf to be innocent; for the writ of conſpiracy doth not lie without an acquittal. Mod. Caſ. 127. 185, 186. Not only writ of conſpiracy, which is a civil action at the ſuit of the party, but alſo action on the caſe in the nature of a writ of conſpiracy, doth lie for a falſe and malicious accuſation of any crime, whether capital or not capital, even of high treaſon; and this, though the bill of indictment be found *ignoramus*, or it does not go ſo far as an indictment. And the ſame damages may be recovered in ſuch action as in a writ of conſpiracy, where the party is lawfully acquitted by verdict. 1 Rol. Abr. 111, 112. 9 Rep. 56. Gilb. Ca. 185. 10 Mod. 148. 214. Salk. 15. An action on the caſe is preferable, as it is more in uſe, and the proceedings more eaſy and not attended with ſuch niceties as the writ of conſpiracy.

If one falſely and maliciouſly procure another to be arreſted, and brought before a juſtice of peace to be examined concerning a felony, &c. on purpoſe to vex and diſgrace him, and put him to charges and trouble, although he is not indicted for the ſame, yet he may have an "action on the caſe;" in which he need not aver that he was lawfully acquitted, as he ought to do in a writ of conſpiracy; but he muſt aver that the accuſation was *falſè et malitioſè*, which words are neceſſary in the declaration; and it muſt appear that there was no ground for it. And as an "action on the caſe" may be proſecuted againſt one perſon, where the writ of conſpiracy or indictment doth not lie but againſt two, this action is moſt commonly brought. 1 Danv. Abr. 208. 213. 2 Inſt. 562. 638.

Conſpirators may be indicted at the ſuit of the king, and at the common law, one may prefer an indictment againſt conſpirators, though nothing be executed: however, the conſpiracy ought to be declared by ſome act, or promiſe to ſtand by one another, &c. But a bare conſpiracy will not maintain a writ of conſpiracy, at the ſuit of the party, becauſe he is not damaged by it; though it is a ground for an indictment. 9 Rep. 56. 2 Roll. Abr. 77. If the defendants can ſhew any foundation or probable cauſe of ſuſpicion, they ſhall be diſcharged: and if a man hath good cauſe of ſuſpicion, that a perſon is guilty of felony, and cauſes him to be indicted, in proſecution of juſtice, action of conſpiracy will not lie; but it is otherwiſe if the proſecutor impoſes the crime of felony, where no crime of felony was committed. 1 Roll. Abr. 115. 4 Rep. 438. Conſpiracies ought to be out of court; for if a proſection be ordered in a courſe of juſtice, and witneſſes appear againſt a party, &c. there ſhall be no puniſhment; and if perſons acted only as jurors in a criminal matter, or judges in open court, there is no ground for proſecution. S. P. c. 173. 12 Rep. 24. If all the defendants but one are acquitted on indictment for conſpiracy, this one muſt be alſo acquitted; becauſe one perſon alone cannot be indicted for this crime: and huſband and wife, being but one perſon, may not be indicted alone for a conſpiracy. 2 Rol. Abr. 708. The acquittal of one perſon is the acquittal of another upon indictment of conſpiracy (3 Mod. 220.) *i. e.* where only two are indicted, and it is not laid or proved that they conſpired with others, unknown. However, where one is found guilty, according to the opinion of lord chief juſtice Hale, if the other doth not come in upon proceſs, or if he

dies pending the fuit, judgment fhall be had againft the other. 1 Vent. 234. It hath been refolved, that if an "action on the cafe" be brought againft feveral perfons, and all but one be acquitted, yet judgment may be given againft that one only. 1 Hawk. 192. Judgment may be alfo given againft one only before the trial of the others: and it has been held, that a confpiracy may be laid without any overt act. 1 Str. 193. Perfons acting feparately may be alfo guilty of a confpiracy; as particularly in the cafe where they are all of a family, *e. g.* hufband, wife, and fervants. 1 Str. 144.

If the parties are found guilty of confpiracy, upon an indictment of felony, at the king's fuit, the judgment anciently was, that they fhould lofe their "frank-law," (which difabled them to be put upon any jury, to be fworn as witneffes, or to appear in perfon in any of the king's courts,) and that their lands, goods, and chattels fhould be forfeited into the king's hands, their houfes and lands ftripped and wafted, their trees rooted up, and their bodies imprifoned. This is commonly called "villainous" judgment, and is given by the common law, and not by any ftatute, and in fome books it is faid generally to be the proper judgment upon every conviction of confpiracy at the fuit of the king, without any reftriction to fuch as endangered the life of the party; but this point doth not feem to be any where fettled. 1 Hawk. 193. 2 Inft. 143. 222. This judgment, however, hath been but feldom given; there being no inftance of it fince the reign of Edw. III. The ufual mode of punifhment at prefent is by pillory, fine, imprifonment, and furety for good behaviour. Burr. 996. 1027. Str. 196. The quarter feffions have jurifdiction over this offence. Finch. 80. 8 Mod. 321. And on motion in arreft of judgment, the defendant muft be perfonally prefent in court. Stra. 1227. Burr. 931.

In cafes where villainous judgment is impofed, the matter of the confpiracy ought to touch a man's life. As fine and imprifonment are at this day the ufual punifhment for confpiracy, fo on writ of confpiracy, &c. the party fhall be fined, and render damages. 1 Hawk. P. C. 72.

CONSPIRATION, Fr. See CONSPIRACY.

CONSPIRATION, *contre le fervice du Roi*, confpiracy againft the king's fervice. Under the old government of France every confpiracy, collufive, or unlawful combination or underftanding againft the king, his governors, commanders, or other officers, was regarded as a capital military offence; and by an order of the 1ft July 1727, it was enacted that every perfon convicted of fuch a crime fhould be broken on the wheel.

CONSPIRATIONE, in *Law*, a writ that lies againft *confpirators*. Reg. Orig. 134. F. N. B. 114.

CONSPIRATORS, according to the ftatute, are thofe that do confederate, or bind themfelves by oath, covenant, or other alliance, that every one of them fhall aid, and bear the other, falfely and malicioufly, to indict, or caufe to indict, or falfely to move, or maintain pleas: and fuch as retain men in the country, with liveries or fees, to maintain their malicious enterprizes: and this extendeth as well to the takers, as the givers: and ftewards, and bailiffs, of great lords, which, by their office, or power, undertake to bear, or maintain quarrels, pleas, or debates, that concern other parties than fuch as touch the eftate of their lords, or themfelves. 33 Edw. I. ftat. 2. 2 Inft. fol. 384. 562.

Moreover, againft confpirators, falfe informers and imbracers of inqueft, the king hath provided a writ in the chancery; and the juftices of either bench and juftices of affize, fhall, on every plaint, award inqueft thereupon. Stat. 28 Ed. I. ft. 3. c. 10. There are alfo confpirators in treafon, by plotting againft the government, &c. See TREASON.

CONSPIRING POWERS, in *Mechanics*, are all fuch as act in directions not oppofite to one another. See POWER, and MOTION.

CONSTABLE. This appellation hath afforded ample matter of difquifition to learned antiquarians. Hiftory has traced it backwards from its introduction to England, through France, Germany, and Greece, to the imperial feat at Conftantinople, in the days of Conftantine the Great; and if we afcend farther towards the Eaft, we fhall find the term *cône* or *cûne* in Paleftine, which fignified in the times of the Old Teftament, a ftability, ftrength, or ftay. Some trace of this word has been difcoverable in the appellation of Laocoon at Troy, and particularly in that of Conftantine, who was himfelf of oriental extraction, having fprung from Dardania, a country of Upper Mœfia, and faid by flatterers to have been defcended from Dardanus and the Trojans. It is not improbable that this appellation of the emperor might have occafioned the adoption of the word into the Roman language about the fame time. For it was at that period that the word *count*, obvioufly deduced from *cone* or *cune*, firft became a name of dignity; and from thence was tranfmitted weftwards, with fome variation, according to the different genius of languages throughout the provinces. Amongft the Saxons the word was *koning* or *kyninge*, from which, without doubt, we derive our word king. Moreover, the word *ftole*, *ftolle*, *ftafle*, or *ftable*, by an eafy tranfmutation of the feveral letters frequent in almoft all languages, which feems to be the other conftituent of the appellation *conftable*, is likewife common to the languages of the middle ages, and fignifies a ftanding place, divifion, or department, called by the Romans *ftatio*. According to this etymology, the word *conftable* fignifies the ftability or ftay of the place, or the ftrong man of the divifion. Thofe who derive it from the Saxon, difcover conftable in *koning-ftapel*, denoting the fupport of the king. But others, as fir Henry Spelman, and Dr. Cowel, confidering that we borrow the name, as well as the office, from the French, deduce it, with greater probability, from that language; in which it is plainly derived from *comes ftabuli*, the mafter of the ftables, or perhaps of the horfe, an officer well known in the empire; fo called, becaufe, like the great conftable of France, as well as the lord high conftable of England, he was to regulate all matters of chivalry, tilts, tournaments, and feats of arms, which were performed on horfeback. Accordingly, they fuppofe, that the dignity, which at firft was civil, in time became military, and the mafter of the ftables was made general of the army.

CONSTABLE *of England, Lord High*, is an ancient officer of the crown, now difufed in England, except on folemn occafions, as the king's coronation, and the like. The firft conftable of England is faid to have been created by the conqueror, who appointed Ralph de Mortimer, one of the principal commanders of his army; and the office continued till the reign of Henry VIII., A. D. 1521; when it became extinct, as the powers annexed to it rendered it troublefome to the king, by the attainder of the third duke of Buckingham, who derived it from the Bohuns, earls of Hereford, and in whom it was hereditary. Since this time there hath not been any permanent high conftable; but the office has been kept vacant, except on particular occafions. About a century after, *viz.* in 1627, it was alfo fuppreffed in

in France, by an edict of Louis XIII.; though the office has been exercised in the command of the marſhals, by the firſt officer in the army. See Connetable.

What authority and juriſdiction belonged to the conſtable, we may partly learn from a ſtatute of the 13th of Richard II., in which it is ſaid "that he ought to have cognizance of contracts touching feats of arms and of war out of the realm, and alſo of ſuch things relating to arms or war within the realm, as could not be determined or diſcuſſed by the common law, with other uſages and cuſtoms appertaining to the ſame matters, which other conſtables before that time had duly and reaſonably uſed." Madox (Hiſt. Excheq. c. 11.) ſays, that he was a high officer, both in war and peace. As the duties enjoined on the conſtable and mareſchal or marſhal, as well in war as in peace, in camp and in court, were multifarious, honourable, and confidential; ſo the powers, privileges, authority, and pre-eminence of thoſe officers, were extenſive, judicial, executory, and reſpectable. The powers and functions of each of theſe two high officers, when acting in their military capacities, were, in ſome inſtances, concurrent; in others, ſeparate and independent. In the diſcharge of ſome official duties, they were upon an equal footing, and the marſhal acted as coadjutor to the conſtable, but in others, the former was ſubordinate and ſubſervient to the latter. The functions of the conſtable, in his civil capacity, were few, and in a great meaſure reſtricted to certain perſonal attendances on the king in his court, on high feſtivals, and on occaſions when ſuch affairs were tranſacted as required pomp and ſolemnity. In his military capacity, the conſtable examined the number and qualifications of thoſe who were ſent by the military tenants, either into the field or garriſon, and alſo of the ſtipendiaries retained by the king, and gave them either their admittance or diſcharge. When the army took the field, and was commanded by the king in perſon, the conſtable acted as his lieutenant, and was next to him in authority; but whenever the king was abſent, the conſtable had the ſupreme and ſole command of the forces. In both caſes, the marſhal was the ſubſtitute or vice-general of the conſtable. See Court *of Chivalry*, and Marshal.

From thoſe mighty magiſtrates, the conſtables of England, are derived the inferior ones, ſince called the *conſtables of hundreds and franchiſes:* theſe were firſt ordained in the thirteenth year of Edward I. by the ſtatute of Wincheſter (13 Ed. I. ſtat. 2. c. 6.); which, for the conſervation of the peace, and view of armour, and for preſenting defaults of armour, and of the ſuits of towns and of highways, &c. appointed, that two conſtables ſhould be choſen in every hundred and franchiſe.

Theſe are what we now call *conſtabularii capitales*, or *high conſtables;* becauſe continuance of time, and increaſe of people, &c. have occaſioned others of like nature, but inferior authority, in every town and pariſh, called *petty conſtables*, or *ſub-conſtabularii*, firſt inſtituted (as ſome ſay) about the reign of Edward III.

Although it has been a prevalent opinion, maintained by Coke, Hale, and others, that high conſtables are not more ancient than the ſtatute of Wincheſter above cited; yet Hawkins concurs with others in maintaining, that both conſtables of hundreds, commonly called high conſtables, and alſo conſtables of tythings, now denominated petty conſtables or tything-men, exiſted by the common law, and were not firſt ordained by the ſtatute of Winton or Wincheſter; for that ſtatute doth not ſay, that ſuch officers ſhall be conſtituted, but evidently ſeems to ſuppoſe that there were ſuch before the making of it. 2 Hawk. 61. That the high conſtable was inſtituted long before the ſtatute of Winton is a fact aſcertained by a writ or mandate of Henry III., preſerved in the Adverſaria to Watts's edition of Matt. Paris, and from which chapters 4 and 6 of the ſtatute of Winton are evidently taken. By this writ it is provided, "that in every hundred there ſhall be *conſtituted* a Chief Constable, at whoſe mandate all thoſe of his hundred, ſworn to arms, ſhould aſſemble and be obſervant to him, for the doing of thoſe things which belong to the conſervation of the king's peace." No mention of this officer, it is believed, can be any where found prior to the date of this inſtrument; which perhaps may no more determine the queſtion as to his original creation than the ſtatute of Winton. As for the "conſtable of the vill," or petty conſtable, as he is frequently called by way of diſtinction from the chief conſtable, this officer has been repeatedly acknowledged to be one of the moſt ancient officers in the realm, for the conſervation of the peace (Poph. 13. 4 Inſt. 265.). It muſt be confeſſed, however, that no mention of him by this identical name is any where found to occur anterior to the writ or mandate of king Henry III. already mentioned; by which it is alſo provided, that in every village or townſhip there ſhould be conſtituted a conſtable or two, according to the number of the inhabitants. But it is partly certain that lord Coke's idea is well founded, and that "this officer is actually owing to the inſtitution of the frank-pledge, uſually attributed to king Alfred," and was in fact originally the ſenior or chief pledge of the tything or *decima*. Hence it appears, that the ordinance of Henry III., far from inſtituting the office, merely enlarged the number of officers, placing them in towns and villages, inſtead of franchiſes; hence it might frequently happen, that a manor of great extent had only a ſingle conſtable for ſeveral townſhips; a caſe exactly ſimilar ſometimes occurring at this day, in which a townſhip, comprehending ſeveral hamlets, equally populous perhaps with itſelf, has only one conſtable for the whole. Upon the whole, it ſeems highly probable, that, at the common law, and before the mandate of Henry III., the conſtable of the hundred and the conſtable of the manor, were officers of the ſame nature and authority, originating at the ſame time and differing only as to the extent of their ſeveral diſtricts; in ſhort, that they bore to each other the ſame analogy as ſubſiſted between the bailiff of the hundred and the bailiff of the manor. Hence it follows, that the conſtable of the hundred neither poſſeſſed nor could have exerciſed any more authority within the precinct of the latter, than the conſtable of one manor poſſeſſed or could have exerciſed in another; the manor being to all intents and purpoſes exempt from, and excluded out of the hundred.

High conſtables are choſen at the court leets of the franchiſe or hundred over which they preſide, or, in default of that, by the juſtices at their quarter ſeſſions, or by the greater number of the juſtices of the diviſion: and they are ſworn at the ſeſſions, or by warrant from the ſeſſions; which courſe hath often been allowed and commended by the juſtices of aſſize. Dalt. c. 28. Salk. 150. And by ſtat. 29 Geo. II. c. 25, §8, 9, in Weſtminſter a high conſtable is to be elected annually by the dean or high ſteward or his deputy at a court leet. But by 1 Geo. ſtat. 2. c. 13. high conſtables are required to take the oaths of allegiance, ſupremacy, and abjuration, as other perſons who qualify for offices; but they are not within the ſtatute of the 25 C. II. c. 2. as to receiving the ſacrament and ſubſcribing the declaration againſt tranſubſtantiation; and petty conſtables are exempted both from the one and from the other. The petty conſtables have two offices united in them; the one ancient, the other modern. Their ancient office is that of *Head*-borough (which ſee), tything-man,

 or

or borſholder, who are as ancient as the time of Alfred; and their more modern office is that of conſtable merely, which was appointed (as it has been ſaid) ſo lately as the reign of Edward III., in order to aſſiſt the high conſtable. And, in general, the ancient head-boroughs, tything-men, and borſholders, were made uſe of to ſerve as petty conſtables; though not ſo generally, but that in many places they ſtill continue diſtinct officers from the conſtable.

The common law requires, that every conſtable ſhould be *idoneus homo*, i. e. apt and fit to execute the ſaid office; and in law he is ſaid to be *idoneus* when he poſſeſſes three qualifications, *viz.* honeſty, knowledge, and ability, (8 Rep. 41. *b.*) And if one be elected conſtable, who is not *idoneus*, he by the law may be diſcharged of his office, and another who is *idoneus* appointed in his place. He muſt alſo be an inhabitant of the place for which he is choſen, (12 Mod. 256.) nor ſhould he be the keeper of a public-houſe, (6 Mod. 42.) which is made an expreſs diſqualification in Weſtminſter, by ſtat. 29 Geo. II. c. 25. Perſons exempt from ſerving the office of conſtable are aged perſons, and in Weſtminſter thoſe 63 years old are expreſsly exempted by ſtat. 31 Geo. II. c. 17. § 13;—aldermen of London;—the preſident, commons and fellows of the college of phyſicians in London, by 32 Hen. VIII. c. 40; but no other phyſicians, nor they elſewhere:—apothecaries, practiſing in, or within ſeven miles of London, free of the company, or in the country having ſerved ſeven years, ſtat. 6 and 7 W. III. c. 4;—ſurgeons, free of the company of ſurgeons in London, examined, approved, and exerciſing the ſcience, by ſtats. 5 Hen. VIII. c. 6: 32 Hen. VIII. c. 42: 18 Geo. II. c. 15; and by cuſtom all ſurgeons (Com. Rep. 312.), and it ſeems by the ſame ſtats. barbers free of that company in London;—attornies of the courts of K. B. and C. P.;—practiſing barriſters;—diſſenters, being teachers and preachers in a congregation, tolerated by law, taking the oaths and making the required declaration, but not others, by 1 W. c. 18. § 11;—foreigners naturalized, who may rather be ſaid to be incapacitated;—militia-men, during the time of their ſervice, by 26 Geo. III. c. 107. § 130;—ſervants to members of parliament, but doubtful;—proſecutors of felons to conviction; the original proprietors, or firſt aſſignee of a certificate (commonly called a tyburn-ticket), if a pariſh or ward office; within the pariſh or ward where the felony happened; to be only once uſed, by 10 and 11 W. c. 23. § 23; but this is no exemption from ſerving the office for a manor, nor, as it ſhould ſeem, for a vill or townſhip; nor where the office is to be executed out of the privileged diſtrict;—but maſters of arts, juſtices of peace in another county, officers of the guards, officers or watchmen at the Cuſtom-houſe, tenants in ancient demeſne, and younger brothers of the trinity-houſe, cannot plead exemption. If, however, a gentleman of quality, or a phyſician, officer, &c. be choſen conſtable, where there are ſufficient perſons beſides, and no ſpecial cuſtom exiſts; ſuch perſons, it is ſaid, may be relieved in B. R. 2 Hawk. P. C. 100. c. 10. § 41. A conſtable, whoſe office is miniſterial, and not judicial, may appoint a deputy; but the conſtable is anſwerable, and his deputy ought to be ſworn, though this is not in all caſes neceſſary; but if the deputy is allowed and ſworn, the principal is not reſponſible. Diſſenters choſen to the office of conſtable, &c. ſcrupling to take the oaths, may execute the office by deputy, who ſhall comply with the law in this behalf, ſtat. 1 W. & M. c. 18. § 7. And by 31 Geo. III. c. 32. the like privileges are given to Roman Catholics on their taking and ſubſcribing the oath and declaration therein ſpecified. Conſtables may appoint a deputy to execute a warrant, when by reaſon of ſickneſs, &c. they cannot do it themſelves. A woman made conſtable, by virtue of a cuſtom, that the inhabitants of a town ſhall ſerve by turns, on account of their eſtates or houſes, may procure another to ſerve for her, and the cuſtom is good.

Conſtables are choſen by the common law at the leet, or, where there is no leet, at the tourn; ſometimes by the ſuitors, and ſometimes by the ſteward; and now, in many towns and pariſhes, by the pariſhioners: all according to ancient and particular uſage. But by whomſoever they ſhall be choſen and appointed, they are to be ſworn and placed in their office by the lord, or his ſteward, or by the ſheriff reſpectively, as being judge of the court. 2 Hawk. 62. If the conſtable be preſent when choſen, he is to take the oath in court; if abſent, he may be ſworn before a (ſingle) juſtice of the peace: but in the latter caſe, he ought to have ſpecial notice of his election, and a time and place ſhould be appointed for his taking the oath (well and truly to ſerve the office). Every petty conſtable being a principal peace officer, and it being neceſſary for the preſervation of the peace, that every vill ſhould be furniſhed with one, the juſtices of the peace have, ever ſince the inſtitution of their office, taken upon them, as conſervators of the peace, not only to ſwear the petty conſtables, who have been choſen at a tourn or leet, but alſo to nominate and ſwear thoſe who have not been choſen at any ſuch court, on the neglect of the ſheriffs or lords to hold their courts, or to take care that ſuch officers are appointed in them. And this power of juſtices of the peace, having been confirmed by the uninterrupted uſage of many ages, ſhall not now be diſputed, but ſhall be preſumed to have been grounded on ſufficient authority. Some have carried this point ſo far, as to allow the juſtices, at their ſeſſions, to ſwear one who was choſen at the leet, and unduly rejected by the ſteward, who had ſworn another in his place. 2 Hawk. 65. A conſtable has been ſworn by a ſingle juſtice of the peace; and upon motion for an information as not being duly ſworn, the court held this to be a good ſwearing. 2 Strad. 1149. It is certain that juſtices of the peace had power to nominate and ſwear conſtables, on the default of the tourn or leet, before the ſtatute of 13 & 14 C. II. c. 12.; and therefore that they have ſuch authority in ſome caſes not mentioned in that ſtatute, which enacts, that if a conſtable ſhall die, or go out of the pariſh, any two juſtices may make and ſwear a new one, until the lord ſhall hold a leet, or till the next quarter ſeſſions, who ſhall approve of the officer ſo made and ſworn, or appoint another; and if any officer ſhall continue above a year in his office, the juſtices in their quarter ſeſſions may diſcharge him, and put in another, till the lord ſhall hold a court as aforeſaid. 2 Hawk. 65. 13 & 14 C. II. c. 12. § 15. It ſeems to be clear at this day, that the King's Bench hath power by mandamus to compel the court or judge to ſwear a conſtable duly choſen. 2 Hawk. 65. And conſtables lawfully choſen, if they ſhall refuſe to be ſworn, may be bound over by a juſtice of the peace to the aſſizes or ſeſſions, there to be indicted. Dalt. c. 28. 2 Str. 920. But it ſeems that a juſtice hath no power to commit any perſon for ſuch refuſal and no more, the proper mode being to indict him upon his refuſal; and if found againſt him, to aſſeſs a good fine upon him. Cro. Car. 567.

Conſtables of London, which city is divided into 26 wards, and every ward into precincts, in each of which is a conſtable, are nominated by the inhabitants of each precinct on St. Thomas's day, and confirmed, or otherwiſe, at the court of wardmote; and after they are confirmed, they are ſworn into their office, at a court of aldermen, on the next Monday after Twelfth-day. The oath of theſe conſtables is long and particular, and comprehends a variety of duties, now ſeldom performed, but regulated by articles of the Wardmote inqueſt;

queft, which directs the conduct of the conftable; who is a kind of fuperintendant of the morals of the inhabitants, and who ought to notice all new-comers, that thofe whofe character is bad may be required to give fecurity for their good behaviour, or be imprifoned. Carth. 129. 138. Every conftable may execute warrants through the whole city. Such as are chofen into the office are obliged to place the king's arms, and the arms of the city, over their doors; and if they refide in alleys, at the ends of fuch alleys, towards the ftreets, to fignify that a conftable lives there, and that they may be more eafily found when wanted.

The general duty of all conftables, both high and petty, is to keep the king's peace in their feveral diftricts; and for this purpofe they are armed with very large powers, of arrefting, and imprifoning, and of breaking open houfes, and the like. One of their principal duties, arifing from the ftatute of Winchefter, which appoints them, is to keep watch and ward in their refpective jurifdictions. See WARD and WATCH.

If any one fhall make an affray or affault upon another, in the prefence of the conftable, or fhall threaten to kill, beat, or hurt another, or in a fury be ready to break the peace; the conftable may commit him to the ftocks, or other fafe cuftody, and afterwards take him before a juftice, or to a gaol, until he fhall find furety for the peace; and if the party will not find furety to the conftable, he may imprifon the party till he fhall do it, provided the offence be in his own view. Dalt. c. 1. Cro. Eliz. 375, 376. The duties of conftables are fo numerous and minute, in confequence of a variety of ftatutes, that the mere recital of them would extend this article beyond its due bounds. They will be found under feveral different heads or titles, that occur in this work.

If a conftable neglect any duty incumbent on him either by common law or by ftatute, he may be indicted and fined by the juftices of peace, to whom he is fubordinate. If he will not return his warrant, or certify what he has done under it, he may be fined. If he wilfully lets a felon efcape out of the ftocks, and go at large, it is felony; and it feems generally agreed, that all voluntary efcapes in the officer amount to the fame crime as the offender was guilty of, whether treafon or felony. 2 Hawk. P. C. c. 19. § 22, &c. It is a mifdemeanour in him to difcharge an offender, brought to the watch-houfe by a watchman in the night. In fhort, he is liable to various pecuniary, and fometimes perfonal, punifhments, on neglecting the duty impofed on him by various ftatutes. As by his office he is fubordinate to a juftice of the peace, he is bound to execute his warrants; and therefore it hath been refolved, that where a ftatute authorifes a juftice of the peace to convict a man of a crime, and to levy the penalty by warrant of diftrefs, without faying to whom fuch warrant fhall be directed, or by whom it fhall be executed, the conftable is the proper officer to ferve fuch warrant, and indictable for difobeying it. 2 Hawk. 262. By 33 Geo. III. c. 55. two juftices, at any fpecial or petty feffions, upon complaint upon oath, of any neglect of duty, or difobedience of any lawful warrant or order of any juftice, by any conftable, or other peace or parifh officer, (fuch perfon being duly fummoned to appear and anfwer to fuch charge,) may impofe, upon conviction, any reafonable fine, not exceeding 40*s*., upon fuch conftable, &c.; and if not paid, levy the fame by diftrefs and fale of the goods of fuch offender, to be applied to the poor of the parifh or place where he refides; or for want of fuch diftrefs, the offender fhall be committed to the houfe of correction for any time not exceeding ten days. The officer executing fuch warrant, if required, fhall fhew the fame to the perfon, whofe goods and chattels are diftrained, and fuffer a copy of it to be taken. 27 Geo. III. c. 26.

On the other hand, the conftable is protected by law, in the execution of his duty. By ftat. 7 Jac. I. c. 5. 21 Jac. II. c. 12. if any action is brought againft a conftable for any thing done by virtue of his office, he, and all who aid him, may plead the *general iffue*, give the fpecial matter in evidence, and if he recovers, fhall have double cofts; but this muft be certified on the record by the judge: and ftat. 19 Geo. II. c. 21. againft profane fwearing, gives treble cofts. By ftat. 24 Geo. II. c. 44. no action fhall be brought againft any conftable or others affifting him for any thing done in obedience to any warrant of a juftice of peace, until demand of the perufal and copy of fuch warrant, and the fame hath been refufed or neglected for the fpace of fix days, &c. &c. No action fhall be brought againft any conftable but within fix months after the act committed. For the charges of conveying malefactors to gaol, fee COMMITMENT. By 27 Geo. II. c. 20. the conftable executing a juftice's warrant, for levying a penalty or other fum of money directed by an act of parliament by diftrefs, may deduct his own reafonable charges; and if any perfon fhall be appointed to execute any warrant for felony, two juftices may order by warrant under their hands a reafonable allowance to fuch fpecial conftable for his expences and lofs of time, to be paid by the treafurer out of the county rate. 41 Geo. III. c. 78. Two juftices may in like manner order an allowance to be made to any high conftable for extraordinary expences incurred in the execution of his office, to be defrayed in the fame manner. And by 18 Geo. III. c. 19. every conftable, headborough, and tything-man, fhall every three months, and within fourteen days after he goes out of office, deliver to the overfeers of the poor a written account, entered into a book kept for that purpofe, and figned by him, of all fums expended in confequence of his office, which the overfeers within the next fourteen days fhall lay before the inhabitants, and if approved, the money fhall be paid out of the poor rate: but if difallowed, they are to return the book to the conftable, who may produce it before a juftice of peace, giving reafonable notice to the overfeers; and the juftice fhall examine the account, fettle the fum due, fign the account, and order payment out of the poor rate; the overfeers, however, may appeal to the quarter feffions.

If a onftable commits a perfon in charge, he is not liable to an action for falfe imprifonment, though the charge be ill-founded; and if the conftable is affaulted in the execution of his office, and the conftable kill the affailant in a conteft, it is no felony; but if the conftable is killed, it fhall be conftrued premeditated murder. A juftice of peace's warrant is a fufficient juftification of a conftable in a matter within the jurifdiction of fuch juftice.

High conftables fhall account, if required, at the general or quarter feffions, for the general county-rate by them received, on pain of being committed to gaol until they account; and they fhall pay the money in their hands, according to the order of the court, under the like penalty. 12 Geo. II. c. 29.

Conftables may be removed in the fame manner and by the fame authority by which they were chofen. The fheriff, or fteward of the leet, having power to place a conftable in his office, has alfo a power of removing him. Juftices of the peace have alfo diplaced fuch conftables as have been chofen and fworn by them. Dalt. c. 28. 2 Hawk. 63. 65. And by 13 & 14 Geo. II. c. 12. if a conftable fhall continue above a year in his office, the feffions may difcharge him, and put another in his place, till the court fhall hold a leet. And if the court, or other judge, fhall refufe to

to difcharge a conftable, the King's Bench may compel them by mandamus. 2 Hawk. 65. If a conftable be difcharged without juft caufe, the court of King's Bench will by rule of court order him to be reftored to his place. Bulft. 174.

CONSTABLES *of the Caftles*, in *Antiquity*, were keepers or governors of the caftles of the king, or of great barons, who were frequently hereditary, or by feudal tenure; fuch were the conftable of the Tower, the conftable of London, or Baynard's caftle, the conftables of the caftles of Dover, Windfor, Chefter, Caernarvon, and other caftles in Wales; fome of which offices, though not now hereditary, are remaining to this day. Their office feems to have been the fame with that of the *caftellani*, or governors of caftles. Thefe conftables are thofe to whom Magna Charta (c. 17. 20.) refers; and who in the ftat. of Weftm. 1. (3 Ed. I.) c. 15. are called conftables of fees, and there confidered as keepers of prifons; a conftituent part indeed of all ancient caftles. 2 Inft. 31. The ftatute of 5 Hen. IV. c. 10. reciting the oppreffions of thefe conftables, and enacting that none be imprifoned but in the common gaol, feems to have put an end to a race of tyrants, who, by their mifconduct, had rendered themfelves odious to the people.

CONSTABLE *of France*. See CONNETABLE.

CONSTABLE, *Provoft of the*. See PROVOST.

CONSTABLE, in *Biography*, general of the Dominican order about the end of the fixteenth century, was born at Ferrara, to which city he was conftituted inquifitor, and afterwards nominated mafter of the holy palace by pope Gregory XIII. In literary hiftory he is known by a work entitled, "De caufis in fancto officio cognofcendis," which related to the hiftory of the dreadful tribunal invented by the founder of his order. His own zeal in the duties of the office to which he had been chofen was exemplary; and to exceffive fatigue and over exertions occafioned in vifiting on foot the monafteries under his government, is to be afcribed an illnefs that terminated in his death, at Venice on 17th of Sept. 1582. Moreri.

CONSTADT, or KUNSTADT, in *Geography*, a fmall town of Pruffia, fituated in Lower Silefia, in the principality of Oels.

CONSTANCE, COSTANTZ, or COSTNITZ, a confiderable town of Wirtemberg, in the circle of Swabia, formerly a free imperial city, under the protection of Auftria, delightfully fituated at the north-weftern extremity of the lake of Conftance, where the Rhine iffues out of it again; or between the two lakes; 45 miles N.E. from Zurich. N. lat. 47° 40'. E. long. 9° 12'. The fort of Peterhaufen defends it on the left fide of the Rhine. "I was much afflicted," fays Mr. Coxe, who vifited this place in 1776 (fee Travels in Switzerland, vol. i. p. 16.) "with the folitary appearance of a town once fo flourifhing in commerce, and fo celebrated in the annals of hiftory. A dead ftillnefs reigns throughout; grafs grows in the principal ftreets; in a word, it wears the melancholy afpect of being almoft totally deferted, and fcarcely contains 3000 inhabitants. This city has endured a fad reverfe of fortune; it was formerly in alliance with Zuric and Bafle; and, fupported by their affiftance, expelled the bifhop, and embraced the reformation. But the Proteftant cantons being worfted in 1531; and the league of Smalcalde, of which Conftance was a member, being defeated by Charles V., the town was obliged to fubmit to the emperor," (having been placed under the ban of the empire in the year 1548, for deferting the Roman Catholic religion), "and readmit the Catholic religion. From this period it loft its independence." In 1549 it was placed under the power of the houfe of Auftria by Ferdinand I.; and though the eftates of Swabia refufed their affent, the fubjection was ratified by the diet at Augfburg. Being neglected by the houfe of Auftria, the town fell to decay. Conftance fomewhat revived, and afforded the profpect of becoming a commercial town, through the permiffion granted by the emperor Jofeph, to the emigrants from Geneva, of fettling and carrying on their trade and manufactures, with very confiderable privileges; the principal of which were the following: *viz.* the right of purchafing or building houfes; the free exercife of religion, entirely independent of the Catholic clergy; the power of erecting a tribunal for the purpofe of deciding all affairs relative to their manufactures and commerce; exemption from ferving in the militia and quartering foldiers, from all contributions during the fpace of 20 years, from duties on their tools and utenfils; and the invariable eftablifhment of the ftandard of the gold and filver employed in their manufactures. "Thefe favourable terms (fays Mr. Coxe) figned on the 30th of June 1785, attracted fo many fettlers to Conftance, that in my fecond vifit to this place, on the 25th of October 1787, the new colony of Genevans confifted of 70 families, comprifing 350 perfons: among thefe were 54 watch-makers, who had introduced the different branches of manufacture which belong to their trade. Four hundred watches were already finifhed, and above 1400 more were preparing. The emperor alfo has granted to Mr. Macaire the convent of Dominicans lately fecularized, towards eftablifhing a manufacture of printed linens and cottons. The refectory is appropriated for the chapel of the new colony." "This convent, which was once the afylum of monkifh fuperftition, is now the feat of trade and induftry; and it muft fuggeft a pleafing reflection to a philofophic mind, that a fucceffor of Sigifmond, who violated his word," (as in the cafe of Hufs) "fhould have configned to a reformed eftablifhment that very convent in which the Bohemian divine was imprifoned, and from which he was led to the ftake; and that the moft enlarged principles of toleration fhould be manifefted in the fame fpot where perfecution was inculcated by precept and examples. It is the triumph of reafon and religion over bigotry and intolerance." Since the period to which we have now referred, France has extended its revolutionary fpirit and operations to the ftates of Switzerland; and time muft develope their effects on the liberty and commerce, and confequent profperity of the country. See HELVETIC CONFEDERACY and SWITZERLAND. At prefent the manufactures and commerce of Conftance are inconfiderable. Its celebrity is chiefly owing to a council held here from 1414 to 1418, which depofed three popes, *viz.* John XXIII., Gregory XII., and Benedict XIII., who had fet up againft each other; appointed Martin V. in their room, condemned the doctrine of Wickliff, and committed his works to the flames, in 1415; and caufed John Hufs and Jerome of Prague to be burnt, the former July 6, 1415, and the latter May 30, in 1416. At this council the affembled fathers on the 14th of June in 1415, paffed the famous decree which took the cup from the laity in the celebration of the eucharift, ordered that the Lord's fupper fhould be received by them only in one kind, *i.e.* the bread, and rigoroufly prohibited the communion in both kinds. The hiftory of this council by L'Enfant is compofed with great accuracy and elegance. A fecond edition of this work appeared at Amfterdam in the year 1728, in 2 vols. 4to.: the firft was publifhed in 1714. For an account of the treaty at Conftance, A. D. 1183; fee the article CITY.

CONSTANCE, *Lake of*, feparates Switzerland from that

that part of Germany hitherto called the circle of Swabia.

It is divided into three parts: the upper part, which is the broadest, is called *Boden-See*, the middle part *Bodmer-See*, and the lower part *Zeller-See*.

The superior lake is about 15 leagues in length, and 6 in its greatest breadth. The borders consist of gently rising hills; on the left hand Swabia, and on the right Thurgau, with a variety of scattered towns, villages, and monasteries, and delightful villas, which afford several views to those who navigate the lake, that are truly enchanting. The form of the lake inclines to an oval, and the water is of a greenish hue. This lake, like all the other lakes of Switzerland, is considerably deeper in summer than in winter; a circumstance which is owing to the first melting of the snow from the neighbouring mountains. It abounds with all sorts of fish, and more particularly with the species of trout, called in its vicinity "Illankin," and by Linnæus Salmo *lacustris*. A little above Stein, which is an independent town, under the protection of Zuric; the Rhine widens considerably, and forms the inferior lake of Constance, or the *Zeller-see*, which is divided into two branches; from Stein to Constance is about 16 miles, and from the latter to Zell, its greatest breadth, about 10.

Near Mersbourg the lake of Constance is said to be 350 fathoms deep. This great depth is extremely advantageous to commerce, the lake being navigated by vessels of 100 tons and upwards. There are two islands in its middle, on one of which is the town of Lindau, formerly a free imperial city, but belonging now to the king of Bavaria, who, by the treaty of the confederation of the Rhine, has engaged to have it fortified and provided with artillery establishments. On the other island, about a mile in circumference, is the town of Meinau, which belonged to the knights of the Teutonic order, and whose situation is delightful.

The Rhine enters the lake of Constance at its south-eastern extremity, and issues out of it again at the north-west, not far from Stein. There is an ancient, and generally accredited tradition, that the Rhine, in crossing the lake in all its length, does not mix with its water. The same is said of the Rhone, which runs through the lake of Geneva. Pliny the Elder, and Ammianus Marcellinus, are the authors of these fables. It is true that the two rivers are distinctly seen some time after their entrance into the lakes, but the difference of colour vanishes as soon as they have deposited the sand which they carry. Mr. Coxe, seated on board a vessel on the lake, in vain attempted to distinguish the waters of the Rhine from those of the lake. The river, in its course from the superior lake, being exactly of the same beautiful greenish colour as the inferior lake into which it flows; it is evident that the one can never be distinguished from the other. Probably, upon its first entrance into the superior lake it is troubled, and, consequently, for some distance, its current may be easily traced; but it purifies itself by degrees, and becomes an indistinct part of the great body of water.

Of no better foundation is the report that the lake of Constance never freezes. Wagner assures that it was frozen in 1572 and 1596, when two inhabitants of Constance walked over the lake on the ice, measured it, and found it to be 7265 fathoms long, from Romizhorn to Bouchorn, which is not its whole length.

CONSTANCY, in a general sense, denotes immutability; but in ethics, or the philosophy of the human mind, the term implies resolution or steadiness, particularly under adverse trials and suffering. It was the saying of a heathen philosopher, that there cannot be imagined upon earth a spectacle more worthy of the regard of the creator, intent on his works, than a brave man superior to his sufferings. Nothing, indeed, can be more noble or honourable, than to possess courage sufficient for executing the injunctions of reason and conscience; for maintaining the dignity of our nature, and the station assigned us; and for being so much unafflicted by poverty, pain, and even death itself, as not to do any thing that is reproachful or sinful in order to avoid them. To possess this temper, is to be great above title and fortune; and manifests a mind of heavenly extraction, and worthy of the offspring of the deity. Of this kind, many illustrious instances occur in history, and particularly in the history of the Christian church, and of the last moments of confessors and martyrs.

CONSTANS I., Flavius Julius, in *Biography*, third son of Constantine the Great, by Fausta, was born A. D. 320, and was created Cæsar at six years of age. Upon the death of his father in 337, Constans succeeded to the sovereignty of Italy, Africa, and the western Illyricum, as his share of the empire. He had enjoyed his power but three years, when he was attacked by his brother Constantine, whom he defeated and slew.

Constans, by this victory, became possessor of Gaul, Spain, and Britain; and in his turn, attacked the Franks, whom he humbled, and the Scots, which probably did not end much to his credit, as no notice is taken of the fact by his early biographers. Nevertheless, the prince was elated by the success of his arms, and assumed a degree of pride on the occasion, which would have ill become any man, and in him was rendered quite contemptible, owing to his want of talents and application. He was, moreover, a slave to his passions, and allowed himself in acts of voluptuousness, that drew down upon him the indignation of the people. Magnentius, an ambitious soldier, encouraged by popular discontents, was resolved to assert the honour of the Roman name. A conspiracy was formed, and Marcellinus, count of the sacred largesses, who had already supplied, with a liberal hand, the means of seduction, under pretence of celebrating his son's birth-day, gave a splendid entertainment: the intemperance of the feast was artfully protracted till a late hour, and the unsuspecting guests were tempted to indulge themselves in a dangerous freedom of conversation. On a sudden, the doors were thrown open, and Magnentius, who had retired for a few moments, returned into the apartment invested with the diadem and purple. The conspirators instantly hailed him with the titles of Augustus and emperor. The guards immediately took the oath of fidelity, and ere the dawning of the day, Magnentius became master of the troops and treasure of the palace and city of Autun. Constans, who was pursuing his pleasure in an adjacent forest, being informed of the fact, threw off the imperial robes, and fled towards Spain; but before he could reach the sea-port, where he intended to embark, he was overtaken by a party of cavalry near Helena, at the foot of the Pyreneés, and put to death. Gibbon. Univer. Hist.

Constans II. grandson of Heraclius, emperor of the East, was raised to the throne in 641, after the senate had deposed the usurper Heracleonas, and his mother Martina. He was then only in his twelfth year, yet before the Byzantine senate, he delivered an oration that did him great credit. Having returned thanks for the just punishment of the assassins, who had intercepted the fairest hopes of his father's reign, he added "By the divine providence, and by your righteous decree, Martina and her incestuous progeny have been

been caſt headlong from the throne. Your majeſty and wiſdom have prevented the Roman ſtate from degenerating into lawleſs tyranny. I therefore exhort and beſeech you to ſtand forth as the counſellors and judges of the common ſafety." The ſenators were gratified by the reſpectful addreſs of their ſovereign; but Conſtans was anxious to ſecure the crown that had ſuddenly devolved on him. He obliged his elder brother Theodoſius to take holy orders, which rendered him incapable of civil government. The young emperor was not ſatisfied with this act, which was regarded as a profanation of the ſacraments, but he cauſed Theodoſius to be put to death. The act was ſcarcely perpetrated before the execrations of his ſubjects, joined to the agonies of remorſe, rendered life a burden. He could no longer bear to reſide in the capital that had been the witneſs of a baſe and infamous fratricide. He became a voluntary and perpetual exile; and embarking for Greece, diſplayed the hatred which he felt, and was conſcious that he inſpired, by ſpitting againſt the walls of Conſtantinople as he left them. After paſſing the winter at Athens, he viſited various parts of Italy, and concluded a pilgrimage of diſgrace, by fixing his reſidence at Syracuſe. Conſtans eaſily fled from the imprecations of an injured people, but he could not forget what he had done. The remorſe of his conſcience created a phantom that purſued him wherever he went: the image of his murdered brother was ever before his eyes, preſenting to his lips a cup of blood, and ſaying, or ſeeming to ſay, "Drink, brother, drink,"—"a ſure emblem," ſays the hiſtorian, "of the aggravation of his guilt, ſince he had received from the hands of the deacon, the myſtic cup of the blood of Chriſt." Conſtans, however, did not reſign the cares of government. He took part in ſome wars carried on in Italy, and having been ſucceſsful, entered the capital with great pomp, and was met by the pope and clergy at a diſtance from the city. In return for this mark of reſpect, he plundered Rome, and ſent its wealth and ornaments to Conſtantinople. He then departed for Syracuſe, where he reſided five years, oppreſſing the people, and hated by thoſe about him. Domeſtic treaſon put an end to his life; he was aſſaſſinated while he was in the bath, in in the year 668, after a miſerable reign of 27 years. Gibbon. Univer. Hiſt.

CONSTANT, David, was born at Lauſanne, in Switzerland, in the year 1638, and became diſtinguiſhed as a proteſtant divine, and profeſſor of theology. He was indebted to his own country for the rudiments of uſeful knowledge, and was afterwards a ſtudent at Herborn in Germany, from which place he went to Groningen, Leyden, and Paris, for farther improvement. At Paris, he became acquainted with many very celebrated members of the reformed church, and having laid the foundation of ſolid learning, and formed a connection with ſeveral worthy characters, he returned to Switzerland in the year 1658, was ordained miniſter according to the calviniſtic form, and undertook the charge of a church at Copet. Here he cultivated a literary intimacy with Turretin, Tronchin, and other profeſſors in the univerſity of Geneva, and with Bayle, the celebrated hiſtorian, but who at that time was tutor in the family of count de Donha, baron of Copet, the patron of David Conſtant. On a vacancy at the college of Lauſanne, Conſtant was appointed tutor to the firſt claſs, by the magiſtrates of Berne, and was afterwards elected profeſſor of moral philoſophy and the Greek language. The important duties of theſe ſtations he diſcharged with high honour to himſelf, and to the advantage of thoſe placed under his inſtructions; his vacant hours were employed in editing ſome of the claſſics, or on original works. By his contemporaries he was much reſpected; they regarded him as a man of conſiderable literary acquirements, poſſeſſed of a ſolid judgment and a correct taſte. In the year 1700, he was choſen profeſſor of theology, a ſituation which he retained until he was eighty-nine years of age, when he reſigned in favour of a ſucceſſor, reſerving to himſelf, even then, the right of giving his aſſiſtance and advice at the public meetings of the college. He died in 1733, having attained the venerable age of ninety-five. He publiſhed new editions of Florus; of Cicero's ſmaller pieces, and of various other pieces adapted to the uſe of ſchools. His original writings were reſpectable; they were diſſertations on curious theological ſubjects. We have alſo "Syſtema Ethico-theologicum," printed at Lauſanne, 1695; a work "De Juramentis;" and another "On Providence."—Moreri.

Constant *quantity*, in *Geometry*, that which remains the ſame, while others increaſe or decreaſe. Thus the ſemi-diameter of a circle is a *conſtant quantity;* for while the abſciſs and ſemi-ordinates increaſe, it remains the ſame.

Constant *winds*. See Wind.

CONSTANTIA, in *Ancient Geography*, a town of Valeria, in the vicinity of the Danube.—Alſo, a town of Thrace, in the territory of mount Rhodope.—Alſo, a town of Aſia, in Meſopotamia; ſaid by Ammianus Marcellinus to have been *Amida*, which was enlarged by the emperor Conſtantine, and aſſumed his name.—Alſo, a name given to Majumas, the port of Gaza, after Conſtantine raiſed it to the rank of a town and gave it the name of his ſon.—Alſo, a name given to the town of Salamine.—Alſo, a name aſſigned by Conſtantine to the town of Arelata (Arles), according to Auſonius, cited by Scaliger.

Constantia *Caſtra*, a town of Gaul, in the ſecond Lyonnenſis; now *Coutances*.

Constantia, in *Geography*, a diſtrict of the Cape of Good Hope, a mile and a half from Alphen, cloſe under the mountains, about midway between Table bay and Falſe bay, conſiſting of two farms which produce the far-famed Cape or Conſtantia wine, ſo remarkable for its peculiar rich flavour and ſweetneſs. One of the farms where the white wine is made is called *Little Conſtantia;* the other produces red. There are only from fifty to one hundred caſks, of 154 gallons each, made annually of the genuine Conſtantia wine. The grape is the muſcadel, and the rich quality of the wine is owing partly to the ſituation and ſoil of the vineyards, and partly to the care taken in manufacturing the wine. No ſtalks, and no fruit but ſuch as is full ripe, are ſuffered to go under the preſs; precautions rarely taken by the other farmers of the Cape, who make annually about ſix hundred 154-gallon caſks of the common Cape wine, which, however, is frequently brought into the European markets, under the name of Conſtantia wine. The muſcadel grape grows at every farm: and at ſome farms in Drakenſtein, the wine preſſed from it is equally good, if not ſuperior, to the Conſtantia, though ſold, on account of the name of the latter, at one ſixth part of the price. This wine ſells at the Cape for 70 or 80 rix-dollars for the half-aum, which ought to contain 20 gallons; but the avaricious diſpoſition of the proprietors, has led them to fabricate falſe caſks, few of which that come to England being found to meaſure more than 17 or 18 gallons, and many not above 16. When they find that the wine is to be ſent abroad, they adulterate it with ſome other wine. For, according to their own returns, the quantity exported and conſumed in Cape Town, as in the caſe of Madeira wine, greatly exceeds the quantity manufactured.

The following table ſhews the quantity of Conſtantia wine exported in four ſucceſſive years.

Years.	Half Aums.	Value.
1799	157	11,752
1800	188	14,070
1801	173	13,007
1802	210	15,745
In 4 years.	728	54,574 R.D.

Barrow's Travels in S. Africa, vol. ii. p. 290.

CONSTANTINA, or Constantine, the eaſtern province of the kingdom of Algiers, which ſee. This province, which is the largeſt and richeſt of the four provinces into which Algiers is commonly divided, (the three others being Maſcara, the territory of the city of Algiers, and Titeri,) lies betwixt the meridians of the rivers Booberak and Zaine, which ſeparates it from Tunis, and is bounded on the north by the Mediterranean, on the eaſt by the kingdom of Tunis, on the ſouth by Biledulgerid, and on the weſt, in its greateſt extent, by the river Malva, or by the territory of Algiers, &c. It is nearly equal in extent to the two weſtern and ſouthern provinces, being, by Dr. Shaw's ſtatement, 230 miles in length, and more than 100 in breadth; and far ſurpaſſing them in wealth and ſtrength, as well as in the number and goodneſs of its cities. The tribute collected by the viceroy of this province, according to Dr. Shaw, is proportionably greater. For whilſt the Titeri bey brings every year into the treaſury of Algiers little more than 12,000 dollars, each dollar being 3*s.* and 4*d.* or 6*d.*, and the Tlemſan bey from 40 to 50 thouſand; the viceroy of Conſtantina never pays in leſs than 80, and ſometimes 100 thouſand. The ſea-coaſt of this province, from the Booberak to Boujeiah, and from thence almoſt entirely to Bona, is rocky and mountainous; and the whole tract which lies between the meridians of the rivers Booberak and Zhorre, from the ſea-coaſt to the parallels of Seteef and Conſtantina, is, for the moſt part, a continued chain of exceedingly high mountains; few of whoſe inhabitants, from the ruggedneſs of their ſituation, pay any tribute to the Algerines. Near the parallels of Seteef and Conſtantina it is diverſified with a beautiful interchange of hills and plains, which afterwards become leſs fit for tillage, till it terminates, upon the Sahara, in a long range of mountains, ſuppoſed by Dr. Shaw to be the *Buzara* of the ancients. The diſtrict of *Zaab* (which ſee) lies immediately under theſe mountains; and beyond Zaab, at a great diſtance in the Sahara, is Wadreag, another collection of villages. This part of the eaſtern province, including the parallel of Zaab, anſwers to the *Mauritania Sitifenſis*, or the firſt Mauritania, as it was called in the middle age. The mountains are inhabited by free Arabian and Mooriſh tribes, which from time to time have proved formidable enemies to the power of Algiers. The moſt remarkable places are *Boujeiah* or Bugia, Cullu, Bona, La Calle, the iſland of Tabarca, and Constantina; which ſee reſpectively.

Constantina, *Conſtantine*, formerly *Cirta*, is one of the moſt conſiderable cities of ancient Numidia, the capital of the above-deſcribed province, and the reſidence of the bey. Next to Algiers, it is the moſt populous city in the Algerine dominions. For a particular account of it, ſee Cirta.

Constantina, a town of Spain, in Andaluſia; 50 miles S.W. of Cordova, and 42 N.N.E. of Seville.

Constantina, in *Ancient Geography*, a town of Phœnicia.—Alſo, a town of Aſia, in Meſopotamia.

CONSTANTINE I., Flavius Valerius Constantinus, in *Biography*, the firſt Chriſtian emperor, and ſurnamed the Great, was ſon of Conſtantius Chlorus by Helena. The celebrity to which this prince attained, has rendered poſterity attentive to the moſt minute circumſtances of his life and actions. The place of his birth, and the condition of his mother, have been ſubjects of warm, not to ſay violent, diſputes. According to Mr. Gibbon, Helena was the daughter of an inn-keeper, and Naiſſus in Dacia was the birth place of her ſon, the ſubject of this article, about the year 274. In his youth he diſcovered little inclination to improve his mind by the acquiſition of knowledge; but the comelineſs of his figure, the dexterity which he exhibited in all manly exerciſes, and his known courage and affability, rendered him a favourite with the army and the people. He was about eighteen years of age when his father was promoted to the rank of Cæſar: this event was attended with his mother's divorce, in order to make way for the ſecond wife of Conſtantius, who could boaſt of an alliance with the imperial race. By this act the noble-minded Conſtantine was reduced to a ſtate of diſgrace and humiliation. Indignant, probably, at the baſe conduct of his father, he remained in the ſervice of Diocleſian, and ſignalizing himſelf in the wars of Egypt and Perſia, he was raiſed to the rank of tribune of the firſt order. The popularity of this young man rendered him an object of jealouſy to Galerius, through whoſe intereſt he had already been denied the rank of Cæſar. Endangered by the power and wiles of his opponent, and being ſent for by Conſtantius, his father, whoſe health was daily declining, he ſecretly left Nicomedia, where he then was, and travelled with all expedition to Boulogne, and embarked with Conſtantius for Britain. The expedition was proſperous, and they eaſily obtained a victory over the Caledonians; but it was the laſt exploit of Conſtantius. He died at York, in the year 306, within little more than a year after he had received the title of Auguſtus. His death was immediately ſucceeded by the elevation of Conſtantine, who was proclaimed emperor by the army. The throne was the object of his ambition; and he knew too well the character of Galerius, the colleague of his late father, to heſitate as to the part he muſt take in this criſis. He was ſatisfied that if he wiſhed to live, he muſt reſolve to reign. At firſt he affected to reſiſt the choice of his people, and wrote a reſpectful letter to the emperor of the Eaſt, acquainting him with the event. The earlieſt emotions of Galerius were thoſe of ſurpriſe, diſappointment, and rage: he threatened to commit to the flames the letter, and him that brought it. Upon farther deliberation, he reſolved not to conteſt his ſucceſſion to the ſovereignty of the provinces beyond the Alps; but conferred on him the title of Cæſar, reſerving that of Auguſtus to his favourite Severus. Conſtantine, who already poſſeſſed the ſubſtance, expected without impatience an opportunity of obtaining the honours, of ſupreme power; and accordingly employed himſelf ſome years in governing and ſecuring the dominions fallen to his ſhare. In defending his own rights, he was often betrayed into acts of cruelty, unworthy of a great mind. Contending with the Franks, he took two of their kings, whom he barbarouſly expoſed to wild beaſts in the amphitheatre of Treves: in ſome inſtances where he was victorious, he ſpared neither ſex nor age; exhibiting a ferocity that ſeems ill to accord with the general tenor of his character, to which he was probably

probably prompted by the ſuppoſition, that upon a barbarous foe all kinds of barbarity were allowable. In 307 he married Fauſta, daughter of Maximian, who had reſumed the purple; but he took no part in the fortunes of his father-in-law, who was ever engaged in warfare, till he became himſelf Conſtantine's open enemy, and endeavoured to diſpoſſeſs him of his rightful authority. Under theſe circumſtances he was delivered into the hands of his ſon-in-law, who ſhewed him no other favour than that of allowing him the choice of the manner in which he would die: Maximian ſtrangled himſelf in the year 310.

Shortly after this event, which was little creditable to the feelings of Conſtantine, or to the filial piety of Fauſta, who took no means to ſoften the reſentment of her huſband, a civil war broke out. Maxentius, who had reigned in conjunction with Conſtantine, now laid claim to the monarchy of the whole Weſt, and made preparations for an invaſion of Gaul. Conſtantine relying as well on his own talents, as on the hatred borne to his rival, reſolved to anticipate the attack, and to carry the war into the heart of Italy. The armies of Maxentius, amounted to one hundred and ſeventy thouſand foot, and eighteen thouſand horſe. The wealth of Italy ſupplied the expences of the war, and the adjacent provinces were exhauſted to form magazines of corn and other kinds of proviſions. The whole force of Conſtantine conſiſted of ninety thouſand foot, and eight thouſand horſe; a large part of which was neceſſary to the defence of his other dominions. At the head of forty thouſand ſoldiers, he marched to encounter an enemy, whoſe numbers were at leaſt four times ſuperior to his own. Conſtantine had been trained from his earlieſt youth to war, to action, and to military command, and his troops were in the higheſt ſtate of diſcipline: theſe he diſpoſed with conſummate ſkill, and for himſelf he choſe the poſt of honour and danger. Diſtinguiſhed by the ſplendor of his arms, he charged, in perſon, the cavalry of his rival, and his irreſiſtible attack determined the fortune of the day. The victory was complete, and the diſmayed followers of Maxentius ruſhed by thouſands into the Tyber. The emperor himſelf attempted to eſcape back into the city over the Milvian bridge, but the crowds which preſſed together through that narrow paſſage, forced him into the river, where he was immediately drowned by the weight of his armour. His body which had ſunk deep into the mud, was found the next day; and the ſight of his head, when it was expoſed to the eyes of the people, convinced them of their deliverance, and led them to acknowledge as their ſovereign Conſtantine, who thus atchieved by his valour and high talents the moſt ſplendid enterprize of his life. It was previous to this battle, A. D. 312., that hiſtorians aſſign the date of Conſtantine's converſion to Chriſtianity, who had never before diſcovered religious principles of any kind. A ſplendid miracle is mentioned as the immediate inſtrument of this change. Dr. Lardner, indeed, offers ſome reaſons why Conſtantine could not well have remained through life without ſome religious impreſſions; he is however willing to follow the account of Euſebius, who ſays, that about the period of the war with Maxentius, the emperor was led to conſider that he ſtood in need of more powerful aſſiſtance than military forces; he therefore ſought for a God that ſhould be his helper. The hiſtorian goes on to ſay, that in part of his march, as the day was declining, there appeared to the ſight of Conſtantine, and to that of all his army, a luminous croſs above the ſun, with the inſcription τούτῳ νικα, *by this conquer*; that the monarch not comprehending the meaning of this ſign was farther inſtructed, in the following night by a viſion of Chriſt himſelf, bearing his croſs, and directing him to take a ſimilar ſtandard, under which he ſhould march to victory. In the morning Conſtantine communicated this wonderful circumſtance to his friends; and ſending for ingenious workmen, he gave them a deſcription of the ſign, and ſaw them make one like it in gold and precious ſtones; which, ſays Euſebius, "we have ſeen." Much has been ſaid reſpecting this ſurprizing phenomenon. By ſome the whole is regarded as a fiction, a ſtratagem and political device of Conſtantine, yet it is related by Euſebius a grave hiſtorian, who declares that he had it from the emperor, who confirmed the narration by an oath. By Fabricius, we are told, that the appearance in the heavens was generally looked upon as a reality, and a miracle: but for his own part, he is inclined to conſider it as the reſult of a natural phenomenon in a ſolar halo; he accordingly admits of the reality of the phenomenon, but does not ſuppoſe it to be properly miraculous. Upon a full and candid review of the evidence, Dr. Lardner, whom we have before quoted, and than whom no one was a better judge of human teſtimony, ſeems inclined to doubt the relation given by the emperor, upon whoſe ſole credit the ſtory is recorded, though it was twenty years after the event, when Euſebius wrote his account, during which period he muſt have heard it frequently from eye-witneſſes, if the emperor's relation were accurate that the appearance was viſible to his whole army as well as to himſelf. The oath of Conſtantine, on the occaſion, with Dr. Lardner, brings the fact into ſuſpicion, and another ſtriking circumſtance is that Euſebius does not mention the place where this wonderful ſight appeared. Without, however, entering, at preſent, farther into the diſcuſſion, which we ſhall refer to the article Cross; we may obſerve, that Euſebius has led us to the period, when the ſign of the croſs began to be made uſe of by Conſtantine, among his armies, and at his battles; this was probably the day before the laſt battle with Maxentius, fought on the 27th of October, 312. About this period, it is admitted, that Conſtantine became a Chriſtian, and continued ſo the remainder of his life, taking care alſo to have his children educated in the ſame principles. His converſion ſeems to have been partly owing to his own reflections on the ſtate of things, partly to converſation and diſcourſe with Chriſtians, with whom, the ſon of Conſtantius, their friend and favourer, muſt have been ſome time acquainted, but perhaps, chiefly to the ſerious impreſſions of his early years, which being once made can never be wholly obliterated. Conſtantine was however a politician as well as a Chriſtian, and he probably hit upon this method to reconcile the minds of his army, to the important change in their religious profeſſion and habits, as well as making uſe of it as a mean of ſucceſs in his deſigns againſt his enemies, for which purpoſe he rightly judged, that the ſtandard of the croſs, and the mark of it as a device on his ſoldier's ſhields, would be of no ſmall ſervice.

We muſt now return to Conſtantine in the character of a victorious general. After the battle, he entered the capital in triumph, wholly deſtroyed the family of his rival, but refuſed to include among the victims, many whom the Romans would gladly have ſacrificed to their abhorrence of the late tyranny. He diſbanded and diſperſed the pretorian guards which had ſo often made and murdered emperors: he recalled many who had been baniſhed, and reſtored to them their eſtates: he diſcouraged informers, and promoted the welfare of the city. The ſenate immediately paſſed a decree, conferring on him the firſt rank among the three Auguſti, who then were maſters of the world: Licinius and Maximin were the other two. Africa readily followed Italy in recognizing the ſovereignty of the conqueror. To Licinius, with whom he had an interview, he gave his ſiſter Conſtantia in marriage, in order to ſtrengthen his own hands. From Milan, where the two emperors iſſued an

edict under their joint authority, allowing a general toleration in religious matters within their dominions, Constantine was called by an attempt of the Franks to cross the Rhine. Over these he gained a complete victory, and made many prisoners, whom, as in former instances, he exposed to wild beasts. In the mean time a civil war arose between Maximin and Licinius, which terminated in the destruction of the former, and the extirpation of his whole family.

Constantine and Licinius were now masters of the world, but they did not long continue united. A war broke out between them in the year 314, but the result of several battles was decidedly in favour of Constantine. Licinius sued for peace, which he obtained, and which continued eight years. In 323 another war was excited between the emperors. Licinius had long been hostile to the Christians, whose affections he had alienated, and who looked up to Constantine as their patron, and the head of their religion. Aware of this circumstance, and relying on his own superiority, as a military commander, Constantine began the quarrel. Under the banner of the cross, and accompanied by bishops and other ministers of their holy religion, he went out with 130,000 well-disciplined and well-accoutred soldiers to meet his rival, who waited his arrival in the vicinity of Adrianople. Constantine was again victorious: Licinius fled to Byzantium, and when he found that place no longer tenable against the power of his enemy, he withdrew to Chalcedon, and from thence, after hazarding another battle, in which he was also unsuccessful, to Nicomedia; where, by the intercession of his wife, he obtained a solemn promise of having his life spared, on the condition of his renouncing all claims to sovereignty. To the disgrace of Constantine imprisonment and death soon followed the humiliation of his rival. This deed has been justified on the plea that the fallen emperor had engaged in a treasonable correspondence against the reigning sovereign, but sufficient evidence of the fact was not adduced. The son of Licinius was also sacrificed to the jealousy of Constantine, who, by these atrocious means, delivered himself from all dread of opposition. An arbitrary prince seldom finds any difficulty in freeing himself from his enemies, but Constantine with all his powers, could neither foresee, nor prevent, those domestic calamities to which he shortly became the prey. Crispus, his son, by a former wife, was viewed, by his mother-in-law Fausta, as the chief obstacle to the future greatness of her own children. She insinuated into the breast of Constantine suspicions of his son's loyalty, and is said also to have brought a charge against him of having attempted her own chastity. Crispus was examined, imprisoned, and put to death in the year 326. His grandmother Helena, convinced of his innocence, resolved to be revenged for his hard fate, and found means of convicting the empress of an adulterous connection with a slave of the palace, for which she was suffocated in the steam of a hot bath. From these circumstances, and from the contempt which he shewed for the pagan rites, the emperor became unpopular with the people and the senate. On his part there was no personal attachment to the ancient metropolis, and he was resolved to perpetuate his name by the foundation of a new city. After much deliberation he fixed on Byzantium, which he had once besieged, as the imperial city that should, with future ages, give him celebrity and renown. See CONSTANTINOPLE.

In the year 331 Constantine was involved in a war with the Goths, who at first were successful against his power, but were, at length, defeated and compelled to agree to such terms as the victor thought proper to propose. Constantine, by chastising the pride of the Goths, and by accepting the homage of a suppliant nation, vindicated the majesty of the Roman empire; and ambassadors from Ethiopia, Persia, and the most remote countries of India, came to congratulate him on the peace and prosperity of his government; and he seems to have enjoyed as uninterrupted a share of felicity, as a man situated as he was could reasonably expect. He attained to the thirtieth year of his reign, a period which none of his predecessors, since Augustus, had been permitted to celebrate. Constantine survived that solemn festival about ten months, and, at the age of sixty-four, after a short illness, he ended his memorable life at a palace in the suburbs of Nicomedia, whither he had retired for the benefit of the air, and with the hope of recruiting his exhausted strength by the use of the warm bath. The demonstrations of grief, or at least of mourning, surpassed whatever had been practised on any former occasion. The body of the deceased emperor was transported to the city which was destined to preserve the name and memory of its founder: there it was adorned with the symbols of greatness, and deposited on a golden bed in one of the apartments of the palace, which was splendidly illuminated and furnished for the purpose. Every day, at the appointed hours, the officers of state, approaching the person of their sovereign, offered the same respectful homage to his dead body as they had been accustomed to present to him during his life, so that it has been said Constantine alone, by the peculiar indulgence of heaven, reigned after his death.

It remains now to give a general estimate of the character of this great man, who was unquestionably the most splendid among the Roman emperors. It is no wonder that a prince who removed the seat of empire, and introduced such important changes into the civil and religious constitution of his country, should have fixed the attention, and divided the opinions of mankind. By certain classes of Christians he has been regarded as the deliverer and defender of the church, and has been decorated with every attribute of a hero, and even of a saint: by others he has been considered as the real, though without any ill intentions on his part, enemy to the cause of true Christianity, by incorporating it with the civil government of the world: by contemporary historians who did not embrace the religion of Christ, Constantine was compared to the most abhorred of those tyrants, who, by their vices and weakness, dishonoured the imperial purple.

Constantine was, in person, remarkably tall, of a comely and majestic presence, and great bodily strength. The general tenor of his life proves that he was a person of no mean capacity: the atchievements and success of Constantine do not belong to men of weak and irresolute minds. His mind indeed was equal to his fortune, great as it was: his valour was tried and approved frequently in his youth, and was conspicuous on all proper occasions throughout his whole life: his chastity, justice, and prudence, are commended by those of his biographers, who, on account of a difference in religion, were not disposed to flatter him: his many acts of bounty to the poor, and his just edicts are arguments of a merciful disposition, and a love of justice. According to Eusebius the palace of Constantine was converted into a church; and the emperor himself chearfully led the way to those that assembled there with him. Taking the sacred books into his own hands, he attentively read and meditated upon the divine oracles; and then recited the usual prayers with those who were met together. Constantine besides prayed daily in private in his closet. In time of war he had a chapel at a small distance from his camp for the performance of religious duties, especially before battle, seeking thereby the divine protection and blessing. He

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taught even his heathen foldiers a form of prayer, in which they worfhipped the one true God. Thefe and many other inftances of the Chriftian temper are afcribed to the emperor by Eufebius. By our own hiftorian, the early part of his life is highly panegerized: "He delighted," fays Mr. Gibbon, "in the focial intercourfe of familiar converfation; and though he might fometimes indulge his difpofition to raillery with lefs referve than was required by the fevere dignity of his ftation, the courtefy and liberality of his manners gained the hearts of all who approached him. The difadvantage of an illiterate education had not prevented him from forming a juft eftimate of the value of learning; and the arts and fciences derived fome encouragement from the munificent protection of Conftantine. In the difpatch of bufinefs, his diligence was indefatigable; and the active powers of his mind were almoft continually exercifed in reading, writing, or meditating: in giving audience to ambaffadors, and in examining the complaints of his fubjects. Even thofe who cenfured the propriety of his meafures were compelled to acknowledge, that he poffeffed magnanimity to conceive, and patience to execute, the moft arduous defigns, without being checked either by the prejudices of education, or by the clamours of the multitude. In the field, he infufed his own intrepid fpirit into the troops, whom he conducted with the talents of a confummate general; and to his abilities, rather than to his fortune, we may afcribe the fignal victories which he obtained over the foreign and domeftic foes of the republic. He loved glory, as the reward, perhaps as the motive, of his labours. The boundlefs ambition, which, from the moment of his accepting the purple at York, appears as the ruling paffion of his foul, may be juftified by the dangers of his own fituation, by the character of his rivals, by the confcioufnefs of fuperior merit, and by the profpect that his fuccefs would enable him to reftore peace and order to the diftracted empire." As he advanced in life, his character was lefs refpectable, his actions lefs honourable. The oftentatious grandeur of his court, and his magnificent buildings, were fupported by taxes which bore very heavily on the people, and in his old age he was charged with prodigality and rapacity. Eutropius fays, that Conftantine, "in the early parts of his reign, might be compared to the beft princes, in its conclufion to the indifferent ones." And Dr. Lardner, who took great pains to underftand and appreciate the worth of this emperor, obferves, with his ufual candour, that "we fhould be willing to make allowances in favour of princes, and efpecially of long reigns. It is next to impoffible for human wifdom and difcretion, in the courfe of many years filled with action, not to be furprifed into fome injuftice, through the bias of affection, or the fpecious fuggeftions of artful and defigning people. Though, therefore, there may have been fome tranfactions in this reign which cannot be eafily juftified, and others that muft be condemned, yet we are not to confider Conftantine as a cruel prince or a bad man." Gibbon. Lardner. Jortin. Univer. Hift.

Constantine II., the eldeft of the three fons of Conftantine the Great, was born in the year 316, and, by the indulgence of his father, was admitted at a very tender age to fhare the adminiftration of the empire. He and his brothers may be faid to have ftudied the art of reigning at the expence of the people entrufted to their care. During his father's life-time, the younger Conftantine was appointed to hold his court in Gaul: and upon his death in 337, he fucceeded to the government of Gaul, Spain, and Britain; to him alfo was affigned the city of Conftantinople, with a certain fuperiority of rank above his brothers. During his fhort reign, he did little that has been deemed worthy of hiftorical record. Diffatisfied with the fhare of empire allotted to him, he was defirous of poffeffing the provinces of Africa, which had been given to Conftans. His folicitations were in vain: determining, therefore, to wreft by force, what he could not obtain by argument, at the head of a tumultuary band, he invaded the dominions of Conftans, and laid wafte many parts of the country. The meafures of his brother were directed with more prudence; and Conftantine, by too great eagernefs, was betrayed into an ambufcade, which had been concealed in a wood, where he and his attendants were furrounded and flain, A. D. 340. His body was afterwards found in the obfcure ftream of Alfa, and obtained a place in the imperial fepulchre; but his provinces transferred their allegiance to the conqueror. Contemporary hiftorians fpeak of Conftantine as a prince of great accomplifhments; but his conduct towards his brother met with a punifhment which neither merited nor obtained the pity of furvivors.

Constantine III., the next emperor of this name, was the fon of Heraclius by Eudoxia, and fucceeded his father in 641. Of him more cannot be well faid than that he reigned three months, and died in his 30th year, either by difeafe, or by poifon, fuppofed to have been adminiftered by his mother-in-law.

Constantine IV. fucceeded his father, Conftans II., in the year 668. Very foon after he came to the throne, he went to Sicily, with a view of punifhing his father's murderers, and to depofe the ufurper whom they had eftablifhed. His enterprize was fuccefsful: but upon his return to Conftantinople, he was fcarcely recognized, on account of the alteration in his beard; hence he obtained the appellation of the *bearded*. In this reign the Saracens invaded Africa, Sicily, and Cilicia, and at length laid fiege to Conftantinople. Their attempts were completely baffled, and their lofs in men was very confiderable. The emperor, however, became tributary to the Bulgarians, who fuccefsfully invaded fome of his territories. This prince, who died in the year 685, appears to have poffeffed a fmall fhare of talent, intermixed with cunning and cruelty. On his two brothers he had beftowed the empty title of Auguftus, unconnected with truft or power. At their fecret inftigation, the troops of the Anatolian province approached the city on the Afiatic fide, demanding for their royal brothers the partition or exercife of fovereignty, and fupported their claims by a theological argument. "We are Chriftians," they faid, "the fincere votaries of the holy and undivided Trinity: fince there are three equal perfons in heaven, there fhould be three equal perfons on earth." The emperor invited them to a friendly conference, in which they might propofe their arguments to the fenate: they obeyed the fummons; but the view of their bodies, hanging on the gibbet in the fuburb of Galatea, reconciled their companions to the unity of the reign of Conftantine. He pardoned his brothers; but on the repetition or fufpicion of a fimilar offence, the obnoxious princes were deprived of their titles and nofes, that the deformity might difqualify them from the empire. In the clofe of life, Conftantine was anxious to eftablifh the right of primogeniture; and the eldeft fon was exalted to the rank of Auguftus, and the affurance of the empire.

Constantine V., fon of the emperor Leo, was born in 719, and crowned in his infancy. He was furnamed *Copronymus*, from having polluted the baptifmal font. During a long reign of 34 years, he ever exhibited an abhorrence of image-worfhip, which rendered him an object of hatred to the catholics, who have ufed every means in their power to tranfmit his name to pofterity in the moft difgufting light.

light. Although he did not merit all the opprobria affixed to his character by ecclefiaftical bigots, yet he undoubtedly exercifed much cruelty towards the party which refifted his attempts for reform in the church. Some were put to death, others mutilated, and not a few underwent lefs fevere punifhments. As a general, he exhibited much prudence and courage. Soon after his acceffion he marched againft the Saracens, who had made an irruption into Afia; and his brother-in-law, taking advantage of his abfence, placed himfelf at the head of the orthodox faction, and was declared emperor. A civil war enfued, in which Conftantine was victorious: the metropolis furrendered to its lawful fovereign, and the ufurper and his fon were deprived of their ill-gotten power, and of their eyes. When every thing at home was fettled to his fatisfaction, he made war again upon the Saracens, took their ftrong places, and deftroyed their fleet. In the midft of his fucceffes, an earthquake, and a peftilence among his own people, were calamities which excited in him the greateft conflernation. After this he was attacked by the Bulgarians, by whom he was fo completely defeated, that he was obliged to feek refuge in his capital: but in another attack, victory determined for Conftantine, who cut off the invaders, with fcarcely any lofs. As he was proceeding on a new expedition againft the fame people, he was feized with a fever, which terminated his life in 775. To the praife of this prince, his enemies admit that he reftored the ancient aqueduct, a work of great importance to the inhabitants of Conftantinople. He redeemed nearly three thoufand captives: and under his reign, plenty was the characteriftic of the times. Moreri. Gibbon. Univer. Hift.

Constantine VI., grandfon of the preceding, was born in 770; and when only five years of age, he was affociated with his father, Leo IV., in the government: but neither then, nor in 780, when he fucceeded entirely to the throne, was he capable of efficient bufinefs. His mother Irene was appointed guardian to the young emperor: fhe, naturally ambitious, and impatient of controul, was unwilling to refign the power out of her own hands. The contefts between the mother and her fon were the moft prominent features of this reign. During the childifh years of the emperor, nothing could be better adminiftered than the government under Irene: but when he had attained the years of maturity, by the advice of his adherents, he would fain have rewarded his mother's fervices by perpetual banifhment to the ifle of Sicily. Irene was too politic to be thus ferved: fhe retaliated upon her enemies, and obtained for herfelf almoft an unlimited obedience. Her abufe of victory proved detrimental to her interefts: Conftantine afcended the throne fole fovereign, and his mother was difmiffed to a life of folitude, to the enjoyment of which her mind was by no means adapted. She was recalled to court, and foon obtained a certain degree of authority. The emperor was attacked and defeated by the Bulgarians; and fufpecting an infurrection in favour of Nicephorus, fon of Conftantine V. by a fecond marriage, he had him feized and his eyes put out, and the tongues of his four brothers were amputated. After this cruel punifhment, they were doomed to perpetual imprifonment. For five years they fubmitted to their fate: an opportunity then offered, and they made their efcape to the church of St. Sophia, difplaying a pathetic fpectacle to the people. "Countrymen and Chriftians," exclaimed Nicephorus for himfelf and mute brethren, "behold the fons of your emperor, if you can recognize our features in this miferable ftate. A life, an imperfect life, is all that is fpared: this is now threatened, and we appeal to your compaffion." Their wretchednefs affected the people, but the minifter of Conftantine contrived to foothe their miferies, and draw them from public view. They were fpeedily embarked for Greece, and Athens allotted to them as a place of exile. Once more they efcaped from the hands of their keepers, and appeared in purple at the gates of Conftantinople. This was their laft effort: in attempting to gain a crown, they loft their lives. Irene foon found an opportunity of exciting difcontents, with a view of depofing her fon. Sufpecting his danger, he attempted to efcape to the provinces, but was feized on the Afiatic fhores, and carried prifoner to his own palace, where, in the very chamber in which he was born, the emiffaries of his unnatural and infamous mother affaulted him in his fleep, and plunged their daggers in his eyes. In this ftate he furvived many years, to reflect on his own cruelty, and to learn the ufurpations of Irene.

Constantine VII. was fon of the emperor Leo VI., and nephew to Alexander, whom he fucceeded in 912, being but feven years of age. During his minority, Romanus Lecapenus, a fuccefsful general, got poffeffion of the emperor's perfon, and perfuaded him to marry his daughter. He then affumed the royal purple himfelf, and affociated his own three fons in the imperial authority, degrading the lawful emperor to the fifth rank among the titular princes. Much, however, to the honour of Romanus, he permitted him to live unmolefted; and the time of Conftantine was fpent in the ftudy and practice of the fine arts. The fall of Romanus was occafioned by the ambition of his own children, who effected the banifhment of their father, and, contrary to their own expectations, elevated Conftantine to his rightful throne. To prevent their future intrigues, the emperor's firft act was to feize the confpirators, and banifh them to the fame ifland and monaftery in which they had fo lately confined their father. Romanus met them on the beach with a farcaftic fmile, and, after a juft reproach of their folly, ingratitude, and weaknefs, prefented his imperial colleagues with an equal fhare of his water and vegetable diet. Conftantine was now in poffeffion of the eaftern world, which he governed, or appeared to govern, fifteen years. He was, however, devoid of that energy of character which became the fovereign of fo mighty an empire. The ftudies which had amufed his life of comparative folitude, were not eafily exchanged for the ferious and important duties of a monarch. The reins of government he entrufted to his wife Helena, while he employed much of his time in the inftruction of his fon Romanus, and in drawing up a treatife for his immediate benefit, but of which he made fo ill a ufe, that he is fufpected of having adminiftered poifon to his father, in order to fucceed him in the empire. The death of Conftantine was regretted by his fubjects, who paid every demonftration of refpect to his deceafed corpfe, which, according to ufual cuftom, lay in ftate at the palace. Before the proceffion moved to the fepulchre, an herald proclaimed the awful admonition: "Arife, O king of the world, and obey the fummons of the King of kings."—One of the depofed fons of Romanus had, during his fhort-lived authority, affumed the title of Constantine VIII.: of him therefore enough has been faid;—and we proceed to the reign of Constantine IX., who, in conjunction with his brother, Bafil II., fucceeded to the throne, on the death of John Zimifces, in the year 976. During the long life of Bafil, Conftantine had only the name of emperor: all emanated from his brother. After his deceafe, Conftantine enjoyed, about three years, the power, or rather the pleafures, of royalty; and his chief care was the fettlement of the fucceffion. He had poffeffed, fixty-fix years, the title of Auguftus; and the reign of the two brothers is the

 longeft

longeft and moft obfcure of the Byzantine hiftory. He ended his inglorious life in 1028, at the age of feventy.

Constantine X. was furnamed *Monomachus*, the fingle combatant, which was probably expreffive of his valour and victory in fome public or private quarrel. He was a Greek of noble extraction, and recalled from exile in Lefbos to fucceed Michael V. He was at that time married to Zoe, the daughter of Conftantine IX. With her, who had already been wife to two emperors, he was diffatisfied, and took, as concubine, a widow, to whom he gave the title of Augufta. This reign was difturbed by various revolts, in which the emperor was ufually victorious. He was fuccefsful alfo againft his foreign enemies; but his indolence or avarice gave the Turks an opportunity of gaining a footing in Afia Minor. He died in 1054. The health of this emperor had, during the greater part of his life, been broken by the tortures of the gout, and his reign was fpent in the alternatives of ficknefs and pleafure.

Constantine XI. furnamed *Ducas*, was chofen by the emperor Ifaac Comnenus, as the fitteft perfon to fucceed him, when he voluntarily laid down the crown in 1059. The beginning of his reign was afflicted by a confpiracy of his own people againft him. Having quelled this, he began to turn his attention to government, for which he feems to have been very unequal. By the principles of avarice, he neglected the maintenance of his garrifons on the frontiers, and the Uxians, a people of Scythia, taking advantage of this circumftance, paffed the Danube, and laid wafte the country. They penetrated into Greece, and defeated the imperial generals, who had been fent againft them. Conftantine would have gladly purchafed peace, on any terms; they, however, difdained to treat, and were finally ftopped in their victorious career, by peftilence, and the arms of the Bulgarians, circumftances which deftroyed the greater part of the number, that in the outfet amounted to nearly half a million of fouls. During this reign an earthquake did much damage to the empire. Conftantine died at the age of 60 years, having previoufly fecured the fucceffion of his three fons. Of thefe one affumed the title of Constantine XII.; but his glory was merely nominal, and loft in that of his elder brother Michael. Of the eleventh Constantine, hiftorians fay he was an orthodox and juft prince, but the flave of avarice. The XIIIth prince of this name was fon of the emperor Manuel Palæologus, and fucceeded his brother John in 1448, at a period when the whole empire fcarcely extended beyond the limits of the capital. This fovereign having fquandered the fmall remaining refources of his dominion in imperial oftentation, found himfelf threatened with the hoftility of his potent neighbour, fultan Mahomet II., who erected a fortrefs on the Bofphorus, found occafion for a quarrel, and laid fiege to the capital. Conftantine determined to refift to the laft, and to fhare the fate of his people. He fought for fuccour among the Chriftian princes of the Weft, but the aid he obtained was tardy, and infufficient to the greatnefs of the occafion. Conftantinople was encompaffed by Turkifh arms, and the emperor, in this extremity, fulfilled the part of a hero. When the final affault was prepared, he took leave of his people in a moving harangue, received the facrament in the church of St. Sophia, and then went to the walls. The numbers of the Turks without, exceeded thofe of the Chriftians within, the city, more than a hundred fold. Every hope of fuccefsful refiftance was vanifhed; breaches had been made in the walls, and at length they and the towers were covered with fwarms of the affailants. Amidft thefe multitudes, the emperor, who nobly accomplifhed all the duties of a general and foldier, was long feen, and finally loft; his mournful exclamation was heard, "Cannot there be found a Chriftian to cut off my head?" His laft fear was that of falling alive into the hands of the infidels. He had thrown off the purple, and falling by an unknown hand, was buried under a mountain of flain. The final cataftrophe of the Greek empire, and emperor, happened May 29th, 1453, Conftantinople having fuftained a fiege of 58 days. See Constantinople. Moreri. Gibbon. Univer. Hift.

Constantine, Flavius Julius, from a private foldier, in the legions of Britain, was raifed to imperial honours, on account of his name, and in refpect for the great Conftantine. He had no fooner attained the high honour, than he paffed over to Gaul with his troops, and made himfelf mafter of that country. With the affiftance of his fon Conftans, he reduced Spain; and upon Conftans he conferred the title of Auguftus. Conftantine fixed his throne at Arles, and when the Goths under Alaric had taken poffeffion of Italy, he marched as far as the Po, on the pretence of effecting its deliverance, but probably with a view of fharing in the fpoil. After paffing through various fcenes, in which he experienced by turns fuccefs and difafter, Conftantine was befieged in his capital by Conftantius, to whom he furrendered, on the promife of fecurity for himfelf and his fon. The terms were granted, but the engagement was not fulfilled. The fallen prince was fent to Italy, where he and his fon Julian, in violation of a folemn promife, fuffered death by the emperor's orders, Sept. the 18th, 411. Moreri. Gibbon.

Constantine: there were two popes of this name: the one a native of Syria, raifed to the Roman fee in 708, characterized for his charity to the poor; and for his ambition, in engaging Juftinian to fubjugate the independent fee of Ravenna to the yoke of Rome; the other, from a layman, was raifed to the higheft office in the church by the influence of his brother; an honour, however, that he did not long retain. An infurrection being excited againft him, in about a year after his elevation, he was depofed, and, under the reign of the new pope, was fubject to the infults and moft cruel treatment of the people, deprived of his fight, and condemned to perpetual imprifonment. Moreri.

Constantine is the name likewife of an abbot who flourifhed at Metz in the eleventh century, and who was author of "The Life of Adalberon II." bifhop of that city: and of a monk diftinguifhed for his writings in the thirteenth century, againft Veccus, patriarch of Conftantinople. Another of the fame name was born at Florence, and became bifhop of Orvieto. He acquired celebrity by his preaching talents, and after his elevation to the bifhopric, he was appointed legate from pope Alexander IV. to Theodore Lafcaris, the Grecian emperor, hoping, by his perfuafion, to induce the emperor and his clergy to fubmit to the Roman fee. He was author of the life of St. Dominic, and other works. He died in the year 1257.

Constantine, furnamed the *African*, was born at Carthage, about the middle of the eleventh century. He refided many years in Babylon, where he became celebrated for his knowledge in the Arabian, Chaldean, Perfian, and Ægyptian languages. Among the fciences, medicine feems to have received the greateft fhare of his attention, as appears by two of his works, which were thought deferving of being printed feveral centuries after his death. In the firft, which was publifhed at Bale, in the year 1536. in folio, "De morborum cognitione, et curatione," libri feptem, he treats of affections of the ftomach, hypochondriafis, on the difeafes of women, &c. In the fecond, which was alfo publifhed at Bale, three years after the former, he treats of fevers, of the elephantiafis, of incantations, and of remedies taken

taken from parts of animals. The whole are however fuppofed to have been principally tranflated from Arabian writers. After a refidence of thirty nine years at Babylon, he returned to Carthage, but foon fell into fuch difgrace with his countrymen, whom he fufpected of intending to deftroy him, that he went to Salernum. Though he was there introduced to duke Robert, who wifhed to retain him about his perfon, preferring a life of eafe and retirement, he entered into a monaftery of the Benedictines, St. Agatha, in Averfa, where he died in 1087. Haller Bib. Med. Eloy Dict. Hift.

Constantine, Robert, a native of Caen in Normandy, was born, as it is faid, about the year 1502. He was profoundly verfed in Greek, Latin, and oriental literature. This procured him the intimacy of J. Cæfar Scaliger (with whom he refided feveral years), and of other great fcholars, but did not defend him againft the farcafms of Jofeph Scaliger, who attacked him with great ferocity. He took his degree of doctor in medicine, but from the many learned works he publifhed, does not feem to have dedicated much of his time to the practice of that art. His editions, with annotations, of the works of Theophraftus, Diofcorides, Celfus, and Quintus Serenus, gained him much credit. They were publifhed between the years 1554 and 1566, as was alfo his "Nomenclator infignium Scriptorum, quorum libri extant vel manufcripti, vel impreffi," 8vo. But the work which eftablifhed his name as a fcholar, was his "Lexicon Græco-Latinum," firft publifhed at Geneva, in 1562, in two volumes folio; reprinted, much improved, in 1592. He is faid by De Thou to have lived to the great age of 103 years, preferving his faculties entire to the laft. Other writers fay he died of a pleurify at the age of 75 years. Haller. Bib. Bot. Eloy Dict. Hift.

Constantine, Antony, an eminent phyfician at Lyons, publifhed in 1597, in 8vo. "Brief traité de la Pharmacie Provençale, et familiere," in which he attempts to fhew his countrymen, that they may find in their fields remedies for their difeafes, without having recourfe to drugs imported from foreign countries. Alfo "Opus Medicæ prognofeos, in quo omnium fymtomatum, caufæ et eventus exponuntur." 8vo. 1613. He died, far advanced in years, in 1616. Eloy Dict. Hift.

Constantine, *Order of*, in *Heraldry*, otherwife the order of the Golden Angel and St. George. Conftantine the Great is by fome confidered as the founder of this order, after his memorable victory over the tyrant Maxentius, A. C. 312. This is at prefent the fecond order of the kingdom of Naples. Others affirm that the emperor Ifaac Angelus Comnenus was the founder of it. The badge of the order is a red crofs, fomewhat in the form of four fleurs-de-lis joined at the extremities, furrounded with a border of gold, thereon embroidered the four letters I. H. S. V.; meaning, "In hoc figno vinces," being the words difplayed on the celeftial meteor, or luminous crofs, which is faid to have appeared to Conftantine, and encouraged him to attack Maxentius. In the centre of the badge is a monogram, or cypher of our Saviour's name, expreffed by the letters X and P, and on each fide are placed one of the letters A and Ω (alpha and omega, or the firft and the laft letters of the Greek alphabet.)

The great collar of this order, worn over the mantle, confifts of fifteen enamelled golden fhields of an oval form, and on each the letters X and P appear in the form of a cypher. The middle fhield is fomewhat larger than the others, and is furrounded with oak and laurel leaves entwined; and from the lower part of it is fufpended the effigy of St. George, in compleat armour, on horfeback, and in the act of ftriking the dragon.

The council of this order is compofed of 50 fenators, who are grand croffes. When the grand mafter affifts in ftate therein, his drefs is as follows: the veft and fmall cloaths are of imperial fcarlet, as alfo the ftockings and fhoes; above the veft is worn a caffock of filver, richly embroidered, with wide fleeves, and reaching to the knees, faftened round the waift with a girdle of fcarlet velvet, embroidered with filver, and about the neck with two rich cords of gold and fcarlet filk mixed, with taffels reaching to the ground. On the left fide of the mantle, the crofs of the order is richly embroidered in gold. The cap is of crimfon velvet, and is one fpan high, lined with white fatin, and adorned with a black oftrich feather. The four fides are turned up, and on each the cypher of our Saviour, as above defcribed.

The grand croffes (in number 50) wear a blue veft and fmall cloaths, and over the fame a white veft, which reaches to the knees; their ftockings and fhoes are white; their girdle red, and their mantle of blue damafk is lined with white: they wear the great collar of the order, and their cap, which is of blue fatin, is turned up at the four fides, and on each the cypher as before: the cap is alfo adorned with a white oftrich feather.

The popes had conferred the grand mafterfhip on the houfe of Comnenus for ever; but in 1699 Angelus Flavius Comnenus, the laft of this houfe, refigned it to Francis Farnefe, the then duke of Parma, to him and his fucceffors for ever; which was confirmed by a brief of pope Innocent XII. dated 29th October, 1699. In 1735 the ducal houfe of Farnefe becoming extinct in the male line by the death of Anthony the laft duke, Don Carlos, the eldeft fon of Philip V. king of Spain, and of Elizabeth Farnefe, the fole heirefs of the family, fucceeded to the duchies of Parma and Placentia, and to the grand mafterfhip of this order. This prince was fucceffively grand duke of Tufcany, and king of Naples: upon his fucceffion to the latter he declared this order royal, and annexed it to the crown of Naples.

CONSTANTINOPLE, in *Geography*, the metropolis of the Turkifh empire, was built on the fcite and ruins of the ancient *Byzantium* in Thrace, by the Roman emperor Conftantine the Great, who, in the year of our Lord 330, removed the feat of the empire from Rome to this new capital. The reafons which induced Conftantine to fix his refidence here, are not exactly known. The imperial court had in fact been removed from Rome about thirty years before. Of the affociate emperors Diocletian and Maximian, the former refided at Nicomedia, and the latter moftly at Milan. Galerius had his court at Nicomedia; Conftantius Chlorus at York. It is fuppofed that Diocletian and Maximian, having concerted a plan of adminiftration more fyftematically defpotic than that of any of the preceding emperors, and being defirous of fetting entirely afide the nominal authority which the fenate ftill poffeffed, had fixed their refidence at a diftance from the ancient metropolis of the empire, in order to avoid the republican remonftrances of that auguft body. Conftantine was probably actuated by the fame motive, for his adminiftration was ftill more defpotic; and after he had removed the feat of empire to Conftantinople, the fenate could fcarcely be reckoned a conftituted order in the ftate. Others attribute Conftantine's choice of a new capital to a diflike which he had conceived againft Rome, on account of the enthufiaftic attachment of that city to paganifm. But whatever may have been Conftantine's motive, it cannot be denied that the fituation of Conftantinople actually was preferable to that of Rome, both as a check

a check to the Perfians, and as a barrier againft the Goths, thofe terrible enemies of Rome, who, having once tafted the rich plunder of Greece and Afia Minor, feized every opportunity of making predatory incurfions into all parts of the empire. Befides, the beautiful and picturefque arrangement of the land and water in the environs of Conftantinople decidedly entitled it to be preferred to Rome. It is fituated on an elevated ground, confifting of gently fwelling eminences, rifing like terraces, one above another, without any of thofe deep vallies which feparate the feven hills on which Rome is feated, and which, together with the marfhes adjoining the Tyber, render the air unwholefome. It fills a triangle formed by the harbour, the BOSPHORUS and the PROPONTIS, or fea of MARMORA. Situated in the 41ft degree of latitude, the imperial city commanded, from her feven hills, the oppofite fhores of Europe and Afia; the climate was healthy and temperate, and the foil fertile, and the approach on the fide of the continent was fmall in extent, and eafy of defence. The harbour on the north fide is fecure and capacious; it is five hundred yards wide at its entrance from the Bofphorus, and runs feven miles into the land. The Bofphorus and the Hellefpont may be confidered as the two gates of Conftantinople; and the prince who poffeffed thofe important paffages could always fhut them againft a naval enemy, and open them to the fleets of commerce when thofe gates were fhut. The capital ftill enjoyed within their fpacious enclofure every production which could fupply the wants, or gratify the luxury, of its numerous inhabitants. In failing up the Propontis towards Conftantinople the moft enchanting profpects charm the eye of the navigator; from every part of that fea he may difcover the high lands of either Thrace or Bithynia, and never lofes fight of mount Olympus, till at laft the city itfelf, rifing from the Strand, attracts his view, and exhibits the moft magnificent appearance. Conftantinople alfo commands the commerce of the vaft regions of the north, by means of the Euxine fea, and of the rivers Don and Dnieper, which difcharge themfelves into it. By the ftrait of the Hellefpont, which forms the communication between the Propontis and the Mediterranean fea, it is equally well fituated for the trade of the fouth and weft; and when Egypt is under its dominion its pofition is extremely advantageous with refpect to the trade to India, and the eaftern coafts of Africa.

Whatever rude commodities were collected in the forefts of Germany and Scythia, as far as the fources of the Tanais and Boryfthenes; whatfoever was manufactured by the fkill of Europe or Afia; the corn of Egypt, and the gems and fpices of the fartheft India, were brought by the varying winds into the ports of Conftantinople, which for many ages attracted the commerce of the ancient world.

The profpect of beauty, of fafety, and of wealth, united in a fingle fpot, was fufficient to juftify the choice of Conftantine. However, as prodigy and fable have, in every age, been fuppofed to reflect a becoming majefty on the origin of great cities, the emperor thought proper to avail himfelf of this circumftance; and in one of his laws he has taken care to inform pofterity, that in obedience to the commands of God, he laid the everlafting foundation of Conftantinople. The ingenuity of fucceeding writers has led them to defcribe the nocturnal vifion which appeared to the fancy of Conftantine as he flept within the walls of Byzantium. The tutelar genius of the city, a venerable matron, finking under the weight of years and infirmities, was fuddenly transformed into a blooming maid, whom his own hands adorned with all the fymbols of imperial greatnefs. The monarch awoke, interpreted the aufpicious omen, and, without hefitation, obeyed the will of heaven. In order deeply to imprefs the minds of the fpectators, the emperor himfelf, on foot, with a lance in his hand, led a folemn proceffion, and directed the line, which was traced as the boundary of the deftined capital, till the growing circumference was obferved with aftonifhment by the affiftants, who, at length, ventured to obferve that he had already exceeded the moft ample meafure of a great city. "I fhall ftill advance," replied Conftantine, "till HE, the invifible guide who marches before me, thinks proper to ftop." In furveying the actual ftate of the city, the palace and garden of the feraglio occupy the eaftern promontory, the firft of the feven hills, and cover about 150 acres of our meafure. The new walls of Conftantine ftretched from the port to the Propontis acrofs the enlarged breadth of the triangle, at the diftance of fifteen ftadia from the ancient fortification; and with the city of Byzantium they enclofed five of the feven hills, which, to the eyes of thofe who approach Conftantinople, appear to rife above each other in beautiful order. About a century after the death of the founder, the new buildings, extending on one fide up the harbour, and on the other along the Propontis, already covered the narrow ridge of the fixth, and the broad fummit of the feventh hill. The inceffant inroads of the Barbarians rendered it neceffary for Theodofius the younger to furround his capital with an adequate and permanent enclofure of walls. The new wall of Theodofius was conftructed in the year 413; and after having been thrown down by an earthquake in 447, it was rebuilt in three months by the diligence of the prefect Cyrus. The fuburb of the Blachernæ was firft taken into the city in the reign of Heraclius. From the eaftern promontory to the golden gate, the extreme length of Conftantinople was about three Roman miles; the circumference meafured between ten and eleven; and the furface might be computed as equal to about 2000 Englifh acres. The fuburbs of Pera and Galata, though fituate beyond the harbour, may deferve to be confidered as a part of the city; and this addition may perhaps authorize the meafure of a Byzantine hiftorian, who affigns fixteen Greek (about fourteen Roman) miles for the circumference of his native city. After all, Conftantinople muft yield to Babylon and Thebes, which filled the great but not incredible circumference of about 25 or 30 miles, to ancient Rome, to London, and even to Paris.

As to the expence incurred by the progrefs of the work, fome eftimate may be formed of it by the allowance of about two millions five hundred thoufand pounds for the conftruction of the walls, the porticoes, and the aqueducts. The forefts that overfhadowed the fhores of the Euxine, and the celebrated quarries of white marble, in the little ifland of Proconnefus, fupplied an inexhauftible ftock of materials ready to be conveyed, by the convenience of a fhort water-carriage, to the harbour of Byzantium. A multitude of labourers and artificers urged the termination of the work with inceffant toil; but the impatience of Conftantine foon difcovered that, in the decline of the arts, the fkill, as well as the number of his architects, bore a very unequal proportion to the greatnefs of his defign. However, the buildings of the new city were decorated by the hands of the moft celebrated mafters of the age of Pericles and Alexander. By the commands of the emperor, the cities of Greece and Afia were defpoiled of their moft valuable ornaments. The trophies of memorable wars, the objects of religious veneration, the moft finifhed ftatues of the gods and heroes, of the fages and poets of ancient times, contributed to the fplendid triumph of Conftantinople; whence the hiftorian Cedrenus took occafion

occafion to obferve, that nothing feemed wanting except the fouls of the illuftrious men, whom thofe admirable monuments were intended to reprefent. For an account of the principal buildings with which this imperial city was decorated, we muft refer to the articles FORUM, HIPPODROME, &c. and the fequel of this article.

The baths of this city, which ftill retained the name of Zeuxippus, were enriched by the munificence of Conftantine with lofty columns, various marbles, and above threefcore ftatues of bronze. In fhort, whatever could adorn the dignity of a great capital, or contribute to the benefit or pleafure of its numerous inhabitants, was contained within the walls of Conftantinople. A particular defcription, compofed about a century after its foundation, enumerates a capitol or fchool of learning, a circus, two theatres, eight public, and 153 private baths, 52 porticoes, five granaries, eight aqueducts or refervoirs of water, four fpacious halls for the meetings of the fenate or courts of juftice, 14 churches, 14 palaces, and 4388 houfes, which, for their fize and beauty, deferved to be diftinguifhed from the multitude of Plebeian habitations. In order to furnifh this favoured city with a population, correfponding to its extent and magnificence, Conftantine invited many opulent fenators of Rome, and of the eaftern provinces, to fix upon his chofen refidence for their own habitation; and he beftowed on his favourites the palaces which he had built in feveral quarters of the city, affigned them lands and penfions for the fupport of their dignity, and alienated the demefnes of Pontus and Afia, for the purpofe of granting hereditary eftates by the eafy tenure of maintaining a houfe in the capital. By degrees, however, a variety of concurring circumftances contributed to fill the city with inhabitants. In lefs than a century, Conftantinople difputed with Rome itfelf the pre-eminence of riches and numbers; and it became neceffary to enlarge its extent by additional edifices, the foundations of which, on either fide, were advanced into the fea, and which, of themfelves, might have compofed a very confiderable city. The emperor alfo conferred, by way of additional allurement or encouragement to his plan of population, feveral privileges on the fettlers at Conftantinople. He divided the city into fourteen regions or quarters, dignified the public council with the appellation of fenate, communicated to the citizens the privileges of Italy, and beftowed on the rifing city the title of colony, the firft and moft favoured daughter of ancient Rome. The walls, porticoes, and principal edifices of this city, were completed, as fome fay, in a few years, or, according to others, in a few months; and the founder foon prepared to celebrate the dedication of his city, a ceremony which was attended with pompous games, and munificent largeffes. As often as the birth day of the city returned, the ftatue of Conftantine, framed by his order, of gilt wood, and bearing in its right hand a fmall image of the genius of the place, was enriched on a triumphal car. The guards, carrying white tapers, and clothed in their richeft apparel, accompanied the folemn proceffion as it moved through the Hippodrome. When it was oppofite to the throne of the reigning emperor, he rofe from his feat, and with grateful reverence adored the memory of his predeceffor. At the feftival of dedication, an edict, engraved on a column of marble, beftowed the title of SECOND, or NEW ROME, on the city of Conftantine. But the name of Conftantinople has prevailed over that honourable epithet, and, after the revolution of fourteen centuries, ftill perpetuates the fame of its author.

It has been conjectured, that the removal of the imperial refidence from Rome, contributed to haften the downfal of the empire: but it is certain, that the fixing of it at Conftantinople, put a final period to the paffage of the Barbarians, through the Bofphorus. They could never after force that infurmountable barrier, and Greece, as well as Afia Minor, felt fecure from their ravages, until Valens unadvifedly fuffered the Goths to pafs the Danube, and received their armed bands into the heart of the empire.

Conftantine the Great did not long enjoy his new refidence. He died the 22d May, 337, and by his will divided his vaft empire among his three fons, Conftantius, Conftans, and Conftantine. Within three years after their father's death, Conftans invaded the dominions of his brother Conftantine, who, being drawn into an ambufcade and flain, left Conftans in poffeffion of two-thirds of the Roman empire. But Magnentius revolting foon after againft Conftans, furprifed him hunting, and purfuing him in his flight, put him to death. Magnentius being in the next place defeated by Conftantius, terminated his life by fuicide; and thus, by the difaftrous fate of his brothers, Conftantius became fole emperor in 353; three and twenty years after the feat of the empire had been removed to Conftantinople.

At the death of Conftantius, which happened in the year 361, Julian, commonly called the Apoftate, fon of Julius Conftantius, and nephew to Conftantine the Great, affumed the imperial purple. He marched foon after againft the Perfians, and was fo infatuated by his expectations of conqueft, as to deftroy the fleet of boats which he had upon the Tigris. Allured by fpies who pretended to be deferters, he advanced far into an unknown country. His army found itfelf at laft in the midft of fandy deferts, and felt the dreadful effects of famine. The guides fuddenly difappeared, and the Perfian monarch approaching, with the whole military force of his kingdom, want of provifions rendered a retreat neceffary, in which the troops were continually haraffed by the Perfians, who carefully avoided any clofe engagement. In fpite of the inceffant attacks of the Perfian cavalry, the Romans fucceeded in gaining the banks of the Tigris, but for want of their boats they could not pafs the river. Exhaufted with fatigue, and perifhing with hunger, they ftill repulfed the attack which the Perfian king made on their camp. In the confufion of the battle, Julian received a mortal wound, of which he died in a few hours, on the 26th of June, 363.

This emperor had conceived the project of extirpating the Chriftian religion; and if he had appointed, or if the army had elected an emperor equally averfe to Chriftianity, his death would not have difpelled the ftorm that was gathering over Chriftendom. Fortunately, Jovian, a Chriftian officer, was chofen emperor. Forced to conclude a difadvantageous peace with Perfia, he purchafed a fafe retreat by the ceffion of Mefopotamia, and the ftrong cities of Nifibis and Singara.

Jovian dying in 364, foon after the conclufion of the peace with Perfia, Valentinian, another Chriftian commander, was decorated with the imperial purple. He named his brother Valens his colleague in the empire, affigning him the eaftern part, whilft he himfelf ruled the weft. It was in this reign that the firft ftep towards the fubverfion of the weftern empire took place. The Huns, a Tartar nation, being driven out of their own country, rufhed like a torrent upon the Goths, on the north fide of the Danube, who, feeing their poffeffions invaded, prefented themfelves in immenfe crowds on the banks of the river, and requefted an afylum in the Roman dominions. They delivered up their children, at leaft thofe of rank, as hoftages; but were unfortunately fuffered to retain their arms. The number of Goths who paffed the Danube on the occafion, was computed at about 200,000 armed men, with their wives and children

children along with them. A fecond army of Goths, coming to the banks of the Danube with the fame requeft, was refufed: but they paffed without leave, and being ill fupplied with provifions, they joined their countrymen, and commenced a war againft the empire. After various fkirmifhes, Valens, without waiting for his nephew Gratian, who was on his march to join him, gave battle to the Goths, in the plains of Adrianople, A. D. 378, and was totally defeated. The lofs on the fide of the Romans was fo great, that this defeat was confidered as the moft fevere fince the battle of Cannæ. Valens was never more feen. It is fuppofed that he was confumed in the flames of a cottage where he had taken refuge.

By the death of Valens, the empire fell into the hands of his nephew Gratian, who had fome time before fucceeded to Valentinian in the weft. But at the end of the year 378, he declared Theodofius his partner in the empire, and committed the Eaft to his care.

Theodofius was a native of Spain. In four years and a half he terminated the Gothic war. The Goths had lands affigned to them in the Roman provinces, and fubmitted to the Roman fceptre on condition of being governed by their own laws.

Theodofius was in every refpect a fecond Conftantine the Great. Like him he rendered the empire triumphant over all its enemies, extinguifhed inteftine commotions, eftablifhed Chriftianity upon a folid bafis, and divided the empire between his two fons Arcadius and Honorius, affigning to the former the eaftern, and to the latter the weftern part. From that period, the two monarchies, forming two feparate and independent ftates, gradually became ftrangers to each other, and even regarded each other's profperity with a jealous eye. Rome fell a prey to the Goths, whilft Conftantinople appeared totally unconcerned at the event. Theodofius died at Milan, the 17th of January 395, in the fixteenth year of his reign, and the fiftieth of his age.

After the death of Theodofius, the hiftory of Conftantinople affords nothing remarkable, until the total deftruction of the Roman empire in the weft by the Goths. Towards that time Bafilifcus ufurped the Eaftern empire. Affifted in his confpiracy by the emprefs Verina, his fifter, he drove out Zeno, the lawful emperor, who fled into Ifauria, whither he was purfued by Ilus and Trecondes, two of the ufurper's generals, and forced to fhut himfelf up in a caftle. But Bafilifcus having loft his popularity by his cruelty, his generals joined Zeno and reftored him to the throne. Bafilifcus perifhed in a dungeon in the year 467. He had reigned about twenty months. During his ufurpation, a dreadful fire happened at Conftantinople; together with a confiderable part of the city, it confumed the imperial library which is fuppofed to have contained 120,000 volumes.

Zeno had the good fortune to efcape other confpiracies that were formed againft him: but he was unfuccefsful in the wars which he waged againft the Oftrogoths, and purchafed a fhort peace at the expence of the provinces of Lower Dacia and Mœfia. Theodoric, king of the Oftrogoths, foon renewed his irruptions into Thrace, and advanced within fifteen miles of Conftantinople, which he was expected to befiege, when he fuddenly turned his arms againft Odoacer, king of Italy, whom he fubdued. Theodoric himfelf was proclaimed king of Italy in his room, two years after the death of Zeno, which happened in 491.

The adminiftration of Athanafius, Zeno's fucceffor, was equally weak. Theodoric, however, reigned in Italy under the fanction of the imperial court of Conftantinople, and ftill acknowledged himfelf a vaffal of the eaftern emperor. But on his death the kingdom of Italy devolved upon his beautiful and accomplifhed daughter, Amalafontha; and at her demife, which happened in the year 535, the Goths of Italy refufed to acknowledge the paramount authority of the imperial court, and renounced all dependence on the empire. Juftinian was then reigning at Conftantinople. His uncle Juftin, who afcended the throne in 518, after Athanafius, had named him his colleague in the year 527, and dying foon after, had left him fole mafter of the empire. He firft turned his whole force againft Chofroes, king of Perfia, difpatched his general Belifarius againft him, and after a fevere defeat, forced him to fue for peace.

About this time, a great tumult happened at Conftantinople. It began among the different factions in the circus. Hypatius, nephew to Athanafius, was proclaimed emperor. To crufh this fedition, Juftinian facrificed two of his minifters who were moft obnoxious to the people; but the multitude grew the more outrageous, and feveral fenators having joined the rebels, the emperor felt fo much alarmed that he thought of abandoning the city, and making his efcape by fea. Encouraged, however, by his emprefs Theodora, he refolved to defend himfelf to the laft with the few fenators who had not yet abandoned him. In the mean time, Hypatius was carried in triumph to the circus, where he was beholding the fports from the imperial throne, among the acclamations of the populace, when Belifarius on his return from Perfia entered the city with a confiderable body of troops. He immediately marched to the circus, fell fword in hand upon the difarmed multitude, and took Hypatius the ufurper, and Pompey, another of the nephews of Athanafius, prifoners. They were both beheaded, and their eftates, as well as thofe of the fenators who had joined them, confifcated.

Juftinian now turned his arms againft the Vandals in Africa, and the Goths in Italy. Belifarius entered Rome A. D. 536, where he was befieged by the Goths. His gallant defence, with only five thoufand veterans, againft a numerous army of Goths, commanded by Vitiges their king, during the fpace of a whole year, is deemed one of the moft fignal military exploits recorded in hiftory. He made many fuccefsful fallies. In one fingle affault the Goths are reported to have loft 30,000 men. They were obliged to raife the fiege on the arrival of frefh troops from Conftantinople. At length the Gothic kingdom of Italy was completely fubdued. Vitiges the king was fent to Conftantinople. Juftinian affigned him for maintenance a rich eftate in Afia Minor, and on his conforming to the Athanafian creed, conferred upon him the rank of Patrician and Senator, which ftill continued as an honorary title in the empire. Gelimer, king of the Vandals, over whom Juftinian alfo triumphed, had likewife an ample eftate affigned to him, but could not enjoy any honorary title on account of his profeffing Arianifm.

In the year 546, the Goths again revolted under the command of Totila, whom they had elected king. Belifarius a fecond time entered Italy, and retook Rome in 547, but at his recal it was again captured by the Goths. The command of the army of Italy was then conferred on Narfes, an eunuch of great military fkill and the moft daring courage. This general defeated and flew Totila the Gothic king, and made himfelf mafter of Rome in 552. He likewife defeated and flew Teias, who had fucceeded Totila as king of the Goths, and made a prodigious flaughter of the Franks and Allemanni, who invaded Italy foon after. Italy was then made a province of the eaftern or Byzantine empire, and a government eftablifhed under the denomination of the Exarchate, of which Narfes was the firft exarch.

By the conqueft of Italy and Africa, Juftinian gave to the eaftern empire an aggrandizement which it had never before poffeffed. He difplayed confummate political abilities, during a reign of thirty-eight years, and exhibited, during a life of eighty-three, a fingular inftance of long continued perfonal profperity. He has left a noble monument of his legiflative talents in his code of laws, and a no lefs noble one of his fkill in architecture, in the magnificent cathedral of St. Sophia at Conftantinople, now a Mahometan mofque. His reign is alfo the important æra of the tranfplantation of the filk-worm from China to Conftantinople. The brilliancy of Juftinian's reign was however in fome degree clouded by great calamities of a phyfical nature. Tremendous earthquakes happened almoft every year throughout the whole extent of the empire. A dreadful peftilence fpread from Pelufium in Egypt, over the greateft part of Afia, Africa, and Europe. During the fpace of three months, from five to ten thoufand individuals died daily in Conftantinople. Many cities in the Eaft were almoft depopulated, and in fome parts of Italy, the harveft rotted on the ground. This contagion, which began in the fifteenth year of Juftinian's reign, was not extinguifhed in lefs than fifty-two years.

Juftinian died in the year 565. Soon after his death the Eaftern empire began to decline. After the fucceffive reigns of Juftin II. and of Tiberius, which filled up the interval, from the death of Juftinian to the acceffion of Maurice in 582, a fpirit of revolt manifefted itfelf in Conftantinople, and terminated in the affaffination of Maurice, and election of Phocas the centurion in 602. Phocas was in his turn depofed and put to death by Heraclius, A. D. 610, whofe reign is remarkable for a moft obftinate conteft with Perfia, to which country it proved finally fatal.

During a period of twelve years, from 610 to 622, the Eaftern empire exhibited a fcene of almoft unexampled diftrefs. From the Adriatic to the fuburbs of Conftantinople, the provinces were ravaged by the Chan of the Avars, who had fubdued the Huns and refided in the royal village of Attila, in the great plain of Hungary; and a Perfian army was encamped at Chalcedon, now Scutari, on the brink of the Bofphorus, directly oppofite to Conftantinople. The general confternation was fo great that the emperor was about to leave the city, and tranfport himfelf with the treafures of the imperial palace to Carthage, when the patriarch of Conftantinople led him to the altar of the church of St. Sophia, and made him take a folemn oath that he would live and die with his people. Heraclius having thus folemnly bound himfelf to the defence of his country, carried devaftation to the very centre of the Perfian dominions. He every where defeated the numerous forces of Chofroes, whofe continual difafters excited a general revolt of the Perfians. Chofroes was depofed A. D. 628, and Siroes his fon proclaimed king. The latter put to death his father and eighteen brothers, and then concluded with Heraclius a treaty of peace, in confequence of which, the former boundaries of the Byzantine and Perfian empires were reftored.

The northern nations, which had overthrown the Roman empire in the Weft, were yet in an unfettled ftate, and Europe exhibited the moft difgufting fcene of barbarifm and anarchy, whilft Conftantinople was triumphing in the fuccefsful termination of a war, which had threatened the extinction of its empire. It was, however, foon to witnefs horrors fimilar to thofe with which the Weft had been familiarized for the fpace of two centuries.

About the year 609, Mahomet, an Arabian, affumed the character of a prophet, and affembling together a determined and daring band, in whom he excited military enthufiafm by means of religious tenets, calculated to flatter their paffions, he fubdued one after another, all the Arabian tribes, and attacked the Eaftern empire three years before his death. His fucceffor, Abubeker, preferred, however, turning his arms towards Perfia, which had not yet recovered from the confufion into which it had been thrown, by the dreadful conteft between Heraclius and Chofroes. But after the death of Abubeker, which happened in 634, Omar, who fucceeded him, affailed the Byzantine empire, with renovated ardour. In the courfe of a very few years, both Syria and Egypt acknowledged the fway of the conqueror. The lofs of Egypt was feverely felt by the people of Conftantinople; that country having always been efteemed the granary of the city, and Syria, being in poffeffion of an enemy, laid all the Afiatic provinces open to invafion.

In the year 644, this new Saracen empire devolved to the Caliph Othman, who completed the conqueft of Perfia, and fubdued all that part of Africa, which had fucceffively been under the dominion of the weftern and eaftern empire, and which extended from Egypt to the Atlantic, and from the Mediterranean to the Great Defert.

But during the whole period of the exiftence of the Saracen empire, Conftantinople ftill refifted all the attacks of thefe Arabian conquerors. They twice laid fiege to the city. In their firft attempt their fleet blockaded Conftantinople, on the fide of the Propontis, from 668 to 675. Their fecond fiege in 716, was rendered memorable by the invention of the Greek fire, which totally deftroyed the Saracen fleet, whilft the army which attacked the city on the land fide, was compelled to raife the fiege with prodigious lofs.

If the progrefs of Mahometanifm was hurtful to the interefts of Chriftianity, and to the fplendour of the Byzantine empire, the conteft between the advocates of the ufe of images in Chriftian temples and their opponents, which violently agitated the church, proved equally fatal in its confequences. It occafioned the firft fchifm between the Greek and Latin churches, and was the origin of thofe differences which in the end produced their total feparation, and haftened the fall of Conftantinople.

This difpute broke out about the year 720, in the reign of Leo, the Ifaurian, who is diftinguifhed in hiftory as the firft of the Iconoclaft emperors. A council was held at Conftantinople in 754, by 338 prelates of the eaftern empire, who condemned all vifible reprefentations of Chrift and his apoftles, as heretical. This decifion immediately caufed the feceffion of Italy. A new Roman republic was eftablifhed; but not being able to maintain its independence againft the Lombards, it was delivered from their oppreffion by Pepin, king of France, whofe fon and fucceffor Charlemagne received from the pope Adrian IV. the title of emperor of the Romans, and founded the Holy Roman or German empire.

The decree of the council of Conftantinople did not, however, maintain its authority for more than thirty years. Irene, an Athenian female, who for her beauty had been advanced to the imperial bed and throne, began to reign in conjunction with her fon Conftantine VI. in the year 780. Her ambition inftigated her to caufe the eyes of her fon to be put out that fhe might reign fole emprefs of the Eaft. She ftrongly exerted herfelf in favour of the reftoration of images, which the fecond council of Nice, condemning that of Conftantinople, effected in 787. Still the two churches of the Eaft and Weft, were never more cordially united.

During the four centuries which elapfed between the death of Theodofius the Great and the reign of Charlemagne, Europe was in a ftate of anarchy and barbarifm: the eaftern empire alone exhibited marks of civilized fociety, and for a while flourifhed in power, till it was curtailed of

half

half of its poffeffions by the conquefts of the Mahometan caliphs. Under Charlemagne the whole world was divided into the Eaftern, Saracen, and new Weftern empire. Of thefe the Saracen empire, under the caliphs, ftood the higheft in literary attainments; Conftantinople, though much declined, ftill held the fecond rank; and the reft of Europe was making fome advances towards the reftoration of learning, when Charlemagne, by dividing his new empire among his fons, replunged it into barbarifm.

In the ninth century, the Bulgarians, who had commenced their attacks towards the latter end of the feventh, and renewed their inroads at different periods, continued to be formidable enemies. They were completely fubdued by Bafilius II. towards the end of the tenth century. It was about the fame time that the empire of the Saracens, being, like that of Charlemagne, fplit into a number of independent ftates, by the revolt of factious and ambitious chiefs, fell a prey to the Seljukian Turks and other barbarous nations of Afia. This fubverfion of the caliphate was attended with the complete wreck of Arabian learning; and the Byzantine empire remained the fole depofitory of all that was worthy of notice in literature, commerce, and the arts and embellifhments of civilized fociety. Thus the tenth century, which, in the weftern countries, was one of the darkeft periods of Gothic ignorance, conftituted the moft flourifhing æra of the Byzantine learning, under the reigns of Leo the philofopher and his fon Conftantine Porphyrogenitus.

About the year 1063 the emperor Conftantine XI. Ducas left, at his death, the empire to his three fons, Michael, Andronicus, and Conftantine XII., and appointed the emprefs Eudocia regent during their minority, on condition that fhe fhould not marry again. But having been releafed from her engagement, through a ftratagem practifed upon the patriarch, who abfolved her of the oath fhe had taken, Eudocia married an officer of great military merit, named Romanus Diogenes, who was proclaimed emperor. After various fucceffes againft the Turks, who were continually encroaching upon all fides of the empire, Romanus was wounded in a defperate engagement, and taken a prifoner. Before his return to Conftantinople, Eudocia was driven from the throne by John, the brother of Conftantine Ducas, and her eldeft fon, Michael Ducas, proclaimed emperor. Romanus was befieged in a ftrong caftle, whither he had retired, and killed in the year 1067, after a reign of three years and eight months.

Immediately after the death of Romanus, the empire was again invaded by the Turks. In lefs than ten years they made themfelves mafters of all Media, Lycaonia, Cappadocia, and Bithynia. At laft Alexius Comnenus, having wrefted the empire from Nicephorus Botoniates, who had depofed Michael Ducas, prepared for war with fo much vigour, that Solyman the Turkifh fultan made propofals of peace, to which Alexius acceded, in order to defend himfelf in the weft againft the Italians, under Robert Guifchard, duke of Puglia and Calabria, whom he defeated, with the affiftance of the Venetian fleet. He alfo forced the Scythians, who had laid wafte great part of Thrace, to fubmit on his own terms.

The war with the Turks was renewed in 1083, and carried on with various fuccefs. But about the year 1095, a romantic fcene of religious enthufiafm and military enterprife began to difplay itfelf; and though it threatened the utter ruin of the Turkifh nation, proved finally fatal to Conftantinople.

Under the polifhed empire of the caliphs, the frequent pilgrimages of Chriftians to the holy fepulchre at Jerufalem had been encouraged; but the barbarians who had overturned the caliphate oppreffed the pilgrims with unreafonable impofitions, and often added infult to injuftice. Incenfed at thefe outrages, Peter, a hermit, who had vifited the holy fepulchre, preached a crufade for the recovery of the holy land from the infidels. The pope approved the project, and the princes and nobles of Europe readily entered into the meafure.

This religious war was carried on, with fome intervals, during the fpace of almoft two hundred years, from the fetting out of the firft crufade in 1095, to the lofs of Acre and all Paleftine in 1291. Innumerable armed hordes were collected out of England, France, Germany, the Netherlands, and Italy. Yet thefe tremendous efforts were not attended with effects of fuch permanency as might have been expected. But one of the moft remarkable events which occurred in the courfe of the crufades, was the capture of the city of Conftantinople by the Latins.

The emperor, Ifaac Angelus, having been depofed and deprived of fight by his inhuman brother, his fon, Alexius, who was only a youth, made his efcape into Italy, and met with a number of the barons of France and Flanders, who were come to Venice to contract with the republic for the fhips neceffary to facilitate one of thofe crufading enterprifes. He concluded with them a treaty, whereby they engaged to reftore his father to the imperial throne of the Eaft, and he promifed to unite the Greek to the Latin church. The French and Venetians, changing the deftination of their armament, failed up the Hellefpont to Conftantinople, broke the chain of the harbour, and affaulted the city. When they were almoft ready to enter the town, the ufurper made his efcape. Ifaac Angelus and his fon, the young Alexius, were proclaimed joint emperors. A ceffation of arms took place: but as foon as the clergy underftood the terms of the treaty concluded by young Alexius, they reprobated the idea of an union with the fee of Rome, and excited the people to fly to arms. The infurrection was alfo fomented by Alexius Mourzoufle, of the family of Ducas, who affumed the purple, imprifoned the blind emperor Ifaac, and put young Alexius to death. The legal fucceffion of the Greek empire being thus overturned, the French and Venetians recommenced the war. After a fiege of more than three months, they affaulted the city from the harbour, and carried it by ftorm, eight hundred and eighty years after its foundation by Conftantine. The city being given up to pillage, the plunder was valued at 400,000 marks, nearly equivalent to 800,000*l.* fterling, the greateft fum ever found in any captured city previous to that period; and notwithftanding the penalties of excommunication, and even of death, denounced againft any one who fhould fecrete any part of the fpoil, the fecret plunder is fuppofed to have exceeded what was produced in public. Baldwin, earl of Flanders, was elected emperor, with one-fourth part of the empire for his fhare: the reft was divided among the barons and knights, into fiefs, held under the emperor.

The Greeks, after this difafter, eftablifhed independent ftates at Nice, Trebifond, and Epirus. The Latins were not profperous in their newly-acquired empire. The diffentions which prevailed among the barons, laid their dominions open to the attacks of the Greeks. They continually gained ground. The Bulgarians alfo revolted, and the emperor, Baldwin of Flanders, being defeated and taken prifoner by them, died in captivity. He was fucceeded by his brother Henry, who fhewed himfelf of equal capacity for peace and war.

Henry checked the proceedings of the popifh legate, in the perfecution of the Greek fchifmatics. But after his death, which happened in 1216, the Latin empire of Conftantinople rapidly declined: and fo preffing were the exigencies of the ftate, that Baldwin II., the laft emperor of the

the Latin dynafty, pledged to the Venetians the crown of thorns pretended to have been worn by Chrift.

At laft Michael Paleologus, having ufurped the Greek empire of Nice, his general, Alexius Strategopulus, with an inconfiderable force, furprifed and recovered Conftantinople in 1261: and thus, after a period of 57 years, that metropolis returned under the dominion of the Greeks. But a confiderable part of the city had been deftroyed in the three dreadful conflagrations which happened at the time of the fiege and capture by the Latins: Conftantinople never more regained that fplendour which it had all along maintained. The imperial palace, which, during eleven centuries, had been the admiration of all who vifited the Eaft, was in ruins. It ftood between the Hippodrome and the magnificent church of St. Sophia. Its fuperb gardens defcended, by feveral rows of terraces, to the fhore of the Propontis. The primitive edifice, erected by Conftantine, rivalled the palace of the Cæfars on the Palatine Mount. The improvements made by his fucceffors ftill added to its magnificence; and the emperors of the Comnenian dynafty had taken particular delight in embellifhing this imperial refidence.

The inveterate enmity of the clergy and people of Conftantinople againft the Latin church ftill fubfifted. To avert a crufade, which the Latins were meditating againft Conftantinople, Michael Paleologus negociated with the pope, and concluded a concordat between the Greek and Latin churches; but at his death, in the year 1282, the union was diffolved. His fon Andronicus, who fucceeded him, reftored the ancient Greek ceremonies, and by this imprudent ftep threw the empire into a new ferment.

In the mean time Conftantine his brother fuccefsfully oppofed the Turks, who continued their encroachments: but his valour rendered him fufpected by the emperor. Conftantine was thrown into prifon. On his removal from the army, the Turks under the famous Othoman made themfelves mafters of feveral places. Philantropenus and Libadarius, two officers of great merit, were fent to oppofe them. The former gained fome advantages over the enemy: but elated with his fuccefs he caufed himfelf to be proclaimed emperor. This rebellion however was foon fuppreffed. Philantropenus was betrayed by his own men: but the Turks taking advantage of thefe inteftine commotions extended their dominions in Afia, conquered moft of the iflands in the Mediterranean, and infefted the coafts of the empire. Andronicus, not trufting his fubjects, hired the Maffagetes to affift him: but they being defeated, turned their arms againft him. He next applied to the Catalans who behaved in the fame manner, and, in 1292, affailed the empire in conjunction with the Turks. This was their firft appearance in Europe. Their enterprife this time proved unfuccefsful.

New commotions having taken place in the empire, the Turks returned to the charge in 1327. The next year, however, Othoman, who may be ftyled the founder of the Turkifh monarchy, being dead, the emperor recovered Nice and fome other places, which were again loft the year following; and, in 1330, a peace was concluded, which left the Turks in poffeffion of their conquefts.

This peace the Turks broke in 1357. Having reduced all Afia, they paffed the Hellefpont, and took a ftrong caftle on the European fide. Soon after fultan Amurath, advancing ftill farther, made Adrianople the feat of his empire. He was flain by treachery, and fucceeded by his fon Bajazet, who levied a yearly tribute on the emperor of Conftantinople, and commanded him to fend him his fon Manuel to attend him in his military expeditions. This demand was complied with. But the emperor dying in 1392, Manuel haftened to Conftantinople without taking leave of the fultan. This incenfed Bajazet fo highly, that he paffed with great expedition into Thrace, ravaged the country adjoining Conftantinople, and at laft invefted the city both by fea and land. In this extremity, Manuel had recourfe to the weftern princes, who fent him an army of 130,000 men, under the command of Sigifmund, king of Hungary, and John count of Nevers. After a few fucceffes they were defeated with great flaughter by Bajazet, who refumed the fiege of the city, and would infallibly have accomplifhed the conqueft of Conftantinople had he not been obliged to turn his forces againft Tamerlane the victorious Tartar, by whom he was overcome in battle, and confined in an iron cage againft the bars of which he beat out his brains in the year 1399.

But as this relief could not be expected to be of long duration, Manuel Paleologus fet fail for Venice, and from thence vifited London and Paris in the year 1400, in the reign of Henry IV. of England and Charles VI. of France, with the view of procuring fome affiftance, which the circumftances of thofe countries did not permit them to grant. He alfo endeavoured to negociate an union with the Latin church; but the negociation broke off. His fon John Paleologus, who fucceeded him, was more fortunate. He concluded a treaty at Florence with pope Eugenius IV.; but it was univerfally reprobated by the whole body of the clergy of Conftantinople, and the emperor was obliged to renounce it. He did not long furvive thefe unhappy difturbances, and, in 1448, left the empire now confined almoft within the walls of Conftantinople to the laft Conftantine.

Upon the near profpect of being befieged in his capital by the Tartar Turks, Conftantine Paleloogus renewed the concordat with the Latin church. A cardinal legate from Rome was admitted at Conftantinople; but after he had officiated in the cathedral of St. Sophia, the Greek clergy abandoned it as a polluted temple, and the whole city of Conftantinople difplayed every extreme of fanaticifm and averfion againft the Latin church. Though reduced to a narrow corner between the Propontis and the Euxine, the Byzantine empire continued the theatre of crimes and political as well as fanatical factions, until the 29th of May, 1453, when, after a fiege of 53 days, Conftantinople was taken by the Turks under Mahomet II. Whatever may have been the ftrength of the army which the Turks brought againft that celebrated metropolis, the force, which the minifter was able to enrol by the emperor's command for its defence, was inconfiderable. There were only 4970 volunteers, and including the Italian auxiliaries, the emperor's troops did not exceed 8000 men.

Conftantine Paleologus made a vigorous defence, and rafhly refufed advantageous terms of capitulation. When the city was at laft carried by affault, he nobly fell in the breach by which the enemy entered Conftantinople. A fhocking fcene now followed. The perfons and property of the citizens were given up to the difpofal of the conquering army. The terrified people fled to the cathedral of St. Sophia and other afylums, from whence they were dragged forth, and without any diftinction of fex or rank, chained together, driven through the ftreets like beafts, and more than fixty thoufand of them fold into flavery. Mahomet, at the expiration of the three days allotted for pillage, made his triumphal entry into Conftantinople, which he named the capital of the Ottoman empire, and which has ever fince held that ftation. See Turks.

Such was the dreadful cataftrophe of Conftantinople, once the metropolis and long the fole exifting remnant of the

the Roman empire. It fell a prey to the Turks 1043 years after Rome was taken by Alaric, and 977 years after the entire fubverfion of the weftern empire. Gibbon's Hift. of the Decline and Fall of the Roman Empire, *paffim.* Le Beau, Hiftoire du Bas Empire. Bigland's Letters on Ancient and Modern Hiftory.

Conftantinople is called by the Turks *Stampol, Iftampol,* or (according to Thornton's prefent State of Turkey, p. 79.) *Iftambol, abounding in faith.* It is fituated at the eaftern extremity of the province named Romania, or Romelia, on the European fide of the Bofphorus, or ftraits of Conftantinople, which feparates Europe from Afia; in N. lat. 41° 10'. 830 miles S. E. of Vienna and 900 E. of Rome. It rifes gradually from the fhore in the form of an amphitheatre; but the ftreets are narrow, and the houfes, in general, mean; the moft fpacious not exceeding two ftories in height. The ftreet called Adrianople is the longeft and broadeft in the city. The public buildings, fuch as the palaces, the mofques, bagnios, bazars, and caravanferais or khans, for the entertainment of ftrangers, are many of them very magnificent. On one point of the triangle, on which the city is built, is the feraglio from whence there is a charming profpect of the delightful coaft of Afia Minor. This inclofure of the Ottoman palace is feparated from Conftantinople by a wall thirty feet high with battlements, embrafures, and towers, in the ftyle of ancient fortifications. Its circumference is above fix miles. There are in it nine gates, but only two of them remarkable for their fize and beauty. It is from one of thefe the *Baba Hoomajun*, or *Sublime Porte*, that the Ottoman court is fuppofed to have taken the name of the *Porte*, or *Sublime Porte*, in all public tranfactions and records. But Mr. Thornton, in his prefent State of Turkey, page 117, contends that the palace of the grand vizir, by a metaphor familiar to moft of the Eaftern languages, is called the Porte or King's gate, in Perfian *Der*, being, as it were, the door of communication between the fultan and his fubjects, and correfponding with the European appellation of a court which follows the perfon of the fovereign.

The feraglio is fo extenfive, that it is fuppofed to occupy the whole of the ground on which the ancient city of Byzantium ftood, and to contain 10,000 inhabitants. That wing of the feraglio which is exclufively appropriated to the ladies of the Grand Signor, is called the *Harem.* Among the ancient monuments preferved in the feraglio, is the tomb of Conftantine the Great. Of the mofques, or Turkifh churches, the moft celebrated is that of St. Sophia, which fronts the great gate of the feraglio, and is thought, in fome refpects, to exceed in grandeur and architecture St. Peter's at Rome. Round it are feveral chapels, which ferve as burial-places for the imperial family. The other mofques of fultan Achmet, fultan Mahomet, fultan Selim, fultan Solyman, and fultan Bajazet, are alfo very fine. Thefe imperial mofques are founded chiefly by fultans, who have obtained victories, and devote the fpoils of war, gained from the enemies of their religion, to the fervice of public worfhip, the inftruction of youth, and the relief of the poor. Foundations of this kind are annexed to every mofque. There are in Conftantinople 518 feminaries of learning, and 1250 primary fchools. The Greeks, befides their patriarchal church, dedicated to St. George, have 22 others. The palace of their patriarch is on a hill, about two hundred paces from the harbour. The Armenians have an archbifhop and three churches; the Roman Catholics have fix convents, and the Jews feveral fynagogues. There is alfo a Swedifh Lutheran church.

The bazars, or befeftins, anfwer to our markets. They are fquares enclofed within gates, where merchants meet for traffic, having generally two rows of fhops built under piazzas. The market of female flaves, *Avrat Bazar,* is a quadrangle, furrounded by a covered gallery, and ranges of fmall and feparate apartments; but Mahometans only are admitted.

The bagnios, or public baths, are elegant and noble ftructures, built with hewn ftones; the inner chambers are capacious, and paved with flabs of the rareft and moft beautiful marble.

At the fouth end of the city, is the formidable ftate prifon of the feven towers, built of fine free-ftone, and furrounded by a wall, with feveral fmaller towers.

There are no theatres at Conftantinople; the *Ombres Chinoifes*, which are fometimes exhibited in the ftreets, fupply the want of dramatic exhibitions. Of other public amufements, the principal are wreftling, and throwing the javelin, on horfeback, in the ancient Hippodrome, an oblong fquare, called by the Turks *Almeidan.*

Conftantinople counts 35 public libraries, fome of which contain 15,000 volumes. That which was founded under Muftafa III. by the vizir Racub Pacha, is the moft modern. A renegado, of the name of Ibrahim, encouraged by the grand vizir, Ibrabim Pafha, and the Mufti Abd'ullah Effendi, introduced the firft printing-prefs at Conftantinople, in the year 1727. It was afterwards deftroyed by fome fanatics, but Abdul Hamid reftored it. Only the Koran, and books treating of the law and the doctrines of the prophet, are forbidden to be printed. Thefe circulate in manufcripts, and afford a comfortable fubfiftence to 20,000 individuals who live by copying them.

The trade of Conftantinople is chiefly in the hands of the Jews, Armenians, and Greeks; and its commerce is carried on by foreigners of all nations, who are confounded under the general name of Franks. No reftrictions are laid on commerce, except in the articles neceffary for the fupport of human life; the exportation of which is fometimes prohibited, efpecially from Conftantinople, where alone the prohibition is rigoroufly enforced. Befides filk, cotton, wool, flax, drugs, coffee, fugar, wax, honey, fruits, hides, and tobacco, Conftantinople exports its own printed muflins, the fatins, filk ftuffs, and velvets, of Brufa and Aleppo, the ferges and camelots of Angora, the crapes and gauzes of Salonica, the fword-blades of Damafcus, and the carpets of Smyrna. The harbour is fpacious, and fuppofed capable of holding 1200 fhips. Near it is *Galata*, a fuburb chiefly inhabited by Greeks, Armenians, Jews, and Franks, who have their warehoufes here. Beyond this is *Pera*, which may be confidered as the fuburb of Galata, where the foreign ambaffadors refide. The air is uncommonly healthy, and the profpect delightful. Near Pera is the quarter called *Tophana*, from its canon foundery.

According to Mr. Dallaway, the population of Conftantinople, including its fuburbs, does not exceed 400,000 fouls, of whom 200,000 are Turks, 100,000 Greeks, and the remainder Jews, Armenians, and Franks, or ftrangers from all the European nations. Mr. W. Eton (in his Survey of the Turkifh Empire, fecond edition, page 287.) brings it down to lefs than 300,000. But this computation is evidently too low. At the time of its capture by the Latins, Conftantinople is fuppofed by Villehardouin to have contained 400,000 effective men; this, however, muft be regarded as an exaggeration. Mr. Le Beau, in his Hiftoire du Bas Empire, fuppofes that it contained then about one million of inhabitants, and that its prefent population amounts to 400,000, which, by all accounts, is the moft probable computation.

Conftantinople is frequently vifited by the plague, which, however, excites but little alarm, and Turkifh indifference

counteracts all efforts to subdue this dreadful epidemical disorder. From the year 1783 to 1785, it swept away 100,000 children and young people. The city has also often been exposed to great conflagrations. In 1782 a fire consumed from 7 to 8000 houses, among which were some belonging to the first officers of the state. On the 5th of August, 1784, more than 10,000 buildings were laid in ashes, and towards the end of the same year, 1600 houses and mosques were burnt down. In 1788 there was so extensive a conflagration as to threaten the entire destruction of the city. They generally originate in the discontents of the Janizaries, or other military bodies. In the last revolution, which they effected on the 28th of May, 1807, when they forced Selim III. to abdicate the throne, and proclaimed Mustapha IV. emperor: they contented themselves with cutting off the heads of a few ministers and military chiefs. But between the first and sixth day of August following, three great fires reduced several hundred houses to ashes, and are supposed to have proceeded from the strong dissatisfaction that prevailed in the mutinous army against the new grand signor, for having issued an order to pay the troops only in the camp. In time of peace the Janizaries watch over and secure the public tranquillity, and exercise all the functions of police officers. A foreigner, who would be insulted if seen alone in the streets of Constantinople, may walk any where without the least molestation if accompanied by a Janizary. See Janizaries. (D'Ohsson Tableau General de l'Empire Ottoman. Eton's Survey of the Turkish Empire. Thornton's present State of Turkey.)

Constantinople, *Patriarch of.* See *Greek* Church.

CONSTANTIUS, Flavius Valerius, in *Biography*, surnamed *Chlorus* from the paleness of his complexion, was son of Eutropius, a Dardanian noble, but his education did not correspond with the style of his birth. Under the emperors Aurelian and Probus, he had learned the military art, and by the emperor Carus, he was appointed governor of Dalmatia in the year 282. Ten years afterwards, in conjunction with Galerius, he was made Cæsar, and associated with the emperors Diocletian and Maximian. To Constantius were assigned the provinces of Gaul, Britain, and Spain. At this time Carausius, an ambitious general, had excited a revolt in Britain, and carried matters so far as to assume the imperial authority; he was also in possession of the port and fleet of Boulogne. To oppose the usurper, Constantius first attacked Boulogne, which surrendered to his arms, together with a great part of the naval strength of the place. After this, Constantius employed three years in preparing a fleet for the conquest of Britain; he scoured the coast of Gaul, invaded the country of the Franks, and deprived the usurper of the assistance of those allies. Before the preparations were finished, Carausius was deposed and murdered by his own servants. Allectus, his prime minister, succeeded to his power and to his danger. But he did not possess equal abilities, either to exercise the one or to repel the other. Constantius, under favour of a thick fog, escaped the British fleet, and landed in safety on the western coast, where an engagement took place, in which Allectus was slain; a single battle decided the fate of this great island, and when Constantius landed afterwards on the shores of Kent, he found them covered with obedient subjects. He now had occasion only to exert his talents in establishing a regular government; to which he appears to have been fully competent; he reigned with mildness, and was anxious not to oppress his subjects by heavy taxes; his court was distinguished by simplicity and great frugality, and he himself was a decided enemy to the persecutions which disgraced the reigns of Diocletian and Maximian; but in which, as their superior, he was obliged occasionally to join. When, however, he rose to the supreme power of Augustus, he banished persecution entirely from the provinces over which he governed. That event occurred in 305. Finding his health decline, he sent, as we have seen, (see Constantine *the Great*,) for his son Constantine to join him at Boulogne, thence they sailed to Britain, where the Picts had made an incursion into the northern part of the Roman province. This expedition, and an easy victory over the barbarians of Caledonia, were the last exploits of the reign of Constantius. He closed his days in the imperial palace of York, fifteen months after he had received the title of Augustus, and near fifteen years after he had been promoted to the rank of Cæsar. His death was immediately succeeded by the elevation of Constantine the Great; besides whom, he left three sons and as many daughters, by a second wife. Moreri. Gibbon.

Constantius II., Flavius Julius, was the second son of the great Constantine, by Fausta, and born in 317. At a very early period of his life he was declared Cæsar: when even a stripling, the care of the East was committed to him. On the death of his father, being then in his twentieth year, he repaired to Constantinople where he took a solemn oath that his kinsmen, who were already in discredit with the soldiery, should be permitted to remain in safety. He is however accused of an utter disregard to the sanction of the oath, and of having excited the massacre in which his two uncles, and seven of his cousins, were put to death. In a new division of the empire, in the year 338, Asia, Syria, Egypt, and Thrace were allotted to Constantius. From this period he was involved in wars with various nations; of which the most important was that with Magnentius, in Lower Pannonia. In the first campaign Constantius was so far unsuccessful, that he offered terms of accommodation, and a partition of his dominions, which his opponent haughtily refused, proposing as the only ground of solid peace the abdication of Constantius. A very bloody and decisive battle ended in a signal defeat of Magnentius, who with difficulty escaped to Italy. Constantius spent the winter in Sirmium, the place of his birth, and in the spring of the following year 352, he passed the Alps, and proceeded to the conquest of Italy, a task of no great difficulty on account of the enmity which the cruelties of Magnentius had excited against him and his cause. He now attempted to treat, but his overtures were not listened to: from Italy he passed to Gaul, and made a stand at Lyons. Africa, Sicily, and Spain, declared for his rival. Another victory over Magnentius, rendered Constantius, in 353, the sole master of the Roman empire; but Magnentius, and his brother Decentius, chose death by their own hands, rather than run the chance of falling into those of their conquerors.

The conduct of Constantius upon this important change, has been variously represented; but there is no doubt that measures of the severest kind were carried on against those who had engaged against him, or had rendered themselves liable to suspicion. Notwithstanding his talents and success as a general, he was by no means equal to the duties attaching to the high office of emperor, and he dreaded too much a rival, to place the government under the auspices of a vigorous mind. His chief advisers were eunuchs, with whom his court was crowded, and to whom he committed the fortunes and lives of his numerous subjects. Constantius had already declared his nephew Gallus, Cæsar, and to him was given the care of the East, where he displayed the most atrocious acts of tyranny, and exhibited an intention of assuming an independent sovereignty. By the advice of Eusebius, the chamberlain of the eunuchs, Gallus was recalled, imprisoned, and executed. Those who write favourably of Constantius, assert, that he had no sooner signed the

the warrant, than he relented, and endeavoured to recal the bloody mandate; but that the ſecond meſſenger entruſted with the reprieve, was detained by the eunuchs, who dreaded the unforgiving temper of Gallus, and were likewiſe deſirous of re uniting to their empire the wealthy provinces of the Eaſt. Some time after this event, Sylvanus, a Frank, who had been in the confidence of the emperor, and who had been of the utmoſt importance to him in his conteſts with Magnentius, was, by falſe accuſations, driven into rebellion. He aſſembled an army at Cologne, but was aſſaſſinated before it could be properly organized. The barbarian tribes of Germany, reſolving to be revenged for his death, burſt into the province, deſtroyed many cities, and among the reſt Cologne itſelf, and reduced the empire to the moſt alarming danger. Julian, the remaining nephew of the emperor, was ſent againſt them, and returned victorious. In 357, Conſtantius paid a viſit to Rome, where he was received with the higheſt honours. He diſplayed his regard for the ancient capital, by adding to its ornaments an obeliſk of granite in a ſingle piece, brought from Egypt, and ſet up in the Circus Maximus. After this, he engaged in other wars, and was in general ſucceſsful. His nephew Julian became now his rival; his high reputation in the army, induced the ſoldiers to proclaim him Auguſtus, but the emperor refuſed to acknowledge him as partner in the empire, and began to make preparations to aſſert his own rights over thoſe of his aſpiring relation. Julian had anticipated him, and had already ſeized upon Illyricum; in purſuit of him there, Conſtantius was ſeized with a fever, which at firſt threatened no ſerious conſequences, but which terminated his life, and thus delivered the country from the horrors of a civil war. He died in November 361, having reigned twenty-four years. He obtained the character of a zealous Chriſtian, and is applauded for having diſcouraged Pagan rites and ceremonies. He built many churches, and behaved with great reſpect towards the clergy; in matters of ſpeculation and theological controverſy, he conſidered himſelf an adept; was himſelf a favourer of the Arian party, and the perſecutor of Athanaſius, and of thoſe who maintained his doctrines. It muſt be confeſſed that the genuine principles of Chriſtianity were never underſtood by any of the Roman emperors; and their ſupport of it, however laudable their motives might be, was highly injurious to its progreſs in the world. Gibbon. Univer. Hiſt.

CONSTAT, in *Law*, the name of a certificate, which the clerk of the pipe, and auditors of the exchequer, make at the requeſt of any perſon, who intends to plead or move in that court for the diſcharge of any thing; and the effect of it is, the certifying what (appears) *conſtat* upon record, touching the matter in queſtion. 3 & 4 Edw. VI. cap 4. and 13 Eliz. cap. 6.

A conſtat is held to be ſuperior to an ordinary certificate; becauſe this may err or fail in its contents, that cannot, as certifying nothing but what is evident upon record. Alſo the exemplification under the great ſeal of the inrolment of any letters patent, is called a *conſtat*. Coke on Littl. 225.

CONSTELLATION, in *Aſtronomy*, an aſſemblage or ſyſtem of ſeveral ſtars, expreſſed and repreſented under the name and figure of ſome animal, or other thing: this aſſemblage is by ſome called alſo an *aſteriſm*.

The ancients portioned out the firmament into ſeveral parts, or conſtellations; reducing a certain number of ſtars under the repreſentation of certain images, in order to aid the imagination, and the memory, to conceive and retain their number, diſpoſition, and even to diſtinguiſh the virtues, which aſtrologers attributed to them: in which ſenſe a man is ſaid to be born *under a happy conſtellation*, i. e. under a happy configuration of the heavenly bodies. The diviſion of the heavens into conſtellations is very ancient, and, probably, as old as aſtronomy itſelf; at leaſt, it was known to the moſt ancient authors extant, whether ſacred or profane. In the book of Job, mention is made of the names of ſome of them; as in chap. ix. 9. "Which maketh Arcturus, Orion, and Pleiades, and the chambers of the ſouth." By the "chambers of the ſouth," ſome have underſtood the conſtellations near the ſouth pole, which are inviſible to the inhabitants of the northern hemiſphere. From the manner in which Job ſpeaks of commerce, we may infer that he lived in a country frequented by merchants, who imported thither the rarities of the ſouth. To this purpoſe Sir Iſaac Newton ſuggeſts, (Chronology, p. 157.) that Job, who lived in Arabia Petræa, among the merchants, might have derived from them his knowledge of the conſtellations. And again, mention of them occurs in that ſublime expoſtulation, chap. xxxviii. 31, 32. "Canſt thou reſtrain the ſweet influence of the Pleiades, or looſen the bands of Orion? Canſt thou bring forth Mazzaroth, (by which ſome underſtand the twelve ſigns, or zodiac,) or canſt thou guide Arcturus with his ſons?"

The firſt of the three conſtellations, mentioned by Job, is עש *aſch*, or עיש *aiſch*, by which ſome have thought that he meant the conſtellation, now called the "Great Bear." The root of *aiſch* is עוש *ouich*, which, in Hebrew, ſignifies, "to gather together, or to aſſemble;" and in Arabic, "to make a circuit, or to deſcribe a circle." Theſe two ſignifications may very well be applied to the Great Bear, which is a group of ſtars making a remarkable circuit round the pole. "Canſt thou guide (or feed) *Aiſch* with his ſons?" (chap. xxxviii. v. 32.) is an expreſſion which figuratively repreſents the ſtars that compoſe the Great Bear, collected together, like a flock which feeds in a meadow. In the ſame ſtrain Virgil ſays, (*Æn.* l. 1. v. 611.) "Polus dum ſidera paſcet." It has been further obſerved, that *Aiſch* is the firſt ſtar named in Job; and that Αρκτος, or the Great Bear, is the firſt conſtellation mentioned by Homer, in his deſcription of the ſhield of Achilles. The ſecond conſtellation or group of ſtars mentioned by Job is כימה *kimah*. From the different paſſages in which this term occurs, we may reaſonably conclude, that it muſt be underſtood of ſome conſtellation remarkable for its relation to an agreeable ſeaſon. God ſays to Job, "Canſt thou bind the ſweet influences of *Kimah*? i. e. Canſt thou bind up or reſtrain the fertility of the earth, for producing fruits and flowers, when *Kimah* appears?" The different ſignifications of this word, both in the Hebrew and Arabic, concur in pointing out the ſame ſenſe of the term. *Kimah* may be derived from כמה *kamah*, which, in Hebrew, ſignifies, "to deſire, or to rejoice." Of all the ſeaſons the ſpring is the moſt deſirable, and the moſt productive of delight and joy. If we deduce the word *kimah* from the Arabic root *kevuam*, or *kam*, this characteriſes the ſpring as diſtinctly as the former. *Kam*, in Arabic, ſignifies, "ſubigere mulierem," and "to become warm." Accordingly, the earth, at the approach of ſpring, begins to become warm, and to open its boſom: this is alſo the time when the females of moſt kinds of animals become pregnant. It remains only to know, what was the conſtellation which in the time of Job introduced the ſpring; and this, as we have ſufficient reaſon for believing, was the Pleiades. *Kam* alſo ſignifies a "troop, number, or multitude:" and this etymology agrees perfectly well with the Pleiades, on account of the number of ſtars included in this collection, or in the conſtellation of the Bull.

The third conſtellation mentioned by Job is כסיל *keſil*; the root of which word is כסל *kaſal*, which, in Hebrew, ſignifies, "to be inconſtant or changeable;" and in Arabic,

"to be benumbed, to be idle, to be cold." By *Kefil,* therefore, it is fuppofed that Job means the Scorpion. God fays to Job, "Canft thou loofen the bands of *Kefil?*" i. e. "Canft thou loofen and open the earth, which is fhut up and benumbed when *Kefil* appears? Canft thou then make it produce flowers and fruits?" Adverting to the interpretation already given of *kimah,* we fhall perceive, by the contrafted characters which diftinguifh them, that they are two conftellations of the zodiac, pointing out two very oppofite feafons. If by *kimah* Job defigned the Pleiades, it is not improbable that by *kefil* he meant the Scorpion, a conftellation oppofed to Pleiades by almoft one-half of the circuit of the heavens, and which then announced the approach of winter. Accordingly, Aben-Ezra underftood by *kefil* that ftar of the firft magnitude, known by the name of the Scorpion's heart, or Antares. In his commentary on Job he thus explains himfelf: "*Kimah,*" fays he, "is the northern ftars, and *Kefil* is a fouthern ftar. *Kimah* produces fruits, which are the delight of man; and *Kefil* does the contrary. *Kimah* is a great ftar, called the Bull's eye, that is to fay, Hyades; and *Kefil* is a great ftar, called the Scorpion's heart, that is to fay, Antares." Rabbi Levi Ben-Gerfon fays alfo, in his commentary on Job, that *Kefil* is one of the fouthern conftellations; and that when the fun enters into the fign where this ftar is found, the trees can no longer bring forth fruit, on account of the cold which this ftar brings with it. *Kefil* has been fuppofed, by fome learned commentators and critics, to denote the conftellation Orion, which, at the time of its rife, portends clouds and tempefts; and they derive it from כסל *kafal,* denoting inconftancy. See Schultens's Commentary on Job, vol. i. p. 239, &c. vol. ii. p. 1086. Goguet's Origin of Laws, &c. vol. i. Differt. 3.

In the prophecy of Amos, who is fuppofed to have lived 790 years B. C., we have the following animated exhortation (chap. v. 7, 8.): "Ye who turn judgment into wormwood, and leave off righteoufnefs in the earth; *feek him* that maketh the feven ftars and Orion, and turneth the fhadow of death into the morning, and maketh the day dark with night; that calleth for the waters of the fea, and poureth them out upon the face of the earth: the Lord is his name." In this paffage, the feven ftars and Orion are mentioned as being well known, both by Amos, who was a herdfman of Tekoa, and the common people, to whom this exhortation was addreffed; and we may hence infer, that the conftellations had been invented for fome time before that period. Some of the conftellations are alfo occafionally mentioned by Hefiod and Homer, who flourifhed above 900 years before Chrift; and Aratus of Tarfus, the aftronomical poet, who lived about 277 years B. C., in his "Phenomena," profeffedly treats of them all, except fome few which were invented after his time; fhewing how each conftellation is fituated with regard to thofe that are near it, what pofition it bears with refpect to the principal circles of the fphere, and what other conftellations rife or fet with it. Hipparchus, the Bithynian, has fhewn, that Aratus followed the defcriptions of Eudoxus, who flourifhed about 366 years B. C.; and it is very probable that the Greek aftronomers who fucceeded him continued to ufe the fame figures of the conftellations till the time of Ptolemy, though not without fome variations and additions. Ptolemy's Almageft (fee ALMAGEST) has been in fuch efteem among aftronomers, that almoft all who have written fince his time have agreed in drawing the figures of the conftellations, or fuppofing them to be drawn, fo as to anfwer his defcription, as far as poffible; and indeed this is neceffary, in order to avoid confufion, when ancient and modern obfervations are compared.

The divifion of the ancients only took in the vifible firmament, or fo much as came under their notice: this they diftributed into forty-eight conftellations, thofe being reckoned ancient conftellations which have been received from the Greeks, and particularly from Ptolemy; twelve of thefe took up the zodiac: the names they gave them are, *Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, Pifces:* from whence the figns of the ecliptic and zodiac take their names; though they are now no longer contiguous to the conftellations which denominate them; *e. g.* the conftellation Aries, about 2000 years ago, occupied the place of the firft fign of the ecliptic; but, on account of the preceffion of the equinox, it is now removed to the fecond; and fo of the others. See SIGN.

The other ftars, on the northern fide of the zodiac, were difpofed into twenty-one conftellations; viz. *Urfa, major* and *minor, Draco, Cepheus, Bootes, Corona Septentrionalis, Hercules, Lyra, Cygnus, Caffiopeia, Perfeus, Andromeda, Triangulum, Auriga, Pegafus, Equuleus, Delphinus, Sagitta, Aquila, Ophiuchus* or *Serpentarius,* and *Serpens:* to which have been fince added *Antinous,* and *Coma Berenices,* and fome others.

The ftars on the fouthern fide of the zodiac were diftributed into fifteen conftellations: their names are, *Cetus, Eridanus fluvius, Lepus, Orion, Canis, major* and *minor, Argo, Hydra, Crater, Corvus, Centaurus, Lupus, Ara, Corona Meridionalis,* and *Pifcis auftralis:* to which have been fince added feveral others, viz. *Phœnix, Grus, Indus, Pavo, Apus* or *Avis Indica, Apis Mufca, Chamæleon, Triangulum auftrale, Pifcis volans, Toucan, Hydrus, Xiphias* or *Dorado, Columba Noachi,* and *Robur Carolinum,* &c. &c. See each conftellation under its proper head, ARIES, TAURUS, &c.

The other ftars, not comprehended under thefe conftellations, yet vifible to the naked eye, the ancients called *informes,* or *fporades,* fome of which the modern aftronomers have fince reduced into new figures, or conftellations.

Thus, Hevelius, v. gr. between *Leo* and *Urfa major,* makes *Leo minor;* and between *Urfa minor,* and *Auriga,* over *Gemini,* makes *Lynx;* under the tail of *Urfa major, Canes venatici, Cerberus, Vulpecula,* and *Anfer, Scutum Sobiefki, Lacerta, Camelopardalus, Monoceros,* and *Sextans.* See alfo ANTINOUS, BERENICE, and COR *Caroli.*

In thefe conftellations, the ftars are ordinarily diftinguifhed by that part of the image wherein they are found. Bayer diftinguifhes them farther by the letters of the Greek alphabet: and many of them, again, have their peculiar names, as *Arcturus,* between the knees of Bootes; *Gemma,* or *Lucida,* in the Corona feptentrionalis; *Palilitium,* or *Aldebaran,* in the Bull's eye, *Pleiades* in the neck, and *Hyades* in the forehead of the Bull: *Caftor* and *Pollux* in the heads of Gemini; *Capella,* with the *Hœdi,* in the fhoulder of Auriga: *Regulus,* or *Cor Leonis; Spica Virginis* in the hand, and *Vindemiatrix* in the fhoulder of Virgo; *Antares,* or *Cor Scorpionis; Fomahaut,* in the mouth of Pifcis-auftralis; *Regel,* in the foot of Orion; *Sirius,* in the mouth of Canis major; *Procyon,* in the back of Canis minor; and the *Pole-ftar,* the laft in the tail of *Urfa minor.*

The knowledge of the ftars has become more extenfive; the number of conftellations has increafed; and a greater number of ftars has been introduced into each conftellation; as their pofitions, by more accurate obfervations, have been afcertained.

The following tables exhibit the names of the conftellations, and the number of ftars in each, including all to the fixth magnitude: and alfo fome of the moft remarkable ftars in each conftellation.

TABLE I. *Constellations in the Zodiac.*

Names of Constellations.	Number of the Stars. Ptolemy.	Tycho.	Hevelius.	Flamsteed, &c.	Chief Stars.	Magn.
Aries, the Ram	18	21	27	66		
Taurus, the Bull	44	43	51	141	Aldebaran	1
Gemini, the Twins	25	25	38	85	Castor and Pollux	1. 2
Cancer, the Crab	13	15	29	83		
Leo, the Lion	with Coma Berenices } 35	30	49	95	Regulus	1
Virgo, the Virgin	32	33	50	110	Spica Virginis	1
Libra, Chelæ, the Scales	17	10	20	51	Zubenich Meli	2
Scorpio, the Scorpion	24	10	20	44	Antares	1
Sagittarius, the Archer	31	14	22	69		
Capricornus, the Goat	28	28	29	51		
Aquarius, the Water-bearer	45	41	47	108	Scheat	3
Pisces, the Fishes	38	36	39	113		

TABLE II. *Constellations northward of the Zodiac.*

Names of the Constellations.	Number of Stars. Ptolemy.	Tycho.	Hevelius.	Flamsteed, &c.	Chief Stars.	Magn.
Ursa minor, the Little Bear	8	7	12	24	Polestar	2
Ursa major, the Great Bear	35	29	73	87	Dubhe	1
Perseus	29	29	46	59	Algenib	2
Auriga, the Waggoner	14	9	40	66	Capella	1
* Bootes	23	18	52	54	Arcturus	1
Draco, the Dragon	31	32	40	80	Rastaber	3
* Cepheus	13	4	51	35	Alderamin	3
* Canes Venatici, *viz.* Asterion, et Chara, the Greyhounds	-	-	23	25		
* Cor Caroli	-	-	-	3		
* Triangulum, the Triangle	4	4	12	16		
Triangulum minus	-	-	-	10		
* Musca	-	-	-	6		
* Lynx	-	-	19	44		
* Leo minor, the Little Lion	-	-	-	53		
* Coma Berenices, Berenices' hair	-	14	21	43		
* Camelopardalus	-	-	32	58		
* Mons Menelaus	-	-	-	11		
Corona Borealis, the Northern Crown	8	8	8	21		
Serpens, the Serpent	13	13	22	64		
Scutum Sobieski, Sobieski's Shield	-	-	7	8		
Hercules cum Ramo & Cerbero, Hercules, since called Engonasia	29	28	45	113	Ras Algiatha	3
* Serpentarius, sive Ophiuchus	29	15	40	74	Ras Alhagus	3
* Taurus Poniatowski	-	-	-	7		
Lyra, the Harp	10	11	17	22	Vega	1
* Vulpeculus & Anser, the Fox and Goose	-	-	27	37		
Sagitta, the Arrow	5	5	5	18		
Aquila, the Eagle, }	-	12	23 }	71	Altair	1
— with Antinous, }	-	3	19 }			
Delphinus, the Dolphin	10	10	14	18		
Cygnus, the Swan	19	18	47	81	Deneb Adige	1
Cassiopea, the Lady in her chair	13	26	37	55		
Equulus, the Horse's head	4	4	6	10		
* Lacerta, the Lizard	-	-	-	16		
Pegasus, the Flying Horse	20	19	38	89	Markab	2
Andromeda	23	23	47	66	Almaac	2

TABLE III. *Conſtellations ſouthward of the Zodiac.*

Names of the Conſtellations.	*Number of the Stars.* Ptolemy.	Tycho.	Hevelius.	Flamſteed, &c.	*Chief Stars.*	Magn.
* Phœnix	-	-	-	13		
* Officina Sculptoria	-	-	-	12		
Eridanus	34	10	27	84	Achernar	1
* Hydrus, the Waterſnake	-	-	-	10		
Cetus, the Whale	22	21	45	97	Menkar	2
* Fornax Chemica	-	-	-	14		
* Horologium	-	-	-	12		
* Reticulus Rhomboidalis	-	-	-	10		
* Xiphias, Dorado, the Sword-fiſh	-	-	-	7		
* Celapraxitellis	-	-	-	16		
Lepus, the Hare	12	13	16	19		
* Columba Noachi, Noah's Dove	-	-	-	10		
Orion	38	42	62	78	Betelgeuſe	1
Argo Navis, the Ship	45	3	4	64	Canopus	1
Canis Major, the Great Dog	29	13	21	31	Sirius	1
* Equuleus Pictorius	-	-	-	8		
* Monoceros, the Unicorn	-	-	19	31		
Canis Minor, the Little Dog	2	2	13	14	Procyon	1
* Chamæleon	-	-	-	10		
* Pyxis Nautica	-	-	-	4		
* Piſcis Volans, *Paſſer*, the Flying Fiſh	-	-	-	8		
Hydra	27	19	31	60	Cor Hydræ	1
* Sextans	-	-	11	41		
* Robur Carolinum, the Royal Oak	-	-	-	12		
* Machina Pneumatica	-	-	-	3		
Crater, the Cup	7	3	10	31	Alkes	3
Corvus, the Crow	7	4	-	9	Algorab	3
* Croſiers, el Cruzero	-	-	-	6		
* Apis Muſca, the Bee or Fly	-	-	-	4		
* Apus or Avis Indica, the bird of Paradiſe	-	-	-	11		
* Circinus, the Compaſs	-	-	-	4		
Centaurus, the Centaur	37	-	-	35		
Lupus, the Wolf	19	-	-	24		
* Quadra Euclidis	-	-	-	12		
* Triangulum Auſtrale, the Southern Triangle	-	-	-	5		
Ara, the Altar	7	-	-	9		
* Teleſcopium	-	-	-	9		
Corona Auſtralis, the Southern Crown	13	-	-	12		
* Pavo, the Peacock	-	-	-	14		
* Indus, the Indian	-	-	-	12		
* Microſcopium	-	-	-	10		
* Octans Hadleianus	-	-	-	43		
* Grus, the Crane	-	-	-	14		
* Toucan, the American Gooſe	-	-	-	9		
Piſcis Auſtralis, the Southern Fiſh	18	-	-	24	Fomelhaut	1

N. B. In the preceding Tables the new Conſtellations are diſtinguiſhed from the ancient by a ſtar, *.

TABLE IV. *Number of Stars of each Magnitude.*

		MAGNITUDES.					
	Firſt.	Second.	Third.	Fourth.	Fifth.	Sixth.	Total.
Conſtellations in the Zodiac - 12	5	16	44	120	183	646	1014
In the Northern Hemiſphere 34	6	24	95	200	291	635	1251
In the Southern Hemiſphere 45	9	36	84	190	221	323	863
	20	76	223	510	695	1604	3128

There are ſeveral ways of delineating the conſtellations and ſtars, ſo that an obſerver may be able to diſtinguiſh them in the heavens. The moſt eligible method of all is to conſtruct a hollow globe of ſuch a large ſize as to admit the obſerver to ſtand on a frame near its centre; and then to paint the ſtars and conſtellations in its inner ſurface, in their proper ſituations with regard to one another. If ſuch a globe, elevated according to the latitude, were made to turn on its poles, the obſerver near the centre would behold the motions and aſpects of the ſtars as they really are in the heavens, and ſoon obtain a correct idea of the whole. A machine of this kind, however, could not be conſtructed without a very conſiderable expence as well as ingenuity. Large machines on this plan have been made at Gottorp, at the expence of Frederick III. duke of Holſtein; and at Paris by the direction of cardinal d'Etrees; but theſe are far inferior in ſize to one erected at Pembroke college, in Cambridge, under the direction of Dr. Long. The deſcription of this curious machine is here ſubjoined in the doctor's own words. "I have, in a room lately built in Pembroke hall, erected a ſphere of 18 feet diameter, wherein 30 perſons may ſit conveniently: the entrance into it is over the ſouth pole by ſix ſteps:—the frame of the ſphere conſiſts of a number of iron meridians, not complete ſemicircles, the northern ends of which are ſcrewed to a large round plate of braſs with a hole in the centre of it; through this hole, from a beam in the ceiling, comes the north pole, a round iron rod about three inches long, and ſupports the upper parts of the ſphere to its proper elevation for the latitude of Cambridge; the lower part of the ſphere, ſo much of it as is inviſible in England, is cut off: and the lower or Southern ends of the meridians, or truncated ſemicircles, terminate on, and are ſcrewed down to a ſtrong circle of oak, of about thirteen feet diameter, which, when the ſphere is put into motion, runs upon large rollers of lignum vitæ, in the manner that the tops of ſome wind-mills are made to turn round. Upon the iron meridians is fixed a zodiac of tin, painted blue, whereon the ecliptic and heliocentric orbits of the planets are drawn, and the conſtellations and ſtars traced:—the great and little bear, and draco, are already painted in their places round the north pole; the reſt of the conſtellations are propoſed to follow: the whole is turned round with a ſmall winch, with as little labour as it takes to wind up a jack, though the weight of the iron, tin, and wooden circle, is about a thouſand pounds. When it is made uſe of, a planetarium will be placed in the middle thereof. The whole, with the floor, is well ſupported by a frame of large timbers." In 1758, the conſtellations and chief ſtars viſible at Cambridge, were painted in their proper places upon plates of iron joined together, which form one concave ſurface. We here add with regret, that this curious machine has been much neglected and is ſo far decayed as to anſwer none of the purpoſes which the ingenious contriver propoſed. The conſtellations and ſtars might alſo be drawn in two concave hemiſpheres, which would contain them all, or ſegments of ſpheres might be made of braſs or paſteboard, of ſuch dimenſions that each ſegment ſhould contain a ſingle conſtellation upon its concave ſurface. Sometimes the conſtellations are drawn upon two planiſpheres projected upon a great circle, which give us the pictures of the two concave hemiſpheres in plano. See our *Plates of Conſtellations*. The conſtellations and ſtars may be alſo depicted on a celeſtial globe.

The firſt uſe of all theſe concave ſpheres, planiſpheres, and globes is, by comparing them with the originals, to know the ſtars in the heavens; but as the rotation of the earth round its axis cauſes the heaven and ſtars, &c. apparently to move the contrary way; and thus the ſphere of the fixed ſtars is made to change its poſition, with reſpect to us, every moment of the natural day: it will be neceſſary, in order to compare the ſtars upon a concave hemiſphere, globe, or planiſphere, with the ſtars in the heaven, to place the globe, hemiſphere, &c. in ſuch a poſition as to correſpond with the ſituation of the heavens at the time of obſervation. The method of rectifying the celeſtial globe for any hour of the night, or ſo to place it that every ſtar on the globe may point at the correſponding ſtar in the heavens, will be ſhewn under the article *Celeſtial* Globe; and when this is done, the conſtellation may be known, by comparing the heavens and the globe with one another. *E. G.* If I would find a ſtar called Arcturus in the heavens, the globe being rectified for the hour, I find Arcturus upon it; then if I imagine a line to be drawn from the centre of the globe through that ſtar, that line continued will point at Arcturus in the heavens. Suppoſe, on the other hand, I ſee ſome bright ſtar in the heavens which I want to find upon the globe, I firſt rectify the globe for the hour of the night, and then if I imagine a line to be drawn from the ſtar to the centre of the globe, it will point at the correſponding ſtar on the ſurface of the globe. Maps of the concave ſurface of the heavens, eſpecially ſuch as take in only one conſtellation, with ſome parts of thoſe which ſurround it, are very uſeful for the purpoſe of becoming acquainted with the ſtars. Of this ſort are the figures given by Bayer in his "Uranometria," and thoſe of Flamſteed, publiſhed after his death by Hodgſon. See our *Plates of Conſtellations*. The manner of uſing theſe maps will be ſeen by the following example. If I would know the ſtars in the Great Bear, I turn the figure about, till the principal ſtars of it are in the ſame ſituation with regard to upper or under, right or left, as they appear in the heavens, at the time of making my obſervation: when this is done, it is eaſy, by looking firſt on the heavens and then upon the map, to diſcover to what parts of the figure, whether to the eye, ſnout, &c. the reſt of the ſtars are to be referred.

It is very probable that the ſtars, and more eſpecially ſome of the moſt remarkable collections of them, ſuch as Charles's Wain, the Pleiades, Orion, &c. were formed into conſtellations

lations and had names given them, in the early ages of the world. Some of them, by their different appearances, ferve to mark out the different feafons of the year, and on that account they were not only taken notice of as a kind of directory for the commencement of ploughing, fowing, and other operations of hufbandry (fee Hefiod, Oper. et Dier., l. ii. v. 1 and 2.), but were alfo thought to have a great influence on the temperature of the air and the fertility of the earth. Hence, from their being *figns*, pointing out the times of the year when heat or cold, drynefs or moifture, are ufually predominant, they were alfo regarded as the caufes of thofe qualities in natural bodies, and imagined to have dominion over minerals, vegetables, and animals, over the complexions, and conftitutions, and even the difpofitions of mankind. This opinion obtained credit the more eafily, becaufe the fun, moon, planets, and ftars, were believed to be of a divine nature; infomuch that fome conceived they were inhabited by an inferior kind of deities, which governed their motions and directed their influences; whilft others thought that they were animals, each of which had a living foul, which was guided by an intelligence, and others again fuppofe that they were animated by a part of the fubftance of the fupreme Being. Each of thefe notions led mankind to pay them a fort of religious worfhip. The moft ancient idolaters are with great probability thought by fome learned men to have received the name of Zabii from their worfhip of the hoft of heaven; and this they could hardly do, without dividing the ftars into parcels, as we find their apteft fcholars in idolatry, the Egyptians, did, who divided the heavens into feveral regions, which they called the ftations or manfions of their gods. The Egyptians worfhipped the heavenly bodies; and more efpecially the fun and moon, which they called their great gods, denominating the fun Ofiris, and the moon Ifis. They alfo found, or imagined that they found, in various animals, fome properties or qualities correfponding to the motions, appearances, or influences of the fun, moon, and fome of the ftars: hence they were induced not only to ufe thofe animals in their hieroglyphic reprefentations of their deities, but alfo to pay them divine honours. Thus by the *ram, aries*, a prolific animal, they reprefented the genial fertilizing warmth of the fun in the fpring, as they did his violent fcorching heat in the fummer, by the hot and furious beaft, the *lion*. The *bull* was regarded by them as another emblem of the various powers of the fun in forwarding the operations of agriculture, to which this animal is fubfervient; and hence were derived their *Apis* or *Mnevis*. The *goat* had divine honours paid him in fome parts of Egypt, as a reprefentative of the tendency of univerfal nature to propagate the feveral fpecies of beings; whence the Greeks took their image of *Pan*. *Virgo* was a reprefentation of their goddefs Ifis: the *Scorpion* was an emblem of the deftructive power of the malignant genius Typhon; the *triangle* was a picture of the land of Egypt, which is of this fhape; the *balance* was the hieroglyphic of juftice, and therefore *Libra* was thought to be a proper conftellation for that part of the heavens wherein the fun appears at one of the equinoxes, where he diftributes equal day and night to the whole earth: or, in its relation to the land of Egypt, it may intimate the equal diftribution of the Nile to the feveral parts of the country, by the genius of the waters; for the figure of this conftellation was among the Egyptians a man holding a pair of fcales. The Egyptians worfhipped *ferpents* and *fifhes*: and the *altar* is faid to have been an hieroglyphic of the land of Egypt. Many other fimilar inftances might be adduced, as moft of the animals and other figures that occur among our prefent conftellations were originally Egyptian. The Greeks, who learned aftronomy of the Egyptians, retained feveral of their figures, as the ram, the bull, the lion, the dog, the triangle, &c.; but accommodated almoft all of them to the fabulous hiftory of their gods and heroes, whom they thus placed among the ftars. Accordingly the Greek and alfo the Roman poets, from the ancient theology, have given us wild and romantic fables about the origin of the conftellations, probably derived from the hieroglyphics of the Egyptians, and tranfmitted, with fome alterations, from them to the Greeks; which may be feen in Hyginus's Poeticon Aftron. and Ricciolus's Almageft, lib. vi. cap. 3, 4, 5; and Sherburne's notes upon Manilius.

Sir Ifaac Newton obferves, (fee his Chronology, apud Oper. vol. v. p. 64.) that Mufæus, one of the Argonauts, was the firft among the Greeks who made a fphere; and the fphere itfelf, he fays, fhews that it was delineated in the time of the Argonautic expedition; for that expedition is delineated in the Afterifms. Thus we have the golden *Ram*, the enfign of the veffel in which Phryxus fled to Colchis; the *Bull* with brazen hoofs tamed by Jafon; and the twins, *Caftor* and *Pollux*, two of the Argonauts, with the *Swan* of Leda their mother. We have alfo the fhip *Argo*, and *Hydrus* the watchful dragon: with Medea's *cup*, and a *Raven* upon its carcafe, the fymbol of death. We have *Chiron* the mafter of Jafon, with his *altar* and *facrifice*; the Argonaut *Hercules* with his *dart* and *vulture* falling down, and the *Dragon*, *Crab*, and *Lion*, which he flew; and the *Harp* of the Argonaut Orpheus. All thefe, fays fir Ifaac, relate to the Argonauts. We have alfo *Orion*, the fon of Neptune, or, as fome fay, the grandfon of Minos, with his *Dogs*, and *Hare*, and *River*, and *Scorpion*. We have the ftory of Perfeus in the conftellations of *Perfeus*, *Andromeda*, *Cepheus*, *Caffiopea*, and *Cetus*; that of Callifto, and her fon Arcas, in *Urfa major* and *Arctophylax*; that of Icareus and his daughter Erigone in *Bootes*, *Plauftrum*, and *Virgo*. *Urfa minor* relates to one of the nurfes of Jupiter; *Auriga* to Erechthonius; *Ophiuchus* to Phorbas; *Sagittarius* to Crolus the fon of the nurfe of the Mufes; *Capricorn* to Pan; and *Aquarius* to Ganimede. We have Ariadne's *Crown*, Bellerophon's *Horfe*, Neptune's *Dolphin*, Ganimede's *Eagle*, Jupiter's *Goat*, with her *Kids*; Bacchus's *Affes*, the *Fifhes* of Venus and Cupid, and their parent the *South-fifh*. Thefe with *Deltoton* are the old conftellations mentioned by Aratus; and they all relate, fays Newton, to the Argonauts and their contemporaries, and to perfons one or two generations older; and nothing later than that expedition was delineated there originally. Antinous and Coma Berenices are novel. Although it be true, as fir Ifaac Newton affirms, that none of the figures on this fphere bear relation to any tranfaction of later date than the Argonautic expedition; yet the great difagreement that fubfifts among mythologifts in their accounts of thefe figures fhews them to be of greater antiquity, and that the conftellations were received for fome time among the Greeks, before their poets, according to their feveral fancies, applied them to different fables. See Long's Aftronomy, vol. i. p. 162.

As the ftars grouped in our conftellations are capable of being reduced to very different figures, thofe of the Chinefe and Japanefe are very different from ours; and fome fuperftitious Arabians, though they received their aftronomy from the Greeks, have given fome of their conftellations different figures; becaufe they thought it unlawful to draw any human figure; and therefore they changed all fuch on the celeftial globe into fome other form. Some Chriftian aftronomers, difpleafed to fee the heavens of the fixed ftars occupied by the fabulous heathen deities and heroes have propofed,

propofed, from fuperftitious zeal but without a due regard to the fcience of aftronomy, to introduce a reformation in this refpect; and whilft they retained the ancient figures, to refer them to fome fcripture hiftory. With this view they would have *Aries*, or the ram, to be a memorial of that which was offered inftead of Ifaac, *Virgo* to reprefent the bleffed Virgin, &c. Thus, venerable Bede, inftead of the profane names and figures of the twelve conftellations of the zodiac, fubftituted thofe of the twelve apoftles; whofe example being followed by Julius Schillerius, in 1627, he completed the reformation, and gave fcripture names to all the conftellations in the heavens. Thus, *Aries*, or the ram, became converted into St. Peter; *Taurus*, or the Bull, into St. Andrew; *Andromeda* into the fepulchre of Chrift; *Lyra* into the manger of Chrift; *Hercules* into the Magi coming from the Eaft; *Canis major* into David, &c. Weigelius, profeffor of mathematics in the univerfity of Jena, made a new order of conftellations; converting the firmament into a *cœlum heraldicum;* and introducing the arms of all the princes in Europe, by way of conftellations. Thus, *Urfa major*, he transformed into the elephant of the kingdom of Denmark; the *Swan* into the Ruta with fwords of the houfe of Saxony; *Ophiuchus* into the crofs of Cologne; the *Triangle* into the compaffes, which he calls the *fymbol of artificers;* and the *Pleiades* into the *Abacus Pythagoricus*, which he calls that of merchants, &c. However, the more intelligent among aftronomers never approved of innovation; as ferving no purpofe but to introduce confufion into aftronomy. The old conftellations, therefore, are ftill retained; both becaufe better could not be fubftituted, and likewife to keep up the greater correfpondence and uniformity between the old aftronomy and the new. See Catalogue.

CONSTERNATION is defined by ethical writers to be an excefs of horror, owing to the ill government of our *admiration* and *fear:* or fuch an immoderate degree of *fear* as confounds the faculties, and incapacitates a perfon for confultation and execution. It denotes a ftrong foreboding of tremendous evils, that are likely to follow misfortunes which have already taken place.

CONSTIPATION, in *Medicine*, is fynonymous with *coftivenefs*, and fignifies a retention of the ftools beyond the ufual period; which likewife implies, in general, a dry and hardened condition of the excrements, and fome difficulty in difcharging them.

The proximate caufe of conftipation of the bowels may confift in an unufual flownefs of the periftaltic motion, or in an obftruction to the paffage of the fæces, while the proper periftaltic motion continues to propel them. The natural motion of the bowels is confiderably different in individuals of different conftitutions, and even in the fame individuals at different periods: fo that it is not eafy to fay when the periftaltic motion can be confidered as preternaturally flow, while the general health continues good. But it is probable that a ftool fhould occur once in 24 hours, in moft habits, although there are many perfons who retain the fæces much longer without inconvenience. Dr. Cullen affirms, that he is clearly of opinion, that every deviation from a diurnal ftool is an approach to an unnatural ftate. The accumulation and induration of the fæces in the great inteftines not only often produces many difeafes in the lower part of the canal, but even occafions diforders in diftant organs, and deranges the fyftem in general.

The occafional caufes of an inefficient periftaltic motion are various. A weaknefs of the mufcular coat of the bowels appears to be, in fome cafes, the origin of coftivenefs, which is then accompanied with other marks of debility; hence coftivenefs is not unfrequent in the female fex, who fuffer confiderable inconveniences from it. A caufe of a contrary nature feems likewife to give rife to conftipation, namely, a rigour and rigidity of the alimentary canal. In fuch cafes there is neceffarily a degree of immobility or torpor, fo that the ftimulus of the paffing fæces excites the inteftines to lefs active motions, than in the more irritable habits; at the fame time digeftion is more perfectly performed, and a fmaller proportion of fæces therefore is produced: the abforption of the liquid parts too is more complete, and hence the fæces are not only fmaller, but drier, and pafs lefs eafily. In rigid and robuft perfons therefore habitual conftipation is not uncommon. And in thofe of hypochondriacal or melancholic habits, a fimilar torpor in the motions of the whole fyftem, and particularly of the inteftinal canal, produces a fimilar difpofition to coftivenefs. Another caufe of the flownefs of the periftaltic motion may be a deficiency of *bile* in the inteftines, which is confidered as one of the principal ftimuli in maintaining the motion of the canal downwards. It is not indeed always in our power to afcertain the occurrence of this circumftance; but we know that, where the bile is withheld from the inteftines, as in jaundice, there is commonly conftipation. It is not quite evident in what manner a regular and conftant exercife of geftation, as in a carriage or on the water, produces coftivenefs, rather than any confiderable bodily activity, which is accompanied by much perfpiration; Dr. Cullen is difpofed to attribute it to the abftraction of the other inteftinal fluids, fecreted from the mucous glands and exhalent arteries. See Materia Med. vol. ii. p. 496.

The caufes which may obftruct the paffage of the fæcal matter, occur either in the inteftines themfelves, or in the neighbouring parts. In the inteftines, a mechanical impediment is fometimes occafioned by a thickening of the coats, which ftraitens the paffage, or by fchirrous tumours, efpecially near the lower extremity of the canal. Sometimes the cavity of the inteftine is partly filled by calculous concretions. A temporary diminution of the calibre of the canal is alfo occafioned by fpafmodic contractions in the coats, as occurs in colic, or by the occurrence of inflammation, as in *enteritis*, and *dyfentery;* in all of which the fæcal matter is retained. Tumours in the neighbouring parts, compreffing the inteftines, neceffarily impede the paffage of the contained fæces. Hence obftinate conftipation has fometimes been occafioned by a fteatomatous tumour in the omentum; and a very frequent caufe of coftivenefs is the compreffion of the diftended uterus upon the rectum, or lower gut, in pregnant women.

When, from neglect of evacuation, or other circumftances, an accumulation of fæces to a confiderable extent takes place in the rectum, or lower inteftines, this collection of matter itfelf becomes a caufe of a moft painful and diftreffing conftipation, attended with peculiar fymptoms, and fometimes terminating fatally. This diforder was firft defcribed by an anonymous writer in the Medical Obfervations and Inquiries, vol. iv. p. 123, and other cafes have fince been recorded by other practioners. (See Duncan's Medical Commentaries, vol. x. p. 255, and vol. xiii. p. 282.) It is the more important to attend to this complaint, becaufe it affumes the appearance of a *diarrhœa*, or rather a chronic dyfentery, and has been often miftaken for the former, and erroneoufly treated with aftringents and opiates in confequence. The patient complains of fevere pain about the lower region of the belly, remitting and again returning after frequent, but fhort intervals, and accompanied with a perpetual bearing down, and almoft continual inclination to evacuate the contents of the inteftines; but only a trifling quantity

quantity of thin difcharge is expelled, fometimes mixed with fmall knobs of hardened excrement, or fcybala; after which the pain abates. A frefh fpafmodic effort fucceeds, and with fimilar fuccefs. It may be confidered as a kind of fpontaneous fpafm of all the parts in, or connected with, the pelvis, for the exclufion of this irritating fubftance. When, from a previous coftivenefs, from the acutenefs of the pain and *tenefmus* (or bearing down), and the obftruction of formed and feculent ftools, this ftate of the rectum is to be fufpected, the gut fhould be examined *per anum*, when the fæces will be readily detected in general, and muft be broken down and removed by the finger, or fome other mechanical means. The accumulation, which thus takes place, is fometimes very great. The following account from an apothecary, is given by Dr. Warren of Taunton:—"the evening you left us, I extracted from our patient (a lady, aged 64, who had laboured under this difeafe for five months,) four large balls of hardened excrementitious matter, about the fize of hen's eggs; the next morning fhe difcharged near twenty, and has continued to pafs more or lefs of them every day, until about a week ago, when fhe took a larger dofe than ordinary of caftor oil, which evacuated 18 lumps of the fame fize as formerly; fince that her ftools have been natural, none of the balls having appeared." See Duncan's Med. Com. vol. x. p. 259. This diforder is peculiar to perfons in advanced life, when a degree of atony often exifts in the bowels; and it is more frequently obferved in the female, than in the male fex. Whatever tends to leffen the periftaltic motion of the bowels, muft induce a predifpofition to it; and it is faid to have been frequently occafioned by a long continued ufe of bark, opium, and other aftringent medicines.

The confequences of a conftipated ftate of the bowels, however, though in a comparatively trivial degree, whether idiopathic, or as a concomitant of other difeafes, are frequently extremely injurious to the conftitution; producing, when it is idiopathic, a variety of diforders; and aggravating, when fymptomatic, the difeafes of which it is a fymptom.

The ftomach and inteftines, being a continuation of the fame canal, reciprocally affect each other, when difordered. Hence, complaints of the ftomach are frequent confequences of coftivenefs of the bowels; fuch as flatulence, ftomach colic, or gaftrodynia, heart-burn, indigeftion, &c. Another affection of the canal is frequently produced by conftipation, namely, the appearance of hæmorrhoidal tumours, or piles, at the lower extremity of the rectum, about the anus. See Hæmorrhois. Sometimes from a fympathy of the head with the ftomach, and fometimes probably from the preffure of the loaded inteftines on the great veffels, impeding the circulation of the blood downwards, and therefore determining it more copioufly towards the head, a pain of the head is excited by a conftipated condition of the bowels. This head-ache is various in different inftances, but moft commonly is confined to the forehead, or to the *occiput*, or nape of the neck: occafionally the hemicrania, or intermitting head-ache, appears to arife from conftipation. In thofe whofe habits predifpofe them to apoplectic, paralytic, or lethargic attacks, a loaded ftate of the bowels, by obftructing the circulation downwards, increafes the predifpofition, and occafionally even becomes the exciting caufe of thofe difeafes.

There are, befides, many diforders both acute and chronic, which, although they cannot be faid to be produced by conftipation of the bowels, are neverthelefs greatly aggravated by it; and the conftipation is frequently a leading fymptom of thefe diforders. Thus in all acute febrile complaints, and particularly in idiopathic and eruptive fevers, fuch as the fynochus, or fummer-fever, typhus, fcarlet-fever, fmall-pox, &c. conftipation is liable to occur, and when occurring at any period of the fever, tends to aggravate its fymptoms, and to prolong its duration: and if, on the contrary, the bowels are freely opened in the commencement of thefe diforders, their feverity is mitigated, and their duration frequently abridged. This is more efpecially the cafe in fynochus and typhus, and in the febrile complaints of children. In a certain fet of chronic difeafes, which have heretofore been confidered as unconnected with the condition of the bowels, fuch as many hyfterical affections, chlorofis, and particularly chorea, or St. Vitus's dance, conftipation has lately been fhewn to be a fource of much mifchief, if not frequently the exciting caufe. (Hamilton on Purgatives.) See Chorea, and Cathartics. In fhort, a conftipated ftate of the bowels is at all times liable to produce injurious effects on the conftitution: in health it is a common exciting caufe of various complaints; and in all ftates of difeafes, whether acute or chronic, it tends to aggravate the fymptoms, and to prevent the beneficial operation of remedies.

The mode of obviating conftipation muft be varied, according to the nature of the caufe, and the conftitution of the patient. Where it is flight and accidental, any of the milder cathartics, fuch as magnefia vitriolata, or Epfom falt, caftor oil, (oleum ricini,) rhubarb, or fmall dofes of calomel, will generally anfwer the purpofe of removing it: if thefe fail, the more active purgatives muft be reforted to, efpecially in ftrong habits, fuch as jalap, aloes, extract of colocynth, calomel in larger dofes, and combined with fome of the preceding fubftances. Calomel, or the other mild mercurial preparations, appear to be peculiarly ufeful, when the conftipation is occafioned by a torpor of the hepatic fyftem, and a confequent deficiency, or morbid change in the quality of the bile, as they appear to ftimulate more particularly the biliary ducts and veffels. The colour and fœtor of the ftools fhould be noticed with care, fince the quality and condition of the bile, which is the principal colouring matter of the fæces, may be thus moft eafily afcertained. In acute difeafes this obfervation is more peculiarly important, as the fenfible qualities of the fæces frequently indicate a loaded and morbid condition of the alimentary canal, and the neceffity of laxatives, when the number of motions does not appear to require fuch evacuation. See Hamilton; alfo Abernethy, Surgical Obfervations, vol. ii.

When conftipation is habitual, fome gently ftimulating or cooling laxative, according to circumftances, may be required to be given daily, until the habit be removed. Much may be done for the relief of this by diet; as by eating a large proportion of vegetables, or by the free ufe of fruits, even thofe which are dried, or preferved with fugar; and by avoiding fuch articles as manifeftly tend to conftringe the body. And the advice of Mr. Locke fhould be fteadily followed; *i. e.* the patient fhould go regularly to ftool at the fame hour daily: for fuch is the periodical regularity of all the functions of the body, that they are more perfectly performed at the accuftomed hours than at any other period. Thus fleep, and the appetite for food, often forfake us altogether, if we delay the gratification beyond the ufual hour.

In ftates of extreme conftipation it is very common among the vulgar to refort to a medicine which appears to have been firft employed from the moft abfurd and falfe notions of its powers, namely, crude mercury, or quickfilver. Whether it may have been fuppofed to open the bowels by fome felf-

moving power, or by its mechanical weight, the theory is equally abfurd: and what is worfe, the practice is not only ufelefs, but dangerous. There are cafes on record, in which the quickfilver, thus adminiftered, had accumulated in the inteftines, formed itfelf a fac by its weight, and at length produced death, by paffing into the cavity of the abdomen, in confequence of the rupture of this fac. It is obvious, indeed, that the medicine could not ever force a paffage by its weight, along the courfe of the bowels, fince it muft afcend occafionally, if the body is erect; and the whole paffage muft be nearly horizontal, if the patient be in a recumbent pofture.

In the worft degrees of conftipation, glyfters confifting of an infufion of tobacco, or the fmoke of tobacco, have been thrown into the bowels with advantage. And when all other expedients have failed, the affufion of cold water on the lower extremities while the patient is placed with his feet on a cold hearth, has been found to excite the propulfion of the fæces. See Colic. A glyfter confifting of Venice turpentine, fufpended in water by means of mucilage, or the yolk of an egg, was a favourite remedy with Dr. Cullen for fevere conftipation; and it is undoubtedly an efficacious expedient; more efpecially if adminiftered a few hours after an active cathartic has been taken internally.

Where the conftipation is occafioned by a mechanical obftruction, it can of courfe be alleviated only by the removal of the obftruction. If it arifes from the prefence of tumours or concretions external to the bowels, it may be confidered as incurable; and can only be alleviated by keeping the bowels lax, and the fæces in as liquid a ftate as poffible. Strictures of the lower inteftine have been frequently relieved by the introduction of a bougie, mechanically enlarging the paffage. An intelligent writer remarks, that "ftrictures take place in different fituations; but they occur fo frequently about the figmoid flexure of the colon, near its termination in the rectum, that this part fhould be carefully examined in every cafe of a total obftruction of the bowels." The infertion of an unyielding tallow candle, though often practifed, has been generally found painful and inefficacious. It is requifite for the purpofe to employ a bougie thirteen inches long, and of a proportionate ftrength; which fhould alfo be directed, with a nice hand, by a fkilful furgeon. "I lately faw a lady," he adds, "thus relieved, who had been twenty-fix days without any evacuation from the bowels, and who feemed nearly exhaufted by violence of pain, and diftenfion of the abdomen, hiccough, cold fweat, &c. It is remarkable how long patients fubfift under thefe diftreffing circumftances. In one inftance the time was twenty-nine days; in another patient thirty-three days. As the latter recovered after enduring every torture fuch a diforder could inflict, practitioners may be encouraged to perfevere fteadily in their attentions, and to retain fome hopes even in the greateft extremity." Willan on Difeafes in London, page 185.

CONSTITUENT Parts, in *Chemiftry*. The conftituent parts of bodies are their diffimilar parts, or principles, into which they may be refolved, by the rules of that art. They are thus called in diftinction from the integrant parts of bodies, which are parts of the fame nature and properties with the bodies themfelves. Thus quickfilver, diffolved by aqua fortis, may be feparated from the diluted menftruum, by means of a copper plate, in its own form; this therefore was only divided into its integrant parts; but cinnabar refolved by chemiftry into fulphur and mercury, is divided into its conftituent parts, neither of thefe, nor any particle of them, being cinnabar, or having its properties. Shaw's Lectures, p. 15.

CONSTITUTION, an eftablifhment, ordinance, decifion, regulation, or law, made by authority of a prince, or other fuperior, ecclefiaftical or civil.

The conftitutions of the Roman emperors make a part of the civil law. The conftitutions of the church make a part of the canon law. Some of the papal conftitutions are in form of *bulls*, others of *briefs*. See each article.

Constitutions *of Clarendon*. See Clarendon.

Constitutions, *Clementine*. See Canon *Law*.

Constitutions, *Legatine*, were ecclefiaftical laws enacted in national fynods, held under the cardinals Otho and Othobon, legates from pope Gregory IX. and pope Clement IV., in the reign of Henry III., about the years 1237 and 1268.

Cardinal Otho arrived in England, as a legate from the pope, in the year 1237, where he continued about three years, receiving many valuable prefents from the bifhops, monafteries, and clergy. This legate held a council at London, A. D. 1237, in which a great number of canons were framed, which were called "the Conftitutions of Otho." Thefe conftitutions do not contain many things new or remarkable. By the fecond canon, the facraments are declared to be feven in number; the fifteenth is againft the clandeftine marriages of the clergy; and the fixteenth againft their keeping concubines publicly: both which practices were ftill very frequent in England. This legate convened two other affemblies of the clergy, with no other view but to make exorbitant demands of money. After the reftoration of the royal authority, by the victory of Evefham, the pope fent his legate Othobon into England, who held a national council, A. D. 1268, at St. Paul's in London. In this council many canons were made, much the fame in fubftance with thofe of the former council of London, in 1237, under the legate Otho.

Constitutions, *Provincial*, are principally the decrees of provincial fynods, held under feveral archbifhops of Canterbury, from Stephen Langton, in the reign of Henry III. to Henry Chicheley, in the reign of Henry V., and adopted alfo by the province of York in 1463, under Henry VI.

Constitutions *of* 1603. See Canon *Law*.

Constitutions, *Apoftolical*, in *Ecclefiaftical Hiftory*, denote a collection of regulations attributed to the apoftles, and fuppofed to have been collected by St. Clement, whofe name they likewife bear.

Thefe are divided into eight books; confifting of a great number of rules and precepts, relating to the duties of Chriftians, and particularly to the ceremonies and difcipline of the church.

Mr. Robert Turner, in his "Difcourfe of the pretended Apoftolical Conftitutions," maintains, that thefe eight books feem to have been made out of feveral doctrines, conftitutions, canons, travels, and traditions, afcribed to the apoftles, and out of fome of the ancient liturgies, and the difcipline and practice of the Greek church, only blended together, adulterated, and changed, by fome ignorant Arian, in the fifth century. Bifhop Pearfon was of opinion, that the Apoftolical Conftitutions were formed out of feveral leffer works, called Doctrines and Conftitutions, faid to be written by Clement, Ignatius, Hippolytus, and others, but altered and interpolated by the author of this collection; and that the eight books of the Conftitutions, as we now have them, were not compofed and finifhed till after the time of Epiphanius.

Authors, however, are divided about the genuinenefs of thefe Conftitutions: the generality hold them fpurious, and endeavour to prove them pofterior to the apoftolic age; maintaining they were unknown till the fourth century: which,

which, if this be the fact, fhews, that St. Clement had no concern in them. It is certain, that no fuch book is quoted as Scripture by any Chriftian writer of the three firft centuries. The firft who cites a work under this title is Epiphanius, and yet he fpeaks of it as of doubtful authority; and fome modern writers are of opinion, that the Conftitutions quoted by Epiphanius were different from the prefent Conftitutions. When he fays, that it was "doubted by many," he himfelf intimates, that fome fufpected it to be the work of fome heretic; in oppofition to which he fays, it ought not to be rejected, as, from its contents, it appeared to be the work of fome honeft, orthodox, or Catholic Chriftian.

It is not eafy to fay, what refpect Epiphanius himfelf had for this work. He quotes things from it as ordinances of the apoftles, and as the divine word or doctrine; but it is not mentioned in any of the paffages, where he gives the catalogues of the books of Scripture. Befides, his expreffions juft taken notice of feem to imply no more, than that the book was an ecclefiaftical or orthodox writing; and we may obferve farther, either that his Conftitutions were not the fame as ours, or that he had no great regard for them. For in our Conftitutions, feveral early heretics are named, and they are condemned and confuted; of which paffages, neverthelefs, Epiphanius has made no ufe in his hiftory of thofe heretics, or in his arguments againft them: which every one muft think he would have done, if the Conftitutions which we have had been then in being, and had been efteemed by him as of authority. Whatever might be his opinion concerning this work, we have no good reafon for fuppofing that it was a book of facred Scripture; becaufe no fuch book is quoted as Scripture by Irenæus, Clement of Alexandria, Origen, Cyprian, Eufebius, or any other Chriftian writer of the firft three centuries. It is more than probable that the eight books, as we have them, were not compofed and finifhed till after the time of Epiphanius, towards the middle, or before the end, of the fifth century. Cotelerius (Ap. Patr. Apoft. t. I.) fays, it is certain, that the work of the Apoftolical Conftitutions, in eight books, is apocryphal and pfeudepigraphal, not compofed by the apoftles, nor by the apoftolic Clement. Tillemont concurs in opinion with Cotelerius. Daillé thinks, that the Conftitutions were compofed after the council of Nice, and before the end of the fifth century; and bifhop Pearfon fuppofes, that the eight books of the Conftitutions, as we now have them, were not compofed and finifhed till after the time of Epiphanius. Le Clerc mentions fome things in the Conftitutions exceedingly unfuitable to the character of the apoftles of Chrift, and fays, that they well reprefent the ecclefiaftical difcipline of the fourth century, but not of earlier times. He thinks, they were compofed by fome Arian of the fourth century; and feems to imagine, there may be fome probability in the conjecture of another learned man, *viz*. Thomas Bruno or Brown, that they are the work of Leontius, bifhop of Tripoli in Lydia.

Mr. Whifton has ventured to oppofe the general opinion: and with fome reafon, much learning, and more warmth, afferted the Apoftolical Conftitutions to be one of the facred writings, dictated by the apoftles in their meetings, written down from their mouths by St. Clement, and intended as a fupplement to the New Teftament; or, rather, as a fcheme and fyftem of Chriftian faith and polity. See his Effay on the "Apoftolical Conftitutions," and his hiftorical preface; wherein the feveral fteps he made in his fancied difcovery are traced.

Dr. Lardner, after citing feveral opinions of learned men concerning this work, offers his own fentiments in his ufual judicious and impartial manner. In his inveftigation of its contents and authority, he obferves, that the whole of the work, and all the ordinances in it, from beginning to end, are delivered in the name of all Chrift's apoftles, and as from God himfelf; and moreover, that they affume not only the names of the apoftles, but alfo their characters and actions. Hence, according to the whole tenor of the work, they are rightly termed "Apoftolical." Dr. Lardner next proceeds to inquire, both from external teftimony and internal evidence, how far the authority claimed by thefe conftitutions, and by the advocates of their antiquity, is well founded. To this purpofe he obferves, that Daillé, after having examined all the feveral ecclefiaftical writers of the firft three centuries, Barnabas, Clement of Rome, Juftin Martyr, Athenagoras, Irenæus, Clement of Alexandria, Tertullian, Origen, Cyprian, Dionyfius, Peter of Alexandria, and fome others, has fhewn, with great probability, that the conftitutions were unknown to all thefe writers. In this opinion Mr. Turner, already cited, concurs. Moreover, the conftitutions contain a long hiftory of Simon Magus, and an account of divers other heretics, fuch as Cleobius, Dofitheus, the Ebionites, Cerinthus, Marc, Menander, Bafilides, Saturninus, the Nicolaitans, and Hemerobaptifts. The evil of herefies is fhewn; the caufes of them are afcertained and enumerated; they are condemned and confuted. Neverthelefs, no notice is taken of all this by Irenæus, Tertullian, Clement of Alexandria, or Eufebius; nor even by Epiphanius; though it would have been much more to their purpofe. In fhort, fays Dr. Lardner, they could not have omitted it in their cenfures of the ancient herefies, or in their arguments againft them, if they had been acquainted with it; for, certainly, the exprefs authority of the apoftles would have been of great advantage to them. As to Clement of Alexandria, though he quotes Clement of Rome, Barnabas, and other Chriftian authors, and had many occafions for quoting the conftitutions, if he had been acquainted with them, yet he does not take the leaft notice of them. Befides, the conftitutions abfolutely forbid the reading of heathen authors; neverthelefs, the fore-mentioned Clement, who was himfelf a man of extenfive reading, and a great mafter of heathen learning, frequently cites in his works all forts of authors, and has recommended the reading of heathen authors, and the ftudy of philofophy; which he would not have done, if he had been acquainted with thefe conftitutions, and had acknowledged them to be apoftolical. Tertullian, Origen, and many more juftify and recommend the reading of heathen compofitions, which could not have been the cafe, if in doing this they would have violated an apoftolical conftitution. If, indeed, there had been a conftitution of the Chriftian church, which forbade the reading of fuch books, the emperor Julian would have had no occafion to make the fame prohibition. In the third century a difpute occurred about baptifm; in which Cyprian and the African bifhops maintained againft Stephen bifhop of Rome, that the baptifm of heretics was null and void, and therefore that thofe who came over from them were to be re baptized; this controverfy is decided in the conftitutions agreeably to the judgment of Cyprian and his colleagues; and yet it was not appealed to at that time, becaufe, probably, it was not then extant. Dionyfius, who was bifhop of Alexandria about the year 248, appears to have been altogether unacquainted with our apoftolical conftitutions. When a controverfy occurred about the time of keeping Eafter, which commenced in the fecond century, and lafted till the fitting of the council of Nice, no appeal was made to the conftitutions, which would have ferved to decide the difpute, if they had actually exifted or had been received as apoftolical. If an appeal be made to the writers of the fourth and the former part of the fifth century, fuch as Gregory Nazianzen, Bafil, Chryfoftom,

tom, the Cyrils of Jerufalem and Alexandria, Jerom, Auguftine, &c.; they give us no intelligence concerning the apoftolical conftitutions; having neither cited nor mentioned them in any of their writings. The firft (Epiphanius excepted) who has mentioned them, as divided into feveral books, is the author of the imperfect work upon St. Matthew, probably a Latin writer, and plainly an Arian, who wrote fome time after the reign of Theodofius the Great; probably not till after the end of the fifth century. Upon the whole, the conftitutions are deftitute of all external evidence, that fhould entitle them to the character of apoftolical. As to the internal evidence, they evidently bear many marks of a later age than that of the apoftles, and unfuitable to their character. Their manner of quoting the books of the New Teftament does not fuit the apoftles, of which Dr. Lardner has given feveral inftances; many things occur in thefe books, that refer to a later period than that of the apoftles: *e. g.* they mention feveral heretics, as we have already obferved, that did not appear before the end of the apoftolical age; they alfo record various circumftances, which feem to fhew, that the reign of heathenifm in the Roman empire had terminated, and that Chriftians enjoyed eafe and profperity; and they write in a ftyle, make ufe of terms and appellations, and refer to practices and obfervances, and offices of the church, which did not obtain till a much later period than the age of the apoftles. Several things in the conftitutions appear to be unworthy of the apoftles of Chrift; of which numerous inftances are cited by Dr. Lardner, and alfo by Dr. Jortin, *ubi infra.* Moreover, this work is not free from inconfiftencies, which are a difparagement to any writings, and they ufe a mode of expreffion that betrays a later time than is pretended. From a recital and ample illuftration of the feveral particulars, above curforily mentioned, by the two learned writers already named, and of others which our limits will not allow us to introduce, we may juftly conclude, that the conftitutions, in eight books, are not a work of the apoftles, and fince they bear their names without fufficient authority, they muft be referred to the clafs of impoftures. Although the exact time when this work was compiled, cannot be determined, and learned men have offered various conjectures, Dr. Lardner inclines to the opinion of thofe, who think that it was compofed in the latter part of the fourth, or the beginning of the fifth century. "The author," probably, fays Dr. Lardner, "was a bifhop of a proud and haughty fpirit, who was fond of church-power, and loved pomp and ceremony in religious worfhip." To this purpofe Dr. Jortin fays, that the conftitutions repeatedly affert, "that a bifhop is a God, a God upon earth, and a king, and infinitely fuperior to a king, and ruling over rulers and kings. They command Chriftians to give him tribute as to a king, and to reverence him as a God, and to pay him tithes and firft-fruits, according, fay they, to God's command; and they ftrictly forbid Chriftians to make any inquiry, and to take any notice, whether he difpofe of thefe revenues well or ill." Sentiments thefe which feem to have been dictated at a time when there were Chriftian emperors.

Many learned moderns, fays Dr. Lardner, "think the author was an Arian; but I do not concern myfelf about that: the paffages, which have been fuppofed to favour Arianifm, make a very fmall, or no part of the preceding collections; I have no reafon, therefore, to bring that point into the conclufion. But I prefume, that none ever fufpected the author to be a Homoüfian." The author of this work, whoever he was, bears teftimony to the fcriptures; and appears to have received all thofe books of the New Teftament, which were all along generally received by Chriftians. Lardner's works, vol. iv. part 2. ch. 85. p. 320—354. Jortin's Remarks on E. H. vol. i. p. 228—278.

Constitution, in a *Phyfical Senfe*, is ufed to denote the general condition of the body, as evinced by the peculiarities in the performance of its functions: fuch are, the peculiar pre-difpofition to certain difeafes, or liability of particular organs to difeafe: the varieties in digeftion, in mufcular power and motion, in fleep, in the appetites, &c. &c. Some marked peculiarities of conftitution are obferved to be accompanied with certain external characters, fuch as a particular colour and texture of the fkin, and of the hair, and alfo with a peculiarity of form and difpofition of mind; all of which have been obferved from the earlieft times, and divided into claffes, which have received names, during the prevalence of the humoral pathology, which they ftill retain, in confequence of the neglect of this important ftudy by modern phyficians. See Temperament.

Constitution, in *Political Economy*, is frequently ufed in common language as fynonymous with government; but the conftitution and the government of a country have different meanings, and are actually diftinguifhed by accurate writers. "By conftitution we mean," fays lord Bolingbroke, in his "Differtation on Parties" (Works, vol. ii. p. 130.), "whenever we fpeak with propriety and exactnefs, that affemblage of laws, inftitutions, and cuftoms, derived from certain fixed principles of reafon, directed to certain fixed objects of public good, that compofe the general fyftem, according to which the community hath agreed to be governed. Whereas by government we mean, whenever we fpeak in the fame manner, that particular tenor of conduct which a chief magiftrate, and inferior magiftrates under his direction and influence, hold in the direction of public affairs." (See Government.) Conftitution, fays the fame writer, in reference to our own country, is the rule by which our princes ought to govern at all times: government is that by which they actually do govern at any particular time. One may remain immutable; the other may, and as human nature is conftituted, muft vary. One is the criterion by which we are to try the other; for furely we have a right to do fo, fince, if we are to live in fubjection to the government of our kings, our kings are to govern in fubjection to the conftitution; and the conformity or non-conformity of their government to it prefcribes the meafure of our fubmiffion to them, according to the principles of the revolution, and of our prefent fettlement, in both of which, though fome remote regard was had to blood, yet the prefervation of the conftitution manifeftly determined the community to the choice then made of the perfons who fhould govern. In order further to evince the difference between the conftitution and the government of a country, lord Bolingbroke obferves that "kings may have preceded lawgivers, for ought I know, or have poffibly been the firft lawgivers, and government by will have been eftablifhed before government by conftitution. Thefeus might reign at Athens, and Eurytion at Sparta, long before Solon gave laws to one, and Lycurgus to the other of thefe cities. Kings had governed Rome, we know, and confuls had preceded kings, long before the decemviri compiled a body of law; and the Saxons had their monarchs before Edgar, though the Saxon laws went under his name." Thefe examples plainly prove, "that however men might fubmit voluntarily in the primitive fimplicity of early ages, or be fubjected by conqueft to a government without a conftitution, yet they were never long in difcovering, that (as Hooker obferves, Ecclef. Pol. l. 1. § 10.) "to live by one man's will became the caufe of all men's mifery;" and therefore "they foon rejected the yoke, or

or made it fit eafy on their necks." By the *conftitution* of a country, fays archdeacon Paley (Princ. of Moral and Political Philof. vol. ii. chap. 7.), is meant fo much of its law, as relates to the defignation and form of the legiflature; the rights and functions of the feveral parts of the legiflative body; the conftruction, office, and jurifdiction of courts of juftice. Accordingly, the conftitution is one principal divifion, fection, or title of the code of public laws; diftinguifhed from the reft only by the fuperior importance of the fubject of which it treats: and therefore the terms *conftitutional* and *unconftitutional*, mean legal and illegal. In England the fyftem of public jurifprudence is made up of acts of parliament, of decifions of courts of law, and of immemorial ufages; confequently, thefe are the principles of which the Englifh conftitution itfelf confifts; the fources from which all our knowledge of its nature and limitations is to be deduced, and the authorities to which all appeal ought to be made, and by which every conftitutional doubt and queftion can alone be decided. This plain and intelligible definition will ferve to difcover the error of thofe writers who abfurdly confound what is conftitutional with what is expedient, and what is unconftitutional with any meafure which they adjudge in any refpect to be detrimental or dangerous; and alfo of others, who afcribe a kind of tranfcendent authority, or myfterious fanctity, to the conftitution, as if it were founded in fome higher original than that which gives force and obligation to the ordinary laws and ftatutes of the realm, or were inviolable on any other account than its intrinfic utility. An act of parliament, in England, can never be unconftitutional, in the ftrict and proper acceptation of the term; but in a lower fenfe it may, *viz.* when it militates with the fpirit, contradicts the analogy, or defeats the provifion of other laws, made to regulate the form of government. Moft of thofe, fays our author, who treat of the Britifh conftitution, confider it as a fcheme of government formerly planned and contrived by our anceftors, in fome certain era of our national hiftory, and as fet up in purfuance of fuch regular plan and defign. This is intimated in the expreffions of thofe who fpeak of the "principles of the conftitution," of bringing back the conftitution to its "firft principles," of reftoring it to its "original purity," or "primitive model." This, in his opinion, is an erroneous conception of the fubject. No fuch plan was ever formed; confequently no fuch firft principles, original model, or ftandard exift; that is, as he conceives, there never was a date, or point of time in our hiftory, when the government of England was to be fet up anew, and when it was referred to any fingle perfon, or affembly, or committee, to frame a charter for the future government of the country; or when a conftitution, fo prepared and digefted, was by common confent received and eftablifhed. The great charter, and the bill of rights, were wife and ftrenuous efforts to obtain fecurity againft certain abufes of regal power, by which the fubject had been formerly aggrieved; but thefe were, either of them, much too partial modifications of the conftitution to give it a new original. The conftitution of England, like that of moft countries in Europe, hath grown out of occafion and emergency; from the fluctuating policy of different ages; from the contentions, fucceffes, interefts, and opportunities of different orders and parties of men in the community. It refembles one of thofe old manfions, which, inftead of being built all at once, after a regular plan, and according to the rules of architecture, at prefent eftablifhed, has been reared in different ages of the art, has been altered from time to time, and has been continually receiving additions and repairs fuited to the tafte, fortune, or conveniency of its fucceffive proprietors; to fuch a building we look in vain for the elegance and proportion, for the juft order and correfpondence of parts, which we expect in a modern edifice; and which external fymmetry, after all, contributes much more perhaps to the amufement of the beholder, than the accommodation of the inhabitant.

Some of our approved hiftorians, and political writers, have difcovered, as they conceive, the origin of the Britifh conftitution in the government of the Anglo-Saxons, brought hither from Germany and the northern countries. To this purpofe, it is alleged, that the government of the northern nations, which eftablifhed themfelves on the ruins of Rome, was always extremely free; and that the free conftitutions then introduced, however impaired by the encroachments of preceding princes, ftill preferve an air of independence and legal adminiftration, which diftinguifh the European nations; and if this part of the globe maintains fentiments of liberty, honour, equity, and valour, fuperior to the reft of mankind, it is faid to have owed thefe advantages chiefly to the feeds implanted by the generous barbarians of the north. The Saxons who fubdued Britain in the 5th century, as they enjoyed great liberty in their own country, obftinately retained that invaluable poffeffion in their new fettlement; and they imported into this ifland the fame principles of independence, which they had inherited from their anceftors. The chieftains, (for fuch they were, more properly than kings or princes,) who commanded them in their military expeditions, ftill poffeffed a very limited authority; and as the Saxons exterminated, rather than fubdued, the ancient inhabitants; they were indeed tranfplanted into a new territory, but preferved, without alteration, all their civil and military inftitutions. Their manners and cuftoms were wholly German; and the fame picture of a fierce and bold liberty, which is drawn by the mafterly pencil of Tacitus, will fuit thofe founders of the Englifh government. The king, fo far from being invefted with arbitrary power, was only confidered as the firft among the citizens; and his authority depended more on his perfonal qualities, than on his ftation. The Anglo-Saxons, being an independent people, little reftrained by law, and cultivated by fcience, were not very ftrict in maintaining a regular fucceffion of their princes. Although they paid great regard to the royal family, and afcribed to it an undifputed fuperiority, they either had no rule, or none that was fteadily obferved, in filling the vacant throne; and prefent convenience, in that emergency, was more attended to than general principles. We are not, however, to fuppofe, that the crown was confidered as altogether elective; and that a regular plan was traced by the conftitution for fupplying, by the fuffrages of the people, every vacancy made by the demife of the firft magiftrate. All the changes which occurred in the royal fucceffion, and indeed the ordinary adminiftration of government, required the exprefs concurrence, or at leaft the tacit acquiefcence of the people. The Anglo-Saxon monarchies were not, ftrictly fpeaking, either elective or hereditary; and though the deftination of a prince might often be followed in appointing his fucceffor, they could not be regarded as wholly teftamentary. The ftates by their fuffrage might fometimes eftablifh a fovereign; but they more frequently recognized the perfon whom they found eftablifhed. Our knowledge of the Anglo-Saxon hiftory is fo imperfect, that it is not eafy to afcertain all the prerogatives of the crown and privileges of the people, or to give an exact delineation of that government. It is probable, that the conftitution might be fomewhat different in the different kingdoms of the HEPTARCHY, and that it changed confiderably during the courfe of fix centuries, which elapfed from the firft invafion of the Saxons, till the Norman conqueft. It appears, however, that at all times,

times, and in all the kingdoms, there was a national council, called a *wittenagemot*, or aſſembly of the wiſe men, as the term imports, whoſe conſent was requiſite for enacting laws, and for ratifying the chief acts of public adminiſtration. The preambles to all the laws of Ethelbert, Ina, Alfred, Edward the Elder, Athelſtan, Edmund, Edgar, Ethelred, and Edward the Confeſſor; even thoſe to the laws of Canute, though a kind of conqueror, ſupply unqueſtionable proofs every where of a limited and legal government. But who were the conſtituent members of this wittenagemot, is a queſtion that has not been determined with certainty by antiquarians. (See WITTENAGEMOT.) Nevertheleſs, it is certain, that whatever we may determine concerning the wittenagemot, in whom, with the king, the legiſlature reſided, the Anglo-Saxon government, in the period preceding the Norman conqueſt, was become extremely ariſtocratical; the royal authority was very limited; and the people, even if admitted to that aſſembly, were deemed of little or no importance and conſideration. Upon the whole, notwithſtanding the ſeeming liberty, or rather licentiouſneſs, of the Anglo-Saxons, the great body even of the free citizens, in thoſe ages, really enjoyed much leſs true liberty, than where the execution of the laws is the moſt ſevere, and where ſubjects are reduced to the ſtricteſt ſubordination and dependence on the civil magiſtrate. But though the general ſtrain of the Anglo-Saxon government ſeems to have become ariſtocratical, there were ſtill conſiderable remains of the ancient democracy, which, though inſufficient to protect the loweſt of the people, without the patronage of ſome great lord, might nevertheleſs give ſecurity, and ſome degree of dignity, to the gentry or inferior nobility. The adminiſtration of juſtice, in particular, by the courts of the decennary, the hundred, and the county, was well calculated to defend general liberty, and to reſtrain the power of the nobles. The county courts, in particular, where all the freeholders were admitted, formed a wide baſis for the government, and furniſhed conſiderable checks on the ariſtocracy. However, the great influence of the lords over their ſlaves and tenants, the clientſhip of the burghers, the total want of a middle claſs of men, the extent of the monarchy, the looſe execution of the laws, and the continued diſorders and convulſions of the ſtate, ſufficiently evince, that the Anglo-Saxon government became at laſt extremely ariſtocratical; and the events, during the period immediately preceding the conqueſt, confirm this inference or conjecture. If we direct our views to a period much more ancient than that of the eſtabliſhment of the Anglo-Saxon government, and prior to the invaſion of the Romans, we ſhall find that the governments of the Britons, who were divided into many ſmall nations or tribes, though monarchical, were free, as well as thoſe of all the Celtic nations; and the common people ſeem to have enjoyed more liberty among them, than among the nations of Gaul, from whom they were deſcended.

Other writers have maintained, that the government, eſtabliſhed by the Anglo-Saxon princes, had little more affinity with the preſent conſtitution, than the general relation common indeed to all the governments founded by the northern nations, that of having a king and a body of nobility; and the ancient Saxon government is ſaid to be "left us in ſtory," (according to the ſtatement of ſir William Temple—Int. to the Hiſt. of England,) but like to many antique, broken, or defaced pictures, which may ſtill repreſent ſomething of the coſtume and faſhions of thoſe ages, though little of the true lines, proportions, or reſemblance." According to theſe writers, it is at the era of the conqueſt, that we are to look for the real foundation of the Engliſh conſtitution. From that period, ſays Spelman, "novus ſeclorum naſcitur ordo." William of Normandy, it is ſaid, having defeated Harold, and made himſelf maſter of the crown, ſubdued the ancient fabric of the Saxon legiſlation; he exterminated, or expelled, the former occupiers of lands, in order to diſtribute their poſſeſſions among his followers, and eſtabliſhed the feudal ſyſtem of government, as better adapted to his ſituation, and indeed the only one of which he poſſeſſed a competent idea. A diſtinction, however, ought to be made between the *government* of William I., which was very tyrannical, and the *conſtitution* eſtabliſhed under him in this kingdom, which was no abſolute monarchy, but an ingraftment of the feudal tenures and other cuſtoms of Normandy upon the ancient Saxon laws of Edward the Confeſſor. He more than once ſwore to maintain thoſe laws, and in the 4th year of his reign, confirmed them in parliament; yet not without great alterations, to which the whole legiſlature agreed, by a more complete introduction of the ſtrict feudal law, as it was practiſed in Normandy.

But that the liberty of the ſubject was not deſtroyed by theſe alterations to the degree which ſome writers have ſuppoſed, plainly appears, ſays lord Lyttelton, (Hiſt. Henry II. vol. i. p. 59.) by the very ſtatutes which William enacted; in one of which we find an expreſs declaration, "that all the freemen in his kingdom ſhould hold and enjoy their lands and poſſeſſions free from all unjuſt exactions and from all tallage; ſo that nothing ſhould be exacted or taken of them but their free ſervice, which they by right owed to the crown, and were bound to perform." It is further ſaid, "that this was ordained and granted to them as an hereditary right for ever, *by the common council of the kingdom;* which very remarkable ſtatute is juſtly ſtyled by a learned author (Nathanael Bacon) *the firſt Magna Charta of the Normans:* and it extended no leſs to the Engliſh than to the Normans. But it was ill obſerved by William, who frequently acted as if his will had been the only law to both nations. It muſt be alſo allowed, that by the interpoſition of many *Meſne Lords* between the crown and the people, and by many offices of judicature and military command being rendered hereditary, which under the Saxons had been either elective, or granted for a ſhort time, the conſtitution became more ariſtocratical than before, more unequally balanced, and, in ſome reſpects, more oppreſſive to the inferior orders of freemen. Nor was the condition of the nobles themſelves to be envied. For there were certain burthens annexed to their ſyſtem of fiefs, which, as they naturally grew out of that policy, were impoſed on the higheſt vaſſals as well as on the loweſt, and were more grievous than any which the Saxons had borne under their conſtitution. In proceſs of time the exceſſive power arrogated and exerciſed by the king contributed to eſtabliſh and guard the freedom of the Britiſh conſtitution; becauſe this exceſs gave riſe to the ſpirit of union and of concerted reſiſtance. Poſſeſſed of extenſive demeſnes, the king found himſelf independent; and veſted with the moſt formidable prerogatives, he cruſhed at pleaſure the moſt powerful barons in the realm. It was, therefore, only by cloſe and numerous confederacies that thoſe barons could reſiſt the tyranny of the ſovereign; and for this purpoſe they were conſtrained to aſſociate the people with themſelves, and to render them partakers of public liberty. As acts and inſtances of tyranny on the part of the conqueror were multiplied, the confederacies of the barons and of their vaſſals became more general and more vigorous; and the people at large, inſtructed and inſpirited by their leaders, ſtipulated conditions for themſelves, and inſiſted that, for the future, every individual ſhould be intitled to the protection

tion of the laws. Thus did thofe rights, with which the lords had ftrengthened themfelves, in order to oppofe the tyranny of the crown, become a bulwark, which was, in time, to reftrain their own. It was in the reign of Henry I., about forty years after the conqueft, that the operation of thefe caufes produced effect. As the nation had refolved to beftow the crown on a prince, who fhould acquire and hold it under no other claim than a *compact* with his people, the title of the king became thus a kind of fecurity for the liberty of the fubject. In order to give that liberty a more folid and lafting eftablifhment, they demanded a charter; which Henry granted foon after his coronation, as he had fworn to do before he was crowned. By this he reftored the Saxon laws which were in ufe under Edward the Confeffor, with fuch alterations, or (as he ftyled them) *emendations, as had been made in them by his father with the advice of his parliament;* at the fame time *annulling all evil cuftoms, and illegal fanctions, by which the realm had been unjuftly oppreffed.* Some of thofe grievances were fpecified in the charter, and the redrefs of them was there exprefsly enacted. It alfo contained very confiderable mitigations of thofe feudal rights claimed by the king over his tenants, and by them over theirs, which were either the moft burthenfome in their own nature, or had been made fo by an abufive extenfion. In fhort, all the liberty, that could well be confiftent with the fafety and intereft of the lord in his fief, was allowed to the vaffal by this charter, and the profits due to the former were fettled according to a determined and moderate rule of law. "This," fays fir Henry Spelman, "was the original of king John's Magna Charta, containing moft of the articles of it, either particularly expreffed or in general, under the confirmation it gives to the laws of Edward the Confeffor." Thofe are therefore much miftaken, who have fuppofed all the privileges granted in *Magna Charta* were *innovations* extorted by the arms of rebels from king John; —a notion which feems to have been firft taken up, not fo much out of ignorance, as from a bafe motive of adulation to fome of our princes in later times, who, endeavouring to grafp at abfolute power, were defirous of any pretence to confider thofe laws, which ftood in their way, as violent encroachments made by the barons on the ancient rights of the crown; whereas they were in reality reftitutions and fanctions of ancient rights enjoyed by the nobility and people of England in former reigns;—or limitations of powers which the king had illegally and arbitrarily ftretched beyond their due bounds. In fome refpects, fays Lord Lyttelton, this charter of Henry I. was more advantageous to liberty than *Magna Charta* itfelf. Henry II. in a parliament held in London, A. D. 1155, granted a charter of liberties confirming that of his grandfather, Henry I., already mentioned. In confequence of the legal rights eftablifhed by this excellent prince and the mixture of Saxon cuftoms, which mitigated and tempered the Norman inftitution, the conftitution of England was the beft feudal fyftem fubfifting, at that time, in any part of the world. The honour of eftablifhing in the Englifh conftitution itinerant judges belongs to Henry II., by whom this inftitution was revived and regularly fettled in the 22d year of his reign, with the advice and concurrence of his parliament held at Northampton. The extenfion of trials by juries to civil caufes may alfo be well efteemed a principal glory of this reign. Although fome veftiges of that method of trial appear among the Anglo-Saxons; yet Spelman fays, that the ufe of trials by 12 men before the conqueft was rare, and did not prevail in any great degree, till the reign of Henry II. (See JURY and *Grand* ASSISE.) The defpotic reign of king John excited through the kingdom a general confederacy againft him and conftrained him, A. D. 1215, to fign the famous deed, commonly called the great charter or *Magna Charta,* which either granted or fecured very important liberties and privileges to every order of men in the kingdom; to the clergy, to the barons, and to the people. (See MAGNA *Charta.*) By this charter, the rigour of the feodal laws was greatly mitigated in favour of the lords; and conditions were alfo ftipulated in favour of the numerous body of the people, who had concurred to obtain it, and who claimed, with fword in hand, fhare in that fecurity which it was defigned to eftablifh. This charter was confirmed in parliament by king Henry III., A. D. 1217, with the addition of fome articles to prevent the oppreffions by fheriffs; and alfo with an additional charter of forefts. Accordingly, thefe famous charters have fubfifted nearly in their original form, during many generations, as the peculiar favourites of the Englifh nation; and they have been juftly efteemed as the moft facred rampart to national liberty and independence. As they fecured the rights of all orders of men, they were anxioufly defended by all, and became the bafis, in a manner, of the Englifh conftitution, and a kind of original contract, which both limited the authority of the king, and enfured the conditional allegiance of his fubjects. King Edward I. who made it a rule in his own conduct to obferve, except on extraordinary occafions, the privileges fecured to the barons by the great charter, acquired a right to infift upon their obfervance of the fame charter towards their vaffals and inferiors. By the ftatute (25 Edw. I.) called *Confirmatio Chartarum,* (the confirmation of which was renewed eleven times in the courfe of his reign,) he directed the great charter to be allowed as the common law; all judgments contrary to it are declared void; copies of it are ordered to be fent to all cathedral churches, and read twice a year to the people; and fentence of excommunication is directed to be as conftantly denounced againft all thofe, who by word, deed, or counfel, act contrary to it, or in any degree infringe it. He alfo, in the ftatute *De Tallagio non Concedendo,* (24 Edw. I.) decreed, that no tax fhould be laid, nor impoft levied, without the joint confent of the lords and commons. This important ftatute, in conjunction with *Magna Charta,* forms the bafis of the Englifh conftitution. Under Edward II. the commons, feeling their importance, began to annex petitions to the bills by which they granted fubfidies; and this was the dawn of their legiflative authority. Under Edward III., they declared they would not, in future, acknowledge any law to which they had not exprefsly affented. Soon after this, they exercifed a privilege, in which confifts, at this time, one of the great balances of the conftitution: they impeached, and procured to be condemned, fome of the firft minifters of ftate. Under Henry IV., they refufed to grant fubfidies before an anfwer had been given to their petitions. In a word, the fundamental articles of our free conftitution have been afferted and confirmed by a multitude of ftatutes, (fir Edward Coke is faid to reckon thirty-two,) from Edward I. to Henry IV. Then, after a long interval, they were corroborated by the *petition of right,* which was a parliamentary declaration of the liberties of the people, affented to by king Charles I., in the beginning of his reign. This famous act was foon followed by the ftill more ample conceffion made by that unhappy prince to his parliament, before the fatal rupture between them; and by the many falutary laws, particularly the *habeas corpus,* paffed under Charles II. To thefe fucceeded the *bill of rights,* or declaration delivered by the lords and commons to the prince and princefs of Orange, 13th February, 1688; and afterwards enacted in parliament,

ment, when they became king and queen: which declaration terminates with these remarkable words: "And they do claim, demand, and insist upon, all and singular, the premises, as their undoubted right and liberties." And the act of parliament itself (1 W. & M. st. 2. c. 2.) recognises "all and singular the rights and liberties, asserted and claimed in the said declaration, to be the true, ancient, and indubitable rights of the people of this kingdom." The Revolution of 1688 may, therefore, be justly deemed the third grand epoch in the history of the English constitution. The great charter had marked out the limits within which the royal authority ought to be confined; some outworks were raised in the reign of Edward I.; but it was at the Revolution that the circumvallation was completed. "It was at this era," says De Lolme, "that the true principles of civil society were distinctly specified and fully established. By the expulsion of a king, who had violated his oath, the doctrine of Resistance, that ultimate resource of an oppressed people, was confirmed beyond a doubt. By the exclusion of a family, hereditarily despotic, it was finally determined, that nations are not the property of kings. The principles of Passive Obedience, the divine and indefeasible right of kings; in a word, the whole scaffolding of false and superstitious notions, by which the royal authority had till then been supported, fell to the ground: and in the room of it were substituted the more solid and durable foundations of the love of order, and a sense of the necessity of civil government among mankind." The liberty of the press, the bulwark and guardian of a free constitution, was, properly speaking, established four years afterwards, in consequence of the refusal of the parliament to continue any longer the restrictions to which it had before been subject. Finally, the liberties of the British constitution were again asserted at the commencement of the last century, in the *act of settlement*, (12 & 13 W. III. c. 2.) by which the crown was limited to his present majesty's illustrious house; and some new provisions were added, at the same fortunate era, for better securing our law, religion, and liberties, which the statute declares to be "the birth-right of the people of England," according to the ancient doctrine of the common law.

The distinguishing excellence of the British constitution, which has been sometimes called a mixed government, and sometimes a limited monarchy, consists in its being formed by a combination of the three regular species of government, *viz.* the monarchy, residing in the King, the aristocracy, in the House of Lords, and the democracy or republic being represented by the House of Commons. To this purpose Cicero declares himself of opinion, (in his Fragments, *de rep.* l. 2.) "esse optimè constitutam rempublicam, quæ ex tribus generibus illis, regali, optimo, et populari, sit modicè confusa." As the executive power of the laws, in the British constitution, is lodged in a single person, they have all the advantages of strength and dispatch, that are to be found in the most absolute monarchy: and as the legislature of the kingdom is entrusted to three distinct powers, entirely independent of each other; and as this aggregate body, actuated by different springs, and attentive to different interests, composes the British parliament, and has the supreme disposal of every thing; no inconvenience can be attempted by either of the three branches, which will not, according to the theory of the constitution, be withstood by one of the other two: each branch being armed with a negative power, sufficient to repel any innovation which it shall think inexpedient or dangerous. Whereas, if the supreme power were lodged in any one of the branches separately, we must be exposed to the inconveniences of either absolute monarchy, aristocracy, or democracy; and so want two of the three principal ingredients of good polity, either virtue, wisdom, or power. If it were lodged in any two of the branches, *e.g.* in the king and house of lords, our laws might be providently made, and well executed, but they might not have always the good of the people in view: if lodged in the king and commons, we should want that circumspection and mediatory caution, which the wisdom of the peers is to afford: if the supreme rights of legislature were lodged in the two houses only, and the king had no negative on their proceedings, they might be tempted to encroach upon the royal prerogative, or perhaps to abolish the kingly office, and thereby weaken (if not totally destroy) the strength of the executive power. But the constitutional government of this island is so admirably tempered and compounded, that nothing can endanger or hurt it, but destroying the equilibrium of power between one branch of the legislature and the rest. For if events should happen, that the independence of any one of the three should be lost, or that it should become subservient to the views of the other two, there would soon be an end of our constitution. The legislature would be changed from that, which (upon the supposition of an original contract, either actual or implied) is presumed to have been originally set up, by the general consent and fundamental act of the society: and such a change, however effected, is, according to Mr. Locke, (on Government, part ii. § 212.) who, says judge Blackstone, perhaps carries his theory too far, at once into an entire dissolution of the bands of government; and the people are thereby reduced to a state of anarchy, with liberty to constitute to themselves a new legislative power.

Archdeacon Paley, in his discussion of this subject, has stated the expedients by which the British constitution provides for the *interest of its subjects*, and for its own *preservation*. With a view to the first of these purposes, it promotes the establishment of salutary public laws, by rendering every citizen of the state capable of becoming a member of the senate, and by investing every senator with the right of propounding to the deliberation of the legislature whatever law he pleases. In order to the attainment of this object, it provides such representatives of the people, with respect to their rank, condition, and character, the mode of their election, as well as the publicity and utility of their parliamentary deliberations, as shall be most likely to answer the end of their appointment, and to satisfy their constituents. (See COMMONS and PARLIAMENT.) For preventing destructive contentions for the supreme power, and for securing the advantages of decision, secrecy, and dispatch, which belong to the resolutions of monarchical counsels, and other important objects, the constitution has committed the executive government to the administration and limited authority of our hereditary king. (See KING.) The British constitution has also guarded the safety of the people in the two articles of *taxation* and *punishment* by the most studious precautions. With regard to *taxation*, this business is exclusively reserved to the popular part of the constitution, who, it is presumed, will not tax themselves, nor their fellow-subjects, without being first convinced that the aids which they grant are necessary. The application of the public supplies is also watched with the same circumspection as the assessment. The national expenditure is accounted for in the house of commons, and computations of the charge, appropriated to any particular purpose, are previously submitted to the same tribunal. In the infliction of *punishment*, the power of the crown, and of the magistrate appointed by the crown, is confined by the most precise limitations: the offender's guilt, being submitted to the judgment

ment of 12 men, of his own order, and the nature and degree of the punifhment being afcertained by fixed laws. In order to prevent arbitrary or clandeftine confinement, with all its injurious confequences, the conftitution has provided with extreme folicitude. The ancient writ of habeas corpus; the habeas corpus act of Charles II., and the practice and determinations of our fovereign courts of juftice founded upon thefe laws, afford a complete remedy for every conceivable cafe of illegal imprifonment. (See thefe articles; and fee alfo TREASON.) The conftitution has alfo provided for its own prefervation, by fecuring each part of the legiflature in the exercife of the powers affigned to it, from the encroachment of the other parts. This fecurity is fometimes called the *balance of the conftitution;* and the political equilibrium, which this phrafe denotes, confifts in two contrivances—a balance of power, and a balance of intereft. By the former is meant, that one part of the legiflature poffeffes no power, the abufe, or excefs of which, is not checked by fome antagonift power refiding in another part. Thus, the power of the two houfes of parliament to frame laws, is checked by the king's negative; and, on the other hand, the application of this negative is checked by the privilege which parliament poffeffes, of refufing fupplies of money to the exigencies of the king's adminiftration. The conftitutional maxim "that the king can do no wrong," is balanced by another maxim, not lefs conftitutional, "that the illegal commands of the king do not juftify thofe who affift, or concur, in carrying them into execution;" and alfo, "that the acts of the crown acquire not any legal force, until authenticated by the fubfcription of fome of its great officers." In connection with this maxim, we might mention the check which parliament holds over the adminiftration of public affairs, in the practice of addreffing the king, for the purpofe of knowing by whofe advice he refolved upon a particular meafure, and of punifhing the authors of that advice for their pernicious counfel. Again, the power of the crown to direct the military force of the kingdom, is balanced by the annual neceffity of reforting to parliament for the maintenance and government of that force. The prerogative of the king, in declaring war, is checked by the privilege which the houfe of commons poffeffes, of granting or withholding fupplies for carrying it on. The king's choice of his minifters, is controlled by the obligation he is under of appointing thofe men to offices in the ftate, who are found capable of managing the affairs of his government, with the two houfes of parliament.

By the *balance of intereft,* which accompanies and gives efficacy to the *balance of power*, is meant this, that the refpective interefts of the three eftates of the empire, are fo difpofed and adjufted; that whichever of the three fhall attempt any encroachment, the other two fhall unite in refifting it. The exercife of arbitrary power, on the part of the king, would contract the power and privileges of the commons, degrade their dignity, and endanger their independence. It would alfo be no lefs formidable to the grandeur of the ariftocracy than fatal to the liberty of the republic; as it would reduce the nobility from their hereditary participation in the national councils, which conftitutes their true greatnefs, to the low and fervile ftate of making a part of the empty pageantry of a defpotic court. On the other hand, if the commons fhould entrench upon the crown, the houfe of lords, attached to the monarchy which gives them their diftinction, would inftantly receive an alarm from every new ftretch of popular power. If the nobles themfelves fhould attempt to revive the fuperiority, which was exercifed by their anceftors under the feudal conftitution, the king and the people would alike remember how the one had been infulted, and the other enflaved, by that barbarous tyranny. After all it fhould be remembered, that there is a wide difference between the conftitution, or the theory of government, and the actual exercife of it, nor fhould thofe anomalies, or irregularities, which occur in peculiar circumftances, or periods of the public adminiftration, be charged on the conftitution itfelf. It is a well-known, and often cited obfervation of Montefquieu, in reference to the Britifh conftitution, "as all things have an end, the ftate we are fpeaking of (viz. England,) will lofe its liberty, and perifh. Have not Rome, Sparta, and Carthage perifhed? It will perifh when the legiflative powers fhall be more corrupt than the executive." Lyttelton's Hift. of Hen. II. Hume's Hift. vol. i. ii. and iii. De Lolme's Conftitution of England. Blackft. Com. v. i. Paley's Principles, vol. ii. ch. 7. Rapin's Hift. of Eng. vol. i. Montefq. Spirit of Laws, vol. i. b. xi. chap. 6.

CONSTRICTION, compounded of *con, together;* and *ftringere, to tie* or *clofe up*; the act of binding, or drawing the parts of a thing clofe together.

CONSTRICTOR CUNNI, in *Myology*, a name applied to the fphincter mufcle of the vagina. See GENERATION, *organs of.*

CONSTRICTOR *ifthmi faucium*, one of the mufcles belonging to the foft palate. See DEGLUTITION.

CONSTRICTOR *nafi*. See COMPRESSOR.

CONSTRICTOR *oris*. See ORBICULARIS *Oris*.

CONSTRICTORES PHARYNGIS. See DEGLUTITION.

CONSTRUCTION, in *Geometry*, the art or manner of drawing, or defcribing a figure, fcheme, the lines of a problem, or the like. The equality of the lines of fuch a triangle, &c. is demonftrated from their conftruction.

CONSTRUCTION *of equations*, is the method of reducing a known equation into lines and figures; whereby the truth of the rule, canon, or equation, may be demonftrated geometrically. Or, it is the method of finding the roots or unknown quantities of an equation, by the geometrical conftructions of right lines or curves, according to the order or rank of the equation. The roots of any equation may be determined; that is, the equation may be conftructed, by the interfections of a ftraight line with another line or curve of the fame dimenfions with thofe of the equation to be conftructed; for the roots of the equation are the ordinates of the curve at the points of interfection with the right line; and it is well known, that a curve may be cut by a right line in as many points as its dimenfions amount to. Thus, a *fimple* equation will be conftructed by the interfection of one right line with another: a quadratic equation, or an affected equation of the *fecond* rank, by the interfections of a right line with a circle, or any of the conic fections, which are lines of the fecond order, and which may be cut by the right line in two points, which will give the two roots of the quadratic equation. A cubic equation may be conftructed by the interfection of the right line with a line of the third order, &c. &c. But if, inftead of the right line, fome other line of a higher order be ufed; then the fecond line, whofe interfections with the former are to determine the roots of the equation, may be taken as many dimenfions lower as the former is taken higher. And, in general, an equation of any degree may be conftructed by the interfections of two lines whofe dimenfions, multiplied together, produce the dimenfion of the given equation. Thus, the interfections of a circle with the conic fections, or of thofe with each other, will conftruct the biquadratic equations or thofe of the fourth power, becaufe $2 \times 2 = 4$; and the interfections of the circle or conic fections with a line

line of the third order, will conftruct the equations of the fifth and fixth powers, &c. &c. Hence it appears, that the method of conftructing equations is different, according to the diverfity of equations.

To conftruct a fimple equation. The whole myftery confifts in this, that the fractions, to which the unknown quantity is equal, be refolved into proportional terms: the method of which will be better fhewn by examples than it can be taught by many rules.

1. Suppofe $x = \frac{ab}{c}$, or $cx = ab$; then will $c : a :: b : x$, to be determined by the method of finding a fourth proportional.

2. If $x = \frac{b^2}{a}$, or $ax = b^2$; then $a : b :: b : x$, a third proportional to a and b.

3. Suppofe $x = \frac{abc}{de}$; let $d : a :: b : \frac{ab}{d}$. This fourth proportional found, being called g; $x = \frac{gc}{e}$, which is therefore found as in the firft cafe.

4. Suppofe $x = \frac{aa - bb}{c}$, or $cx = a^2 - b^2$. Since $aa - bb = (a + b) \times (a - b)$; $c : a + b :: a - b : x$, a fourth proportional to c, $a + b$ and $a - b$.

5. Suppofe $x = \frac{ab}{c} + \frac{adc}{be}$. Find, as before, $g = \frac{ab}{c}$, and $f = \frac{adc}{be}$. Then will $x = g + f$ be the fum of the lines g and f.

6. Suppofe $x = \frac{a^2 b + bcd}{af + cg}$. Seek $\frac{cg}{a}$, and let $f + \frac{cg}{a} = h$; then will $af + cg = ah$; confequently, $x = \frac{a^2 b + bcd}{ah}$. Thus is the prefent cafe brought to the preceding one.

7. Suppofe $x = \frac{a^2 b - bad}{af + bc}$. Find $\frac{af}{b}$, and make $\frac{af}{b} + c = h$; then will $af + bc = bh$. Hence, $x = \frac{a^2 b - bad}{bh} = \frac{a^2 - ad}{h}$. Confequently, $hx = a^2 - ad = a \times a - d$; and $h : a :: a - d : x$.

8. Suppofe $x = \frac{a^2 + b^2}{c}$, or $cx = a^2 + b^2$. Conftruct the triangle ABC (*Plate* I. *Analyfis, fig.* 8.) whofe fide $AB = a$, $BC = b$; then will $AC = \sqrt{a^2 + b^2}$. Let $AC = m$; then will $a^2 + b^2 = m^2$. And therefore $x = \frac{m^2}{c}$; confequently, $c : m :: m : x$, a third proportional to c and m.

9. Suppofe $x = \frac{a^2 - b^2}{c}$. On AB (*fig.* 9) $= a$, defcribe a femicircle, and therein fet off $AC = b$. Since the triangle ACB is rectangular; $CB = \sqrt{a^2 - b^2}$. Let $CB = m$; then will $x = \frac{m^2}{c}$; confequently, $c : m :: m : x$.

10. Suppofe $x = \frac{a^2 b + bcd}{af + bc}$. Say, $b : a :: f : \frac{fa}{b}$; and let $\frac{fa}{b} + c = h$; then will $bc + af = bh$. Hence, $x = \frac{a^2 b + bcd}{bh} = \frac{a^2 + cd}{h}$. Find betwixt $AC = c$ (*fig.* 10.) and $CB = d$, a mean proportional $CD = \sqrt{cd}$. Let $CE = a$; then will $DE = \sqrt{a^2 + cd}$. Call this m; then will $x = \frac{m^2}{h}$; confequently, $h : m :: m : x$.

To conftruct a quadratic equation geometrically. Since quadratic equations may be reduced to fimple ones, thofe may likewife be conftructed from the methods already laid down: for if the equation be pure, $x^2 = ab$; then will $a : x :: x : b$; wherefore we fhall find $x = \sqrt{ab}$; and therefore if between $AC = a$, and $BC = b$, we find a mean proportional DC, this will be equal to x.

If the quadratic be affected, *e.g.* $x^2 + 2ax = b^2$, then form the right-angled triangle ACB (*fig.* 11.), whofe bafe AB is a, and perpendicular BC is b; and on the centre A, with the radius AC, defcribe the femicircle DCE, then will DB and DE be the two roots, *viz.* the affirmative and the negative, of the given quadratic equation. For by refolving the quadratic, we fhall have $x = a \pm \sqrt{b^2 + a^2} = AB \pm \sqrt{BC^2 + AB^2} = AB \pm \sqrt{AC^2} = AB \pm AC$, *i. e.* DB or BE, with their proper figns. If the quadratic be $x^2 - 2ax = b^2$, then the conftruction will be the fame with that of the preceding one, $x^2 + 2ax = b^2$. But if the form be $2ax - x^2 = b^2$; form a right-angled triangle FGH (*fig.* 12), whofe hypothenufe FG is a, and perpendicular GH is b; then with the radius FG and centre F defcribe a femicircle IGK; and IH and HK will be the two roots of the given equation $2ax - x^2 = b^2$, or $x^2 - 2ax = b^2$. Maclaurin's Algebra, part iii. chap. 2. and Simpfon's Algebra, p. 269.

To conftruct cubic and biquadratic equations. The roots of a biquadratic equation may be determined by the interfections of two conic fections; for the equation by which the ordinates from the four points in which thefe conic fections may cut one another can be determined, will arife to four dimenfions; and the conic fections may be affumed in fuch a manner, as to make this equation coincide with any propofed biquadratic: fo that the ordinates from thefe four interfections will be equal to the roots of the propofed biquadratic.

If one of the interfections of the conic fection falls upon the axis, then one of the ordinates vanifhes, and the equation by which thefe ordinates are determined, will then be of three dimenfions only, or a cubic; to which any propofed cubic equation may be accommodated. So that the three remaining ordinates will be the three roots of that propofed cubic. The conic fections for this purpofe fhould be fuch as are moft eafily defcribed. The circle may be one, and the parabola is ufually affumed for the other.

Let APE (*fig.* 13.) be the common Apollonian parabola. Take on its axis the line AB = half of its parameter. Let C be any point in the plane of the parabola, and from it as a centre defcribe, with any radius CP, a circle meeting the parabola in P. Let PM, CD, be perpendiculars on the axis in M and D, and let CN, parallel to the axis, meet PM in N.

Then will always $CP^2 = CN^2 + NP^2$ (47 E. 1.)

Put $CP = a$, the parameter of the parabola $= b$. $AD = c$, $DC = d$, $AM = x$, $PM = y$.

Then $CN^2 = \overline{x \backsim c}|^2$, $NP^2 = \overline{y \backsim d}|^2$; and $\overline{x \backsim c}|^2 + \overline{y \backsim d}|^2 = a^2$. ($x \backsim c$ is the difference of x and c indefinitely, whichever of the two is greateft. That is, $x^2 \pm 2cx + c^2 + y^2 \pm dy + d^2 = a^2$. But from the nature

ture of the parabola, $y^2 = bx$, and $x^2 = \frac{y^4}{b^2}$; substituting therefore these values for x^2, and x, it will be $\frac{y^4}{b^2} \pm \frac{2cy^2}{b} + y^2 \pm 2dy + c^2 + d^2 - a^2 = 0$. Or, multiplying by b^2, $y^4 \pm \overline{2bc + b^2} \times y^2 \pm 2db^2 \times y + \overline{c^2 + d^2 - a^2} \times b^2 = 0$. Which may represent any biquadratic equation that wants the second term; since such values may be found for a, b, c, and d, by comparing this with any proposed biquadratic, as to make them coincide. And then the ordinates from the points, P, P, P, P, on the axis will be equal to the roots of that proposed biquadratic. And this may be done, though the parameter of the parabola (viz. b) be given: that is, if you have a parabola already made or given, by it alone you may resolve all biquadratic equations, and you will only need to vary the centre of your circle and its radius.

If the circle described from the centre, C, pass through the vertex A, (*fig.* 14.) then $CP^2 = CA^2 = CD^2 + AD^2$, that is, $a^2 = d^2 + c^2$; and the last term of the biquadratic $(c^2 + d^2 - a^2)$ will vanish; therefore, dividing the rest by y, there arises the cubic, $y^{3*} \pm \overline{2bc + b^2} \times y \pm 2db^2 = 0$. Let the cubic equation proposed to be resolved be $y^{3*} \pm py \pm r = 0$. Compare the terms of these two equations, and you will have $\pm 2bc + b^2 = \pm p$, and $\pm 2db^2 = \pm r$, or, $\mp c = \frac{b}{2} \mp \frac{p}{2b}$, and $d = \pm \frac{r}{2b^2}$. From which you have this construction of the cubic $y^{3*} \pm py \pm r = 0$, by means of any given parabola A P E.

From the point B *take in the axis (forward, if the equation has* $-p$, *but backwards, if* p *is positive) the line* $BD = \frac{p}{2b}$; *then raise the perpendicular* $DC = \frac{r}{2b^2}$, *and from* C *describe a circle passing through the vertex* A, *meeting the parabola in* P, *so shall the ordinate* P M *be one of the roots of the cubic* $y^{3*} \pm py \pm r = 0$.

The ordinates that stand on the same side of the axis with the centre C are negative or affirmative, according as the last term r is *negative* or *affirmative*; and those ordinates have always *contrary* signs that stand on *different* sides of the *axis*. The roots are found of the same value, only they have contrary signs, when r is positive as when it is negative; the second term of the equation being wanting.

A cubic equation, that has all its roots equal, may be constructed by a circle. Let the radius O B (*fig.* 15.) = R, the sine $EF = s$, G H the sine of the arc G B or 3 B E. Then, by trigonometry, $3s - \frac{4s^3}{RR} = GH$. Draw C D parallel to A B, and put $SF = c$, $ES = x$, $GH = b$; then $c + x = s$, whence $3 \times \overline{c + x} - \frac{4}{RR} \times \overline{c + x}|^3 = b$; and this reduced will give

$$x^3 + 3cx^2 + 3ccx + c^3 - \frac{3}{4}RR + \frac{1}{4}bRR = 0.$$
$$- \frac{3}{4}cRR$$

Suppose this cubic equation to be given; *viz.* $x^3 + px^2 + qx + r = 0$. Comparing this with the former, and equating the coefficients, we shall have $p = 3c$, and $c = \frac{1}{3}p$; also $q = 3cc - \frac{3}{4}RR = \frac{1}{3}pp - \frac{3}{4}RR$; whence $R = \frac{2}{3}\sqrt{pp - 3q}$, and $r = c^3 + \frac{1}{4}bRR - \frac{3}{4}cRR$, and $b = \frac{9r - pq}{pp - 3q} + \frac{2}{3}p$. Hence we obtain the following rule for the solution of the given equation $x^3 + px^2 + qx + r = 0$. With the radius $\frac{2}{3}\sqrt{pp - 3q}$ describe the circle B G A K (*fig.* 16.) Draw the diameter A B, and C D parallel to it at the distance of $\frac{1}{3}p$; above it, if it be $+p$, but below it, if it be $-p$. Draw also Z G parallel to A B, at the distance $\frac{9r - pq}{pp - 3q} + \frac{2}{3}p$, above it, if it be affirmative, or below it, if negative. Let it cut the circle in G. Take the arc $BP = \frac{1}{3}BG$, and make $PQ = QK = KP$. From the points P, Q, K, let fall perpendiculars upon the line C D, which will be the roots of the equation; the affirmative above the line, and the negative below it. N. B. If $3q$ be greater than pp, the equation is impossible; for in this case the equation has two impossible roots. Also, if $p = 0$, then the radius of the circle $OB = \frac{2}{3}\sqrt{-3q}$, and C D coincides with A B; and the distance of Z G from A B is $-\frac{3r}{q}$. And if q be affirmative, the equation is impossible. These constructions are easy: *e.g.* 1. Let $x^3 + 9x^2 - 22x - 120 = 0$. Here the radius $OB = \frac{2}{3}\sqrt{pp - 3q} = \frac{2}{3}\sqrt{81 + 66} = 8.0829$, and $\frac{1}{3}p = 3$, the distance of C D above A B. And $\frac{9r - pq}{pp - 3q} + \frac{2}{3}p = \frac{-1080 + 198}{81 + 66} + \frac{2}{3} \times 6 = -6 + 6 = 0$, the distance of G Z from A B, which therefore coincides with it; and the arc B G, and also its third part is o, and P falls on B; and making $PQ = QK = KP$, and letting fall perpendiculars on C D, we shall have $PS = -3$, $QT = +4$, and $KT = -10$, the three roots required.

E. G. 2. Suppose $x^3 - 17x^2 + 82x - 120 = 0$. The radius O B (*fig.* 18.) $= \frac{2}{3}\sqrt{289 - 246} = 4.37$; $\frac{1}{3}p = -5.66$, the distance of C D below A B, and $\frac{9r - pq}{pp - 3q} + \frac{2}{3}p = \frac{-1080 + 1394}{289 - 246} - \frac{34}{3} = 7.302 - 11.333 = -4.031$, the distance of G Z below A B. Take B P the third part of B G, and making $PQ = QK = KP$; and measuring the perpendiculars upon C D, we have $PS = +4$, $QT = +10$, and $KV = +3$, the roots of the equation.

E. G. 3. Let $y^3 - 13y + 12 = 0$. In this example $p = 0$, and therefore C D (*fig.* 19.) coincides with A B; and the radius $OB = \frac{2}{3}\sqrt{-3q} = \frac{2}{3}\sqrt{39} = 4.18$; and $\frac{-3r}{q} = \frac{-36}{-13} = 2.77$, the distance of Z G above A B. Take the arc $BP = \frac{1}{3}$ arc B G, and make $PQ = QK = KP$, and let fall perpendiculars on A B; then $PS = +1$, $QT = +3$, and $KV = -4$, will be the roots required.

If

If the roots of a cubic equation, $x^3 - qx + r = c$, be poſſible, they may be found by means of a table of coſines. Let D A C (*fig.* 20.) be an angle whoſe coſine, to the radius m, is x; in A D take A B $= m$; from B, as a centre, with the radius B A, deſcribe a circle cutting A M in C, and from C, with the ſame radius, deſcribe a circle cutting A D in D; join B C, C D, and draw B K, D M, at right angles to A M, and C L at right angles to A D. Then, the triangles B A C and B C D being iſoſceles, the angles B A C and B C A are equal, as alſo C B D and C D B; and the perpendiculars B K, C L, biſect the baſes A C, B D. Alſo, the angle D B C = B A C + B C A = 2 B A C; and the angle D C M = C A D + C D A = C A D + C B D = C A D + 2 C A D = 3 C A D. Let C M, the coſine of the angle D C M to the radius m, be called c; thence, from the ſimilar triangles A B K, A C L, A B : A K :: A C : A L, or $m : x :: 2x : \frac{2x^2}{m} =$ A L; and A L − A B $= \frac{2x^2}{m} - m =$ B L; hence A D, or A L + B L $= \frac{4x^2}{m} - m$: Again, A B : A K :: A D : A M, or $m : x :: \frac{4x^2}{m} - m : \frac{4x^3 - m^2x}{m^2} =$ A M, and A M − A C = C M $= \frac{4x^3}{m^2} - 3x = c$; therefore $4x^3 - 3m^2x = m^2c$, and $4x^3 - 3m^2x - m^2c = 0$.

Let the equation $4x^3 - 3m^2x - m^2c = 0$, or $x^3 - \frac{3m^2}{4}x - \frac{m^2c}{4} = 0$, be made to coincide with the equation $x^3 - qx + r = 0$; that is, let $\frac{3m^2}{4} = q$, and $\frac{m^2c}{4} = -r$, or $m = \sqrt{\frac{4q}{3}}$, and $c = -\frac{3r}{q}$: then, from a table of coſines, find the angle whoſe coſine is $-\frac{3r}{q}$ to the radius $\sqrt{\frac{4q}{3}}$, and the coſine of one-third of this angle, to the ſame radius, is one value of x. Hence it follows, 1. That if A be the arc whoſe coſine is c, and P the whole circumference, c is alſo the coſine of A + P, or A + 2 P; therefore the coſines of $\frac{A+P}{3}$, and $\frac{A+2P}{3}$, are alſo values of x. 2. Since the radius is greater than the coſine, $\sqrt{\frac{4q}{3}}$ is greater than $-\frac{3r}{q}$, or $\frac{4q}{3}$ is greater than $\frac{9r^2}{q^2}$; that is, $\frac{q^3}{27}$ is greater than $\frac{r^2}{4}$; therefore this ſolution can only be applied when the roots of the cubic equations are poſſible.

Vieta, in his "Canonica Recenſione affectionum geometricarum," and Ghetaldus, in his "Opus poſthumum de Reſolutione et Compoſitione Mathematica," and alſo Des Cartes, in his "Geometria," have ſhewn how to conſtruct ſimple and quadratic equations. Des Cartes has alſo ſhewn how to conſtruct cubic and biquadratic equations, by the interſection of a circle and parabola; and the ſame has been done by Baker in his "Clavis Geometrica," or "Geometrical Key." (See the article BAKER.) But the genuine foundation of all their conſtructions was firſt laid and explained by Sluſius in his "Meſolabium," pars 2. This doctrine is alſo treated of by De la Hire, in a ſmall treatiſe, entitled, "La Conſtruction des Equations Analytiques," annexed to his "Conic Sections." Sir Iſaac Newton, at the end of his "Algebra," has given the conſtruction of cubic and biquadratic equations mechanically; and alſo by the conchoid and ciſſoid, as well as the conic ſections. See alſo Dr. Halley's conſtruction of cubic and biquadratic equations, and Colſon's in the Philoſophical Tranſactions; the Marquis de l'Hoſpital "Traité Analytique des Sections Coniques," lib. iv.; and Maclaurin's "Algebra," part iii. chap. 3. However, the intent of theſe geometrical conſtructions is more readily anſwered by the method of extracting roots by converging ſeries and approximation; and therefore this mode of obtaining them is very much laid aſide.

CONSTRUCTION, or *Syntax*, in *Grammar*, denotes the arranging and connecting of the words of a ſentence, according to the rules of the language. See SYNTAX.

The conſtruction is generally more ſimple, eaſy, and direct, in the modern tongues than in the ancient: we have very few of thoſe inverſions which occaſion ſo much embarraſſment and obſcurity in the Latin; our thoughts are uſually delivered in the ſame order in which the imagination conceives them: the nominative caſe, for inſtance, always precedes the verb, and the verb goes before the oblique caſes it governs.

The Greeks and Latins, M. St. Evremont obſerves, uſually end their periods, where, in good ſenſe and reaſon, they ſhould have begun them; and the elegance of their language conſiſts, in ſome meaſure, in this capricious arrangement, or rather in this tranſpoſal and diſorder of the words.

Conſtruction is either *ſimple* or *figurative*. *Simple*, is that wherein all the terms, or parts of the diſcourſe, are placed in their natural order.

Figurative conſtruction, is that wherein we recede from this ſimplicity, and uſe certain expreſſions, ſhorter, and more elegant than nature affords.

The ſyntax, or conſtruction of words, is diſtinguiſhed into two parts, *concord* and *government*, or *regimen*.

CONSTRUCTION *of deeds and wills*, in *Law*, is regulated by ſome general rules and maxims, which have been laid down by courts of juſtice. Theſe are, 1. That the conſtruction be favourable, and as near the minds and apparent intents of the parties, as the rules of law will admit. For the maxims of law are, that "verba intentioni debent inſervire;" and "benigne interpretamur chartas propter ſimplicitatem laicorum." And therefore the conſtruction muſt alſo be reaſonable, and agreeable to common underſtanding. 2. That "quoties in verbis nulla eſt ambiguitas, ibi nulla expoſitio contra verba fienda eſt;" but that where the intention is clear, too minute a ſtreſs be not laid on the ſtrict and preciſe ſignification of words; "nam qui hæret in litera, hæret in cortice." Therefore, by a grant of a remainder a reverſion may well paſs, and *è converſo*. Another maxim of law is, that "mala grammatica non vitiat chartam;" neither falſe Engliſh nor falſe Latin will deſtroy a deed. 3. That the conſtruction be made upon the entire deed, and not merely upon disjointed parts of it. "Nam ex antecedentibus et conſequentibus fit optima interpretatio." And therefore that every part of it be (if poſſible) made to take effect; and no word but what may operate in ſome ſhape or other. "Nam verba debent intelligi cum effectu, ut res magis valeat quam pereat." 4. That the deed be taken moſt ſtrongly againſt him that is the agent or contractor, and in favour of the other party. "Verba fortius accipiuntur contra proferentem." As, if tenant in fee-ſimple grants to any one an eſtate for life, generally, it ſhall be conſtrued an eſtate for the life of the grantee. 5. That, if the words will bear two ſenſes, one agreeable to, and an-

 other

other againſt law, that ſenſe be preferred which is moſt agreeable to it. As, if tenant in tail lets a leaſe to have and to hold during life generally, it ſhall be conſtrued to be a leaſe for his own life only, for that ſtands with the law; and not for the life of the leſſee, which is beyond his power to grant. 6. That, if there be in a deed two clauſes ſo totally repugnant to each other, that they cannot ſtand together, the firſt ſhall be received, and the latter rejected. In this reſpect it differs from a will; for there, of two ſuch repugnant clauſes the latter ſhall ſtand. In both caſes, however, we ſhould endeavour to reconcile them. 7. That a deviſe be moſt favourably expounded, to purſue if poſſible the will of the deviſor, who, for want of advice or learning, may have omitted the legal or proper phraſes. Hence the law often diſpenſes with the want of words in deviſes, that are abſolutely requiſite in all other inſtruments. Thus, a fee may be conveyed without words of inheritance; and an eſtate-tail without words of procreation. By a will alſo an eſtate may paſs by mere implication, without any expreſs words to direct its courſe. With regard to a will, in this reſpect, there is no diſtinction between the rules of law and of equity; for the will, being conſidered in both courts in the light of a limitation of uſes, is conſtrued in each with equal favour and benignity, and expounded rather on its own particular circumſtances, than by any general rules of poſitive law. Blackſt. Comm. b. ii. ch. 23.

Construction *of Statutes*, comprehends the following rules: 1. In the conſtruction of remedial ſtatutes there are three points which require conſideration, *viz.* the old law, the miſchief, and the remedy; that is, how the common law ſtood at the making of the act; what the miſchief was, for which the common law did not provide; and what remedy the parliament hath provided to cure this miſchief. And it is the buſineſs of the judge ſo to conſtrue the act, as to ſuppreſs the miſchief and advance the remedy. An inſtance may be ſpecified in the reſtraining ſtat. of 13 Eliz. c. 10. By the common law, eccleſiaſtical corporations might let as long leaſes as they thought proper; the miſchief was, that they let long and unreaſonable leaſes, to the impoveriſhment of their ſucceſſors: the remedy applied by the ſtatute was the making void all leaſes by eccleſiaſtical bodies for longer terms than three lives, or 21 years. In the conſtruction of this ſtatute, it is held, that leaſes, though for a longer term, if made by a biſhop, are not void during the biſhop's continuance in his ſee; or, if made by a dean and chapter, they are not void during the continuance of the dean: for the act was made for the benefit and protection of the ſucceſſor. The miſchief is, therefore, ſufficiently ſuppreſſed, by vacating them after the determination of the intereſt of the grantors; but the leaſes, during their continuance, being not within the miſchief, are not within the remedy. 2. A ſtatute, which treats of things or perſons of an inferior rank, cannot, by any *general words*, be extended to thoſe of a ſuperior. Thus, a ſtatute, treating of "deans, prebendaries, parſons, vicars, *and others having ſpiritual promotion*," is held not to extend to biſhops, though they have ſpiritual promotion; deans being the higheſt perſons named, and biſhops being of a ſtill higher order. 3. Penal ſtatutes muſt be conſtrued ſtrictly. Thus, by the ſtatute 14 Geo. II. c. 6. ſtealing ſheep, *or other cattle*, was made felony, by benefit of clergy: but *or other cattle* being conſidered as too looſe an expreſſion for creating a capital offence, the act was held to extend to nothing but mere ſheep. In the next ſeſſions it was therefore found neceſſary to make another ſtatute, 15 Geo. II. c. 34. extending the former to bulls, cows, oxen, ſteers, bullocks, heifers, calves, and lambs, by name. 4. Statutes againſt frauds are to be liberally and beneficially expounded. 5. One part of a ſtatute muſt be ſo conſtrued by another, that the whole may (if poſſible) ſtand: "ut res magis valeat, quam pereat." As if land be veſted in the king and his heirs by act of parliament, ſaving the right of A.; and A. has at that time a leaſe of it for three years; here A. ſhall hold it for his term of three years, and afterwards it ſhall go to the king. 6. A ſaving, totally repugnant to the body of the act, is void. If, therefore, an act of parliament veſts land in the king and his heirs, ſaving the right of all perſons whomſoever; or veſts the land of A. in the king, ſaving the right of A.: in either of theſe caſes the ſaving is totally repugnant to the body of the ſtatute, and (if good) would render the ſtatute of no effect or operation; and therefore the ſaving is void, and the land veſts abſolutely in the king. 7. Where the common law and a ſtatute differ, the common law gives place to the ſtatute; and an old ſtatute gives place to a new one: and this upon a general principle of univerſal law, that "leges poſteriores priores contrarias abrogant;" conſonant to which it was laid down by a law of the Twelve Tables at Rome, that "quod populus poſtremum juſſit, id jus ratum eſto." This is to be underſtood only when the latter ſtatute is couched in negative terms, or where its matter is ſo clearly repugnant, that it neceſſarily implies a negative. But if both acts be merely affirmative, and the ſubſtance ſuch that both may ſtand together, here the latter does not repeal the former, but they ſhall both have a concurrent efficacy. 8. If a ſtatute, that repeals another, is itſelf afterwards repealed, the firſt ſtatute is hereby revived, without any formal words for that purpoſe. 9. Acts of parliament, derogatory from the power of ſubſequent parliaments, bind not. 10. Acts of parliament, that are impoſſible to be performed, are of no validity; and if out of them ariſe collaterally any abſurd conſequences, manifeſtly contradictory to common reaſon, they are, with regard to thoſe collateral conſequences, void. Some have laid down this rule more largely, alleging that acts of parliament, contrary to reaſon, are void. We may further obſerve, that equity is frequently called in to aſſiſt, to moderate, and to explain poſitive laws. Nevertheleſs, our courts of equity are only converſant in matters of property. For the freedom of our conſtitution will not allow, that in criminal caſes a power ſhould be lodged in any judge, to conſtrue the law otherwiſe than according to the letter. This caution, while it admirably protects the public liberty, can never bear hard upon individuals. A man cannot ſuffer *more* puniſhment than the law aſſigns, but he may ſuffer *leſs*. The laws cannot be ſtrained by partiality to inflict a penalty beyond what the letter will warrant; but in caſes where the letter induces any apparent hardſhip, the crown has the power to pardon. Blackſt. Com. vol. i. Introd. § 3.

CONSTRUCTION Military. This term, in its general and unlimited acceptation, extends to the conſtructing of every ſort of military work. But it is commonly and peculiarly applied to the conſtruction of the different parts of the various ſyſtems of fortification that have been delivered by writers on the ſubject in different nations and languages. And to this application of it we ſhall chiefly attend.

Fear and neceſſity muſt have firſt given riſe to works of defence or fortification, of which the object originally was ſafety or ſecurity. And although there muſt have been quarrels ever ſince there have been men, we have every reaſon to ſuppoſe that the erection of works of defence, even of the ſimpleſt kind, were ſubſequent to the fiſhing and hunting ſtate of ſociety, and even in a great meaſure to that of the paſtoral.

The

The discovery of America, which exhibited men in a much simpler state of society than any that was recorded prior to that event in history, sacred or profane, afforded no specimens or traces of such works among tribes who had not formed some sort of villages, and become partly, at least stationary, by paying some attention to agriculture. The form and structure of works of defence, varied gradually with the means and the modes of attacking them. At first, a simple row of pickets, or a ditch, with that addition, was deemed sufficient. Afterwards, in woody countries (and all countries have been more or less covered with woods) an enceinte or enclosure of solid timber was made use of. Sometimes the walls round towns were raised with beams, earth, and stones. This mode of erecting them appears to have prevailed among the Gauls, in the time of Julius Cæsar, who, in the 23d chapter or section of his seventh book, "De Bello Gallico," expresses himself on the subject in the following words.

"Muris autem omnibus Gallicis hæc fere forma est. Trabes directæ perpetuæ in longitudinem, paribus intervallis, distantes inter se binos pedes, in solo collocantur. Eæ revinciuntur introrsus, et multo aggere vestiuntur. Ea autem, quæ diximus intervalla grandibus in fronte saxis effarciuntur. Iis collocatis et coagmentatis, alius insuper ordo adjicitur, ut idem illud intervallum servetur, neque inter se contingant trabes, sed paribus intermissæ spatiis singulæ singulis saxis interjectis arte contineantur: sic deinceps omne opus contexitur dum justa muri altitudo expleatur. Hoc quum in speciem varietatemque opus deforme non est, alternis trabibus aut saxis, quæ rectis lineis suos ordines servant, tum ad utilitatem et defensionem urbium summam habet opportunitatem, quod et ab incendio lapis, et ab ariete materia defendit, quæ perpetuis trabibus pedes quadragenos, plerumque introrsus revincta, neque perrumpi neque distrahi potest."

In some parts of Russia, there are even at this day towns defended by wooden walls; and in America there are some works, even with small bastions, composed entirely of wood or timber.

In countries, however, either considerably cleared, or not abundantly supplied with timber, stones come chiefly, and almost solely, to be made use of for erecting walls round their towns and cities. These walls were at first simple stone enclosures, of a sufficient height to prevent surprises, and thickness at top for three or four men to walk a-breast. But having no flanking defences, they occasioned dead or unseen parts throughout their whole extent; by which means the assailants, as soon as they got near the foot of them, were almost as much screened or covered from the view of those who defended them, as they on the other hand were from theirs. To remedy this inconvenience and defect, openings were made on the top of such a wall, and loop-holes. This contrivance, however, did not afford a complete remedy, or entirely remove the defect. For the opposite sides of every adjacent two of these openings and loop-holes, which were wider within than without, produced, formed with the front of the wall a triangular space, that could not be seen or commanded from them. To remove this defect, square towers were added to the wall at distances from one another, suited to the missile weapons then in use, with one face of each looking towards the field. This mode, however, of enclosing towns, was still found to be imperfect and defective, as the face of each of those towers that fronted the field, could not be seen from any other part, and of course could not be defended. Round towers were therefore introduced instead of them, as creating fewer dead parts, and as being better calculated for resisting battering engines. This method was practised a long time, and would, in all human probability, have continued in use had it not been for the invention of gun-powder, which changed the mode of attacking places, and of course rendered alterations in that of defending them necessary. Even after the application of that powerful and inflammable substance to military purposes, bulwarks, or large bastions, of a round form, continued for a long time in use. Most of these have been either taken down, or changed into angular ones. But several still remain, and are to be seen in different parts of Europe.

The intestine wars which harrassed Italy for a length of time, taught the Italians experience in war, and the necessity of attending to every thing that contributed to improve the art of defence. They were accordingly the first people in Europe who fixed the idea of modern fortification, and reduced it to a sort of system. Unaccustomed then, however, to the effects of shells, and a numerous artillery, they confined their improvements chiefly to the covering of two guns in each flank, for disputing the passage of the ditch.

The war, which afterwards broke out in the Low Countries, and continued during eighty years with an extraordinary degree of valour and obstinacy, and a destruction of the human race, of which there are but few examples, contributed a good deal to the advancement of this science. The Dutch, who alone, and unsupported, had to oppose for a long time the whole pressure of a power so formidable as that of Spain then was, made great progress in the attack and defence of places. And it is from that time that we ought to date the epoch of the superiority which the former of these has acquired over the latter.

The following is Errard's method of construction. He fortifies inwards; and his line of defence is rasant in all figures. He makes his flank from the square, up to the octagon, inclusive, perpendicular to the face of the bastion. But, in all other polygons, he makes it perpendicular to the curtain.

The flanked angle, or saliant angle of the bastion, is, in the square, equal to sixty degrees, in the pentagon, to eighty, and in all other polygons, to ninety degrees.

For instance, let AB (*Plate* V. *Fortification, fig.* 1.) be the side of a hexagon, of which O is the centre. Draw the radii A O, B O, at the extremities A, B, of the exterior side A B, make the angles O A F, O B E, each equal to forty-five degrees. From the points A, B, draw right lines A E, B F, bisecting these angles, and meeting B E, A F, in the points E, F. Then these last-mentioned points E, F, will be the terminations of the curtain E F, of the lines of defence A F, B E, and of the flanks E C, F D, which in all figures, up to the octagon inclusive, are by this construction perpendicular to A F, B E, the lines of defence, but in all other polygons to E F, the curtain. If the same construction be made on each of the other sides of the hexagon, it will be fortified. And if from C, D, the angles of the epaules or shoulders, right lines be drawn parallel to the rasant lines, or lines of defence A F, B E, we get the counterscarp of the ditch. On the inside he makes a rampart equal in breadth to the length of one of the flanks.

Since the line A B, in the preceding figure, is supposed to represent the side of a regular hexagon inscribed in a circle, the angle A O B of the centre is equal to 60 degrees, the angle A B K of the polygon is equal to 120 degrees; the flanked angles, or angles of the bastions L A C, D B M,

D B M, are each of them equal to a right one, or 90 degrees. The angles of the epaules or fhoulders A C E, B D F, are alfo each of them equal to a right angle. The angle *diminué* A F G, or B E H, or the angle A B E, or B A F, formed by the exterior fide, and either line of defence being equal to the difference between 60 and 45 degrees, is of courfe equal to 15 degrees. The angle C E F, or D F E of the flank, is equal to 75 degrees, and the flanking angle C N D, is equal to 150 degrees. But fince the angle C A E, which is half the flanked angle, or angle of the baftion, is equal to 45 degrees, and is by conftruction bifected by the right line A E, each of the angles C A E, E A G is equal to 22° 30′. And the angle A E C, the complement of C A E to 90°, is confequently equal to 67° 30′. The angle A E G is therefore equal to 37° 30′, the angle A E F to 142° 30′; the angle A G F to 120 degrees, and the angle E A B to 37° 30′. Alfo the angle A E B is equal to 127° 30′.

Thus then all the neceffary angles are known for calculating the different parts of the conftruction. For the exterior fide A B being given, the line of defence A F or B E is eafily found by means of the triangle A F B, or the triangle A E B, by the following analogies.

As the fine of the angle A F B
Is to the fine of the angle A B F,
So is the fide A B
To the fide A F.
As the fine of the angle A E B
Is to the fine of the angle B A E,
So is the exterior fide A B
To the line of defence B E.

And the right line A E, or its equal B F, is found by the following analogy.

As the fine of the angle A E B
Is to the fine of the angle A B E,
So is the exterior fide A B
To the right line A E or B F.

And as the angle A C E is a right one, we get the face A C of the baftion, and the flank C E, by means of A E, and the following analogies.

As radius
Is to the fine of the angle A E C,
So is the right line A E, or its equal B F,
To A C, the face of the baftion, or its equal B D.
And,
As radius
Is to the fine of the angle C A E,
So is the right line A E, or its equal B F,
To the flank C E, or its equal D F.

The perpendicular to the exterior fide A B, or the rectilinear diftance from the middle of it, to the point N, the interfection of the rafant lines, or lines of defence, is determined by this analogy.

As radius
Is to the tangent of the angle BAN, or ABN,
So is half the exterior A B
To the perpendicular diftance from the middle thereof, to the point N.

By means of the flank, the curtain is found by the following analogy.

As radius
Is to the fecant of the angle CEF, or DFE,
So is the flank C E, or D F,
To the curtain E F.

And the capital A G of the baftion is found by this analogy.

As the fine of the angle A G E
Is to the fine of the angle A E G,
So is the right line A E
To the capital A G of the baftion.

In like manner, the demi-gorge E G, or F H, is found by the following analogy.

As the fine of the angle A G E
Is to the fine of the angle E A G,
So is the right line A E, or its equal B F,
To the demi-gorge G E, or its equal F H.

The calculation of thefe different parts will be fimilar when the flank is perpendicular to the curtain, inftead of the lines of defence as in polygons above an octagon, which is effected by taking the right lines NC, ND, equal, refpectively, to the lines N E, N F. The flanks then are longer and better.

This author affigns no reafon drawn either from the nature of the polygons, or their capability of being embraced or defended for the length of his perpendicular or the magnitude of the angle formed by an exterior fide, and a line of defence. And, as in all polygons, from the hexagon upwards, the flanked angle or faliant angle of the baftion, is the fame, or equal to 90 degrees; his conftruction in all polygons, above an octagon, gives this perpendicular or angle much greater than it ought to be. Thus, in a decagon, it gives this angle equal to $\dfrac{180^\circ - \frac{360^\circ}{10} - 90^\circ}{2} =$ 27°; whereas, it ought but very little to exceed $22\frac{1}{2}°$.

In a dodecagon is given this angle $= \dfrac{180^\circ - \frac{360^\circ}{12} - 90^\circ}{2}$ = 30°.; whereas it ought only to be about 24°. And this conftruction on part of a right line, which may be regarded as a polygon of an infinite or rather indefinite number of fides, gives this angle equal to 45 degrees, and the flanking angles formed by the interfections of the lines of defence, equal each to 90 degrees. The lines of defence in this cafe exactly correfpond with Montalambert's conftruction in his "Fortification Perpendiculaire."

As in this conftruction the angle *diminué*, or the angle formed by an exterior fide and a line of defence increafes faft in magnitude, as the number of the fides of the polygon increafe, being in the dodecagon twice as great as it is in the hexagon, the lengths of the curtains decreafe and the faces of the baftions increafe greatly beyond their juft proportions, which is a material defect; fince the faces, which are the weakeft parts, being defended refpectively, only on one fide by a fingle flank, are thereby augmented, and the curtains, which are the ftrongeft, being defended each on both fides, or by two flanks, are diminifhed.

His mode of placing the flanks in figures up to the octagon inclufive at right angles to the lines of defence, and in other polygons perpendicular to the curtains, though it certainly fecures them well againft the enemies' batteries, and renders them fit for defending the gates and curtains, (which, however, by their nearnefs to the flanks, are naturally beft fecured), does not enable them to difcover the enemies' batteries fufficiently to defend the counterfcarp, and prevent them from advancing their works to it, a circumftance which affords great advantage to the befiegers. And if orillons be made in flanks, fo placed, the covered flanks would be fo hid, that they could fcarcely fee the ditch throughout its whole width, and the merlons from their angles towards the field being very acute, would eafily be ruined by the enemies' batteries and rendered ufelefs. Flanks ought to be placed per-

pendicularly, or at leaft very nearly fo to the lines of defence. For when an enemy once makes a lodgment on the counterfcarp, he will difcover them whether they be fo placed or not. And if flanks be difcovered, they alfo difcover, and being either reveted or demi-reveted and formed of earth that is well fettled, they are by no means fo eafily ruined as the batteries of the befiegers, which are formed of gabions and newly raifed earth.

Count Pagan's method of conftruction on a polygon, (*fig.* 2.) is widely different from that of Errard, and alfo much preferable. For inftead of making the angle of the flank acute in the octagon and figures of a fmaller number of fides, and only equal to a right one in any polygon of a greater number of fides, as Errard does, he makes it obtufe and places his flanks perpendicularly to the lines of defence, in order that they may difcover more ground, and the better rafe and defend the faces of the baftions, which are the moft faliant and weakeft parts of the body of the place and are firft attacked, breaches being commonly made in them. This ingenious author makes his lines of defence like Errard's, always rafant, but does not like him make 90 degrees the maximum of his flanked angle, or angle of his baftion.

He delivers conftructions for three forts of fortifications, namely, the great, the mean, and the little. He fortifies or conftructs inwards, and in the great fortification makes the exterior fide equal to 200 toifes, in the mean equal to 180 toifes, and in the little equal to 160 toifes. He allows 60 toifes to each face of a baftion in the great, 55 in the mean, and 50 in the little, in all figures above a fquare. He makes the perpendicular to the exterior fide in the great fortification in all figures, except the fquare where it is 27 toifes, equal to 30 toifes; in the mean equal to 24 toifes; and in the little equal to 21.

The dimenfions of thefe principal lines in thefe three kinds of fortification, are contained in the following Table.

	Great Fortification.		*Mean.*		*Little.*	
	Square.	In all other Polygons.	Square.	In all other Polygons.	Square.	In all other Polygons.
Exterior Sides.	200	200	180	180	160	160
Perpendiculars.	27	30	24	30	21	30
Facesofbaftions	60	60	55	55	45	50

Suppofing then the exterior fide A B, (fee the figure,) equal to 200 toifes in the great, to 180 in the mean, and to 160 in the little, bifect it in the point C. In C O, which is perpendicular to A B, take C D equal to 30 toifes, in all regular figures of a greater number of fides than four. Through the point D, draw the lines of defence A D H, B D G, on which take A E and B F, each equal to 60 toifes in the great fortification, to 55 in the mean, and to 50 in the little. Then draw the flanks E G, F H, perpendicularly to the rafant lines or lines of defence B G, A H, and form the curtain by joining the points G, H. This is Count Pagan's conftruction, without orillons and retired flanks.

The figure is a regular hexagon, fuppofed to have each of its fides equal to 180 toifes, as in his mean fortification. The angle A O B of the centre is therefore equal to 60 degrees, and the angle of the polygon to 120. A C, or B C, is equal to 90 toifes, the perpendicular C D is equal to 30, and the face A E, or B F, to 55 by conftruction.

Now by means of thefe lines and angles, the others are eafily found. And in the firft place, the angle *diminué* C A D, or the angle formed by the exterior fide A B, and the line of defence A H, is formed by the following analogy.

As A C, equal to 90 toifes,
Is to C D, equal to 30 toifes,
So is radius
To the tangent of the angle $CAD = 18° \; 26' \; 6''$ very nearly. If this angle be taken from 60 degrees, half the angle of the polygon, we get the angle O A H, or M A E, equal to $41° \; 33' \; 54''$. But this is equal to half the faliant angle of the baftion, wherefore the whole flanked angle or angle of the baftion is equal to $83° \; 7' \; 48''$. And the flanking angle A D B, being equal to the excefs of 180 degrees above twice the angle *diminué*, is evidently equal to $143° \; 7' \; 48''$.

The tenaille A D, being equal to $\sqrt{\overline{AC}^2 + \overline{CD}^2}$, is $= \sqrt{9000} = 10\sqrt{90} = 94.868329805$ nearly. Or it is found by this analogy.

As radius
Is to the fecant of the angle *diminué* C A D,
So is A C, half the exterior fide A B,
To the tenaille A D.

If from this there be taken the face A E, which is equal by conftruction to 55 toifes, we get the right line D E, and the following analogy for the flank E G.

As radius
Is to the fine of double the angle *diminué* C A D,
So is the right line D E
To the flank E G.

And as the angle A E G of the epaule or fhoulder is always, in regular conftruction, equal to twice the angle *diminué* C A D, and the angle E G B formed by the flank and line of defence, the angle D E G is known, and D G is afcertained by the following analogy.

As radius
Is to the fine of the angle D E G,
So is the right line D E
To the right line D G.

The angle E G H of the flank, is in this conftruction equal to 90 degrees, together with the angle *diminué*, or the angle formed by the exterior fide, and one of the lines of defence.

The complement, D G, or D H, being thus found, the curtain G H is afcertained by the following analogy.

As the fine of the angle *diminué* D G H
Is to the fine of double the faid angle,
So is the complement D G
To the curtain G H.

The lengthened curtain M H, or G N, is determined by the following analogy.

As the fine of half the angle of the polygon
Is to the fine of half the flanked angle,
So is the rafant line, or line of defence A H,
To the lengthened curtain M H. From which, and the curtain G H, the inward or interior fide M N is immediately obtained.

And the capital A M is afcertained by this analogy.

As the fine of half the angle of the polygon
Is to the fine of the angle *diminué*,
So is the rafant line, or line of defence A H,
To the capital A M of the baftion.

It is manifeft from the foregoing table, that the perpendicular in this learned and judicious author's great fortification, fubtends in the fquare an angle of about $15° \; 6' \; 34''$ nearly, and in all other regular figures of about $16° \; 41' \; 57''$ nearly; that in his mean fortification it fubtends in the fquare an angle of about

about 14° 55′ 53″, and in all other regular figures an angle of about 18° 26′ 6″; and that in his little fortification, it ſubtends in the ſquare an angle of about 14° 42′ 30″, and in all other regular figures an angle of about 20° 33′ 22″.

For his caſemates or retired batteries and orillons, he biſects his flanks, leaving one-half of each adjoining the epaule or ſhoulder for its orillon. The firſt flank or battery on the other half is retired five toiſes behind the orillon, and is two toiſes above the level of the ditch; the ſecond is retired ſeven toiſes within the firſt, and is four toiſes above the level of the ditch; and the third is retired ſeven toiſes behind the ſecond, and is ſix toiſes above the level of the ditch, being as high as the rampart, which is three toiſes above the level of the field, or terre-plain of the place, as the bottom of the ditch is three toiſes below it. Theſe are formed by continuing the lines of defence into the baſtions, and drawing lines parallel to theſe continuations from the points biſecting the flanks.

He makes within each of his baſtions a ſort of ſmaller baſtion, or a cavalier in the form of one, having its faces parallel to thoſe of the baſtion and 13 toiſes diſtant from them, which ſerves as a retrenchment. The great ditch is 16 toiſes wide, and its counterſcarp is parallel to the faces of the baſtions or to the lines of defence. The capital of each of the ravelins, which he places on the re-entering angles of the counterſcarp in ſuch a manner as to be defended by the faces of the baſtions and the counter-guards before them, is equal to 50 toiſes, and its faces are drawn to the ſhoulders. The demi-gorges of the redoubt within the ravelin are each equal to 15 toiſes, and the faces of it are parallel to thoſe of the ravelin itſelf. The ditch of the ravelin is 12 toiſes wide, and that of the redoubt 6. The ſaliant angle of each counter-guard is 40 toiſes diſtant from that of the baſtion which it covers, and this work is from 9 to 10 toiſes broad at its extremities. The ditch before it is 12 toiſes wide. The covert-way is 4 toiſes wide, and the faces of the places of arms are each 8 toiſes long, and parallel to the oppoſite counterſcarp.

The flanks, curtain, and other lines in this conſtruction found above by means of ſines, tangents, and ſecants, may be aſcertained without any logarithmic table, in the following manner.

Since the tenaille A D is $= 10\sqrt{90}$ toiſes $= 30\sqrt{10}$ toiſes, and A C is = 90 toiſes by hypotheſis, and C D is = 30 toiſes, by conſtruction, or $= \frac{AC}{3}$, we have A D : A C :: $\sqrt{10}$: 3, and A D : C D :: $\sqrt{10}$: 1. But A D : A C :: A E (55 toiſes by conſtruction) : the exceſs of A C above one half of E F, which exceſs is therefore equal to $\frac{3 \times 55}{\sqrt{10}}$ toiſes, and its double, which is the exceſs of A B above E F, is of courſe equal to $\frac{330}{\sqrt{10}}$ toiſes, or to $33\sqrt{10}$ toiſes; conſequently E F is equal to $180 - 33\sqrt{10}$ toiſes; but A D : C D :: E F : F H, and A D : A C :: E F : E H; wherefore the flank F H is equal to $\frac{180-33\sqrt{10}}{\sqrt{10}}$ toiſes $= 18\sqrt{10}-33$ toiſes; and E H is equal to $\frac{540-99\sqrt{10}}{\sqrt{10}}$ toiſes $= 54\sqrt{10}-99$ toiſes. And ſince E D is = A D − A E $= 30\sqrt{10} - 55$ toiſes; we get D H equal to $24\sqrt{10} - 44$ toiſes. But A D : A B :: D H : G H, which is therefore equal to $\frac{24\sqrt{10}-44}{\sqrt{10}} \times 6$ toiſes $= \frac{144\sqrt{10}-264}{\sqrt{10}}$ toiſes; and D I, which is equal to a ſixth part of G H is equal to $\frac{24\sqrt{10}-44}{\sqrt{10}}$ toiſes. Conſequently C I is equal to $\frac{54\sqrt{10}-44}{\sqrt{10}}$ toiſes. And O C : C I :: O A : the capital A M of the baſtion. Count Pagan's flank, in his mean fortification, being to the perpendicular, as $18\sqrt{10}-33$ to 30, is upwards of 5 toiſes leſs than it, which is certainly too great a difference.

This learned and judicious author, whom the principal fortifiers ſince his time, particularly Vauban, have very much followed, conſidering that the flanks, ramparts, and ditches, were the works that contributed moſt powerfully towards the defence of the body of a place, and the retarding of the approaches of an enemy to it, made the demi-gorges of his baſtions large, in order to have three flanks or batteries on each of them, ſufficiently long for placing four pieces of cannon in, reſpectively. Three of theſe, in each of the ſaid three flanks, are, by his conſtruction, ſo well covered from the counter-batteries of the beſiegers, that they cannot eaſily be damaged by them. And the beſiegers, on approaching the breaches, and attempting to make lodgments in the ruins of them, muſt ſuffer greatly from the guns ſo covered in theſe retired flanks, as they are then fired on by them, de revers, or in the rear.

Though his diviſion of fortification, into great, mean, and little, ſeems not to be of much uſe, or moment, he muſt certainly be allowed to be the firſt writer on the ſubject that gave the true poſition to his flanks, making them perpendicular to the lines of defence. His mean fortification appears to be preferable to the great, as it does not make the lines of defence too long for muſquet-ſhot. The poſition of the flanks, and great length, he gives to the faces of his baſtions, render his demi-gorges long enough to afford a ſufficiency of room for his retired flanks.

The two ditches, with the two ramparts, that he makes, are well calculated for obſtructing and retarding the enemies' paſſage of the ditch, for depriving them of the uſe of fourneaux, and for preventing them from lodging themſelves on the ruins of the breaches. For when the beſiegers have even paſſed the main ditch, and taken the firſt rampart, they will find themſelves expoſed in the ſecond ditch to the beſieged's fire on all ſides, and liable to be deſtroyed by ſhells, handgrenades, fourneaux, mines, &c.

By giving one-half of his flank to the orillon, he covers his retired batteries extremely well. The ditch is very well defended from the flanks, which being perpendicular to the lines of defence, look fully along the faces of the oppoſite baſtions.

It muſt be obſerved, however, that though the poſition of his flanks be good, they are too ſmall, particularly in polygons of a conſiderable number of ſides, being a good deal ſhorter than the perpendiculars to the exterior ſides; whereas they ſhould be equal, or nearly equal to them, as perpendiculars to the exterior ſides of polygons were firſt introduced into conſtruction for the ſole purpoſe of obtaining flanking defences. This is in a great meaſure occaſioned by his making the faces of his baſtions too long, which he was probably led to do from a deſire of obtaining three retired batteries in each flank. The face of the baſtion is equal to the $\frac{11}{36}$th part of the exterior ſide, whereas it may with confidence be aſſerted, that it ought not to exceed a fourth. For the faces of the baſtions are moſt ſaliant, and conſequently the tendereſt part of the body of the place. They are always firſt attacked, and in them the breaches are conſtantly made. But when they are very long, the beſiegers can

can make large breaches in them, which is a great advantage to them, and a no lefs difadvantage to the befieged.

The retrenched baftion, or redoubt in form of one within the baftion, muft increafe the expence at leaft one-third: The ditch before it is but ill defended, as there are no tenailles for that purpofe. And as it is hollow or empty, it may be taken as eafily as the main baftion, by means of a fecond mine, and thereby occafion the lofs of the place, efpecially as no retrenchment can be raifed within it to enable the befieged to capitulate with more advantage.

His retired flanks, or batteries, appear to be too near to one another, being only feven toifes diftant from outline to outline.

He makes no traverfes. But this cannot be imputed to him as either an overfight or fault, as firing *en ricochet* was not known in his time. By giving the fame length of perpendicular to the exterior fides of all figures of a greater number of fides than four, he makes the flanked angle, or angle of the baftion in a polygon of a confiderable number of fides, very obtufe. This angle begins to become obtufe in the hexagon, and by his conftruction on part of a right line, it is no lefs an angle than one of $143^\circ\ 7'\ 48''$.

He affigns no reafon whatfoever for the length of his perpendicular, derived from the properties of different polygons, or their relative degree of importance and capability of defence, nor for his giving the fame perpendicular in all regular figures of a greater number of fides than four. His perpendiculars are mere arbitrary affumptions, like thofe of all other authors, who have written on fortification fince his time. The truth however is, that every regular figure has a perpendicular of its own, which is different from that of any other, of a precife and determinate length, and bearing a given ratio to the exterior fide.

Mr. Blondel's method of conftruction is as follows:

Like Count Pagan he fortifies inwards, but inftead of the perpendicular he begins with the angle *diminué*, or the angle formed by an exterior fide, and a line of defence. This angle he determines by taking a right angle, or 90 degrees from the angle of the polygon, and adding 15 degrees to a third part of the remainder. Thus, if n denote the number of the fides of a regular figure, the angle of the polygon, or the angle contained by two of its fides, will be equal to $180^\circ - \frac{360^\circ}{n}$, and his angle *diminué* will of courfe be equal to $30^\circ - \frac{120^\circ}{n} + 15^\circ$ or $45^\circ - \frac{120^\circ}{n}$, which gives 15° for it in the fquare, 21° in the pentagon, 25° in a hexagon, and in his conftruction on part of a right line 45°, which then makes the perpendicular equal to half the exterior fide. This expreffion for his angle *diminué*, as is evident by infpection, is always equal to the excefs of 45° above 120° divided by the number of the fides of the figure; wherefore it is always found without any reference whatfoever to the angle of the polygon, by dividing 120° by the number of the fides of the figure, and fubtracting the quotient from 45°. And fince the angle of the centre, or the angle fubtended by one of the fides of the figure, is equal to $\frac{360^\circ}{n}$, this angle *diminué* is had by taking from 45 degrees a third part of the angle of the centre.

His angle *diminué* gives the angle of the baftion, or flanked angle, in a fquare equal to 60 degrees, in a pentagon equal to 66 degrees, in a hexagon equal to 70 degrees, and in a conftruction on part of a right line equal to 90 degrees.

The flanking angle, or the angle formed by the lines of defence, is in the fquare, equal to 150 degrees, in the pentagon, to 138, in the hexagon, to 130, and in a conftruction on part of a right line, to 90 degrees.

He fuppofes two forts of fortification, *viz.* the great, in which he makes the exterior fide equal to 200 toifes in all polygons; his line of defence equal to feven tenths of the exterior fide, or 140 toifes; and the face of his baftion equal to half the tenaille, or line between a flanked angle and the interfection of the lines of defence; and the little, in which he makes the exterior fide in every figure equal to 170 toifes, the line of defence equal to feven tenths of this, or to 119 or 120 toifes, and the face of the baftion equal to half the tenaille, his conftruction in both being the fame.

Thus for inftance, let A B (*fig.* 3.) be the fide of a hexagon. At its extremities A, B, make the angles *diminué* A B G, B A G, each equal to 25 degrees, the excefs of 45 degrees above a third part of A M B the angle of the centre. On A G, B G produced take A F, B E for the lines of defence, each equal to feven tenths of A B the exterior fide. Bifect the tenailles A G, B G, in the points C, D, to get the faces A C, B D, draw the flanks C E, D F, and form the curtain by drawing E F.

Mr. Blondel takes on each flank 10 toifes for his fquare orillon, employing the reft of it as a covered flank, which he keeps retired five or fix toifes inwards, as high as the heptagon; on higher polygons from 10 to 12 toifes, in order to lengthen the curtains; and to obtain curtains in conftructions, which being made on a ftraight line, or very high polygons, have none, or very fhort ones, he retires his flank as much as 20 toifes, that he may have a curtain upwards of 20 toifes long. For by his conftruction on a right line, where the angle *diminué* is 45 degrees, the tenaille is upwards of feven tenths of the exterior fide. The retirade of the flank is meafured on a right line, drawn from the angle of the oppofite baftion, to the point terminating the ten toifes, fet off from the epaule on the flank for the orillon. Like Count Pagan, he makes three retired batteries in each flank within the cafemate, allowing three toifes for the breadth of the parapet in each, and five for its platform, or eight toifes from the outline of one battery to that of another. The loweft of thefe retired flanks is from nine to twelve feet above the bottom of the ditch, the fecond from 18 to 24, and the third, or higheft, from 27 to 36 feet, being level with the rampart. Thefe three flanks are terminated towards the demi-gorge upon the line of defence produced, and towards the orillon, on the line drawn from the angle of the oppofite baftion, through the end of the fame orillon. The parapet of the loweft flank is nine or ten feet high, that of the middle one fix or feven, and that of the third, or higheft one, $3\frac{1}{2}$. Thofe of the loweft, and middle one, muft of courfe have embrafures in them.

As there is a great deal of fpace between the two high flanks in each baftion, he makes a cavalier in it, having its faces parallel to the flanks, and each of them capable of holding twelve pieces of cannon at leaft. Thefe cavaliers and retired flanks muft be made with the earth taken from the great ditch, of which the width is equal to the length of one of the flanks. The re-entering angle of the counterfcarp is therefore oppofite to and nearly about the middle of the exterior fide.

This author places a counter-guard in front of each baftion, with its faces parallel to thofe of the fame compofed entirely of mafonry without any earth, and every where countermined. Its breadth or thicknefs is only from 3 to 4 toifes, including its parapet, which is from 8 to 10 feet thick. It is erected in the great ditch 10 or 12 toifes diftant

tant from the counterfcarp, which diftance therefrom forms its ditch. The principal object in erecting this counter-guard is to conceal from the enemies' view the low flanks oppofite to it, whilft its narrownefs or fmall breadth puts it out of his power to place his guns in after he has taken it.

The faliant angle of his ravelin is determined by the interfection of two arcs, defcribed from the fhoulders of the two adjoining baftions, with a radius equal to the diftance between them. Its faces produced meet thofe of the baftions about 6 toifes from the fhoulders and are bounded on the lines or faces of the counter-guards produced, which alfo determine the gorge of the ravelin.

The ditch of the ravelin is from 10 to 12 toifes broad, and that it may be the better defended, Mr. Blondel takes, in the face of the baftion, a fpace equal to this breadth, commencing fix toifes from the fhoulder, in which he makes a low battery of 4 or 5 feet high, and another on the infide of the fame height with the parapet of the place, and retired about 7 toifes within the face.

The ditch before the counter-guards is 10 toifes broad. The ravelin not only covers the fhoulders and the orillons of each baftion, but likewife defends the ditch of the counter-guard, as he takes as much of its face as is fufficient for feeing or difcovering all that to make two batteries in, *viz.* a low one and a high one in the fame manner as he does in the faces of the baftions. He allows no more terre-plain in the ravelin, than what is juft enough for the recoiling of his guns, leaving all the reft of its infide empty for the purpofe of being able eafily to countermine the rampart, and to prevent the enemy from making a lodgment in it, after he may have forced it.

The better to cover the batteries in the face of each baftion, which defend the ditch of the ravelin, he adds in the angles of the counterfcarp of the ravelin *lunettes*, in the form of lozenges, allowing 20 toifes for the femi-gorge in each. Thefe have their faces parallel to the counterfcarps of the ditches before the ravelin and counter-guard, and the ditch before them 8 toifes broad.

The author likewife makes a *lunette* in his great ditch from 7 to 8 toifes broad, which he carries quite round the work to prevent the low flanks, which would be otherwife eafily acceffible, from being got at. A fmaller or narrower *lunette* might alfo be made in the ditches of the outworks, particularly when there are batteries in the demi-lunes or ravelins.

The calculations for the angles and lines of a conftruction on the fides of a polygon, according to Mr. Blondel's method, are made in the following manner.

Since the figure referred to is a hexagon, the angle of the centre is equal to 60 degrees, the angle of the polygon to 120, and the angle *diminué*, B A F or A B E, to 25 degrees. The flanking-angle, A G B, is 130 degrees, and the flanked angle, N A G, or D B S, is equal to 70 degrees. Wherefore half the flanked angle, E B O, or F A P, is equal to 35 degrees.

The tenaille A G, and of courfe the face A C of the baftion, is found by the following analogy.

As the fine of the angle A G B
Is to the fine of the angle A B G,
So is the exterior fide A B
To the tenaille A G, of which the face A C is one-half.

From the line of defence A F, which is feven-tenths of the exterior fide A B, we get the complement G F or G E, and the curtain E F of courfe by this analogy.

As the fine of the angle E F G
Is to the fine of the angle E G F,
So is the complement E G
To the curtain E F.

And as the fum of the angles C E F, E C F, is equal to $180° -$ the angle *diminué* C F E $(25°) = 155°$, and C F, E F, are known, we have this analogy.

As the fum of the fides C F, E F
Is to their difference,
So is the tangent of $77° \ 30'$, half the fum of the angles,
To the tangent of half their difference.

Half this difference added to half the fum, gives C E F the angle of the flank, and taken from half the fum gives E C F the fupplement of A C E the angle of the *epaule* or fhoulder.

And for the flank C E we have the following analogy.

As the fine of C E F, the angle of the flank,
Is to the fine of the angle *diminué* C F E,
So is C F
To the flank C E.

The demi-gorge E P is determined by firft finding the lengthened curtain F P by this analogy.

As the fine of the angle A P F, which is known,
Is to the fine of the angle F A P which is alfo known,
So is the line of defence A F $= \frac{7}{10}$ of A B
To the lengthened curtain F P.

Then from F P fo found take the curtain E F, and there will remain the demi-gorge E P.

TABLE

TABLE of the Angles of the different Parts of the Conſtruction, according to Mr. BLONDEL's Method.

Angles	A M B of the Centre.	Q A B of the Polygon.	M A B half of that of the Polygon.	N A C flanked, or of the baſtion.	M A C half of the flanked.	C A I diminué.	A G B flanking, or of the tenaille.	F G D ſupplement of flanking-angle.	F D B of the Epaule or Shoulder.	F D G ſupplement of the Epaule.	D F E of the Flank.	G F D	G H P
Square 4 ſides.	90°	90°	45°	60°	30°	15°	150°	30°	120°	60°	122° 47′	107° 47′	120°
Pentagon 5	72°	108°	54°	66°	33°	21°	138°	42°	132°	48°	123° 11′	100° 41′	105°
Hexagon 6	60°	120°	60°	70°	35°	25°	130°	50°	140°	40°	123° 48′	97° 48′	95°
Heptagon 7	51° 25′	128° 35′	64° 17½′	72° 51′	36° 25½′	27° 52′	124° 16′	55° 44′	145° 44′	34° 16′	124° 15′	96° 23′	87° 51′
Octagon 8	45°	135°	67° 30′	75°	37° 30′	30°	120°	60°	150°	30°	125° 4′	95° 4′	82° 30′
Enneagon 9	40°	140°	70°	76° 40′	38° 20′	31° 40′	116° 40′	63° 20′	153° 20′	26° 40′	125° 20′	94° 40′	78° 20′
Decagon 10	36°	144°	72°	78°	39°	33°	114°	66°	156°	24°	126° 54′	93° 54′	75°
Endecagon 11	32° 44′	147° 16′	73° 38′	79° 6′	39° 33′	34° 5′	111° 50′	68° 10′	158° 10′	21° 50′	127° 42′	93° 37′	72° 17′
Dodecagon 12	30°	150°	75°	80°	40°	35°	110°	70°	160°	20°	128° 28′	93° 28′	70°
Right line.	0	180°	90°	90°	45°	45°	90°	90°	180°	0	135°	90°	45°

TABLE of the Lines of the different Parts of the Conſtruction according to Mr. BLONDEL's Method.

Lines.	A B Exterior ſide.	O P Interior ſide.	A F Line of Defence.	B G Tenaille.	B D Face.	F D Flank.	E F Curtain.	F O Demi-gorge.	B O Capital.	B M Semi-diameter major.	O M. Semi-diameter minor.	F K	B K	G K	G F	E O
Square 4 ſides	200 170	127½ 109	140 120	103½ 88	51½ 44	27 23	70½ 60½	28½ 24½	52 44½	141½ 120	89⅛ 75½	23 19½	60 51	59½ 50½	36½ 31	99 87
Pentagon 5	200 170	129½ 111	140 120	107 90½	53½ 45	36½ 31	60½ 52	33½ 29	62 53	170 144½	108 91½	28 24	74 62½	61 52	33 28	96 82
Hexagon 6	200 170	132 113	140 120	110 94	55 47	42½ 35	54 46	39 32	68½ 58½	200 170	131½ 111½	34 29½	86 72	63½ 54½	29½ 25	93 80
Heptagon 7	200 170	137 117½	140 120	113 96	56 48	47½ 41	48 41	44½ 38	72½ 62	230½ 196	158 134	38½ 33	93½ 79½	65½ 56	27 23	92½ 79½
Octagon 8	200 170	142½ 122	140 120	115½ 98	58 49	50½ 43	41½ 35½	50½ 43	75½ 64½	261½ 222	186 157½	47 40	101 87	71½ 60½	24½ 21	92 79
Enneagon 9	200 170	146 125	140 120	117½ 99	59 49½	53 45½	38 32½	54 46½	78½ 67½	292½ 248½	214 181	52 46	107 91	74½ 64	22½ 19	92 79
Decagon 10	200 170	150½ 129	140 120	119½ 101½	60 51	54½ 47	34½ 29½	58 49½	80½ 69	323½ 275	243 206	57½ 49	113 96	78 66½	20½ 17½	92½ 79½
Endecagon 11	200 170	154½ 132½	140 120	121 103	60½ 51½	56½ 48½	31½ 27	61½ 52½	81½ 69½	355 302	273½ 232½	62 53	117 100	81 69	19 16	93 80
Dodecagon 12	200 170	156 134	140 120	122 104	61 52	58 49½	30 25½	63 54	82½ 71	386 328½	303½ 257½	66 56	122½ 104	84 72½	17½ 15	93 80
Straight line	200 170	200 170	140 120	141 120	70½ 60	70½ 60	0 0	100 85	100 85	Infinite. Infinite.	Infinite. Infinite.	141 120	200 170	141 120	0 0	100 85

This

This ingenious author alfo gives a table of the lengths of the different lines in his conftruction on the two following fuppofitions:

1ft. That the exterior fide of each figure is equal to 200 toifes.

And 2dly. That the exterior fide of each figure is equal to 170 toifes.

Mr. Blondel was undoubtedly a man of confiderable talents and eminence, and had travelled over the greateft part of Europe, America, and the Weft Indies, making fenfible and judicious obfervations on the various modes of fortifying, practifed by different nations.

His acutenefs however in difcovering the miftakes committed by others, and his anxiety to avoid them, did not prevent him from falling into ftill greater ones himfelf. He did not attend fufficiently to the great expence that the execution of his method would unavoidably occafion, or to the numerous artillery that would be required for its defence.

Imagining, that places are generally loft for want of fufficient flanks, he makes three, one behind another. They are however fo near to each other, that the rubbifh of the higher ones muft certainly render the lower ones ufelefs: and were fhells to fall into the lower ones they muft unqueftionably deftroy the troops for want of room to avoid them. They are moreover too open and liable to be deftroyed from the covert-way, as the counter-guards are not broad enough to cover and fcreen them from the enemies' fire. The low flanks are too narrow and too much confufed. Before fhells, however, were much ufed at fieges, they might have afforded a good defence.

He makes no ufe of traverfes. But this is not to be imputed to him as a fault or omiffion, as rocket-firing was not ufed in his time.

His great ditch appears to be too wide, being not lefs than 25 toifes before the faces of the baftions.

His angle *diminué* muft be allowed to be prepofteroufly great, as he makes it of as many degrees as it ought to be in a conftruction on a ftraight line, or on the fides of a polygon of an infinite or indefinite number of fides.

The following is the conftruction according to Mr. Bombelle's method.

Like Count Pagan he eftablifhes three forts of fortification. But inftead of conftructing inwards like him, he conftructs outwards. His three forts he denominates the little royal, the mean, and the great royal. The interior fide of the little royal is equal to 60 rods of 12 Paris feet each, or 120 toifes, that of the mean is equal to 70 fuch rods or 140 toifes, and that of the great royal is equal to 80 fuch rods or 160 toifes. His manner of fortifying in all the three is the fame, and is the following.

Having determined on the fide A B, (*fig.* 4.) (which we fhall here fuppofe to be that of a hexagon), for the great, mean, or little royal, allow a fifth part of it for the demi-gorges A C, B D; and a fourth part of it for the flanks C E, D F, each of which muft make, with the curtain CD, an angle of 100 degrees. Then the points, G, H, of the baftions are afcertained by the rafant lines C H, D G, and the whole operation or conftruction is furnifhed.

As the conftruction in this figure is fuppofed to be made outwards on three of the fides of a regular hexagon, the angle A O B of the centre is equal to 60 degrees, and the angle G H K of the polygon is equal to 120 degrees. But the angle E C D of the flank is by conftruction equal to 100 degrees, the demi-gorge A C or BD is equal to a fifth part of the interior fide AB, and the flank C E or D F is equal to a fourth part of A B. Confequently the fum of the angles C D E, C E D, is given equal to 80 degrees, and the fides C E, C D, are given; wherefore we have this analogy.

As the fum of the curtain C D and flank C E
Is to their difference,
So is the tangent of 40° half the fum of the angles C D E, C E D
To the tangent of half their difference.

Hence the angle *diminué* C D E or C D G, the angle C E D the fupplement of the angle C E G of the *epaule* or fhoulder, and A G D half the flanked angle, or half the angle of the baftion, are given.

And as the lengthened curtain A D or B C is given by the conftruction equal to four fifths of the interior fide A B, we have the following analogies for D G, the line of defence, and A G the capital of the baftion.

As the fine of A G D, half the angle of the baftion,
Is to the fine of the angle G A D,
So is the lengthened curtain A D
To the line of defence D G.

And,

As the fine of A G D, half the angle of the baftion,
Is to the fine of the angle *diminué* A D G
So is the lengthened curtain A D
To A G the capital of the baftion.

In like manner we obtain D E from the triangle C E D by means of the following analogy.

As the fine of C D E, the angle *diminué*,
Is to the fine of E C D, the angle of the flank,
So is the flank C E which is given
To the right line D E, which taken from D G, the line of defence, gives E G the face of the baftion.

And as in this figure, which is fuppofed to be a hexagon, the exterior fide G H, or line joining the faliant angles of two adjoining baftions, is equal to O G the perpendicular diftance of the point I, the interfection of the lines of defence from G H is obtained by the following analogy.

As radius
Is to the tangent of I G Z, the angle *diminué*,
So is G Z, the half of G H or O G, in this figure,
To I Z, the perpendicular diftance of I from G H.

And the perpendicular diftance of the interfection of the rafant lines, or lines of defence, from the curtain, is found by this analogy.

As G H or O G in this figure
Is to the curtain C D,
So is I Z
To the perpendicular diftance I Y of I from C D.

And in any other regular figure than a hexagon, G H is found by this analogy.

As O A, the radius of the circumfcribing circle,
Is to the interior fide A B, which is given,
So is O G = O A + A G
To G H, the fide of the exterior polygon.

And as radius
Is to the tangent of I G Z, the angle *diminué*,
So is G Z equal to half G H,
To I Z, the perpendicular diftance of I from G H.

And as G H, the fide of the exterior polygon,
Is to C D the curtain, which is known,
So is I Z, the perpendicular diftance of I from G H,
To I Y, the perpendicular diftance of I from the curtain.

Mr. Bombelle, in the conftruction of each of his three forts of fortification, makes the angle E C D or F D C of the flank, always equal to 100 degrees, and the angle *diminué* G D C or H C D invariably equal to about 20° 56'.

For

For CD being always equal to three-fifths of AB, and CE equal to a fourth part of AB, the ratio of CD + CE to CD − CE is a given or constant ratio, being that of 17 to 7, whatever be the length of AB. And the construction of his mean fortification gives the demi-gorge AC or BD, equal to 28 toifes, the curtain CD, equal to 85, the lengthened curtain AD or BC, equal to 112, the flank CE or DF, equal to 35, the line of defence DG or CH, equal to about $153\frac{1}{5}$, the capital AG or BH of the baftion, equal to about $63\frac{1}{2}$, the face GE or HF of the baftion, equal to about $61\frac{1}{3}$. And in all the three the ratio of DY half the curtain, to IY the perpendicular diftance from it to I, the interfection of the lines of defence, or of GZ, half the fide of the exterior polygon, to ZI, the perpendicular diftance from it to the faid point of interfection, is given or conftant, being always that of radius to the tangent of 20° 56′. The conftruction of his mean fortification on the fides of a hexagon gives ZI, equal to about 38,884 toifes, and YI to about 16,066 toifes.

This author makes his main ditch, or the ditch of the body of the place, 12 rods of 12 Paris feet each, or 24 toifes broad, beyond which and oppofite to the curtain he places a ravelin, the faliant angle of which is in the interfection of two arcs defcribed with the lengthened curtain AD, or BC, as radius from the extremities A, B, of the interior fide AB, and the faces of which produced acrofs the main ditch would terminate on the fhoulders *i, i*, of the fquare orillons, that cover his rounded flanks or cafemates, which are defcribed in the following manner.

From the extremities C, D, of the curtain, and perpendicularly thereto, he draws two other flanks, C*i*, D*i*, meeting the lines of defence in the points *i, i*, lengthening the faces GE, HF refpectively by E*i*, F*i* in order to have room enough in each flank of every baftion for two covered ones, which are conftructed in the following manner:

Take the two lines G*r*, H*r*, equal each to a third part of G*i* or H*i*, (C*i*, D*i* being drawn from the extremities C, D, of the curtain CD perpendicular thereto), and the lines *ik*, *ik*, alfo equal each of them to a third part of C*i* or D*i*. From the points, *r, r*, draw right lines, *rkl, rkl*, through the points *k, k*, terminated at the points *l, l*, by the right lines C*l*, D*l*, drawn perpendicularly to the lines of defence GD, HC, which muft be produced till they meet the radii of the polygon in fome points as *p, p*, in order to take upon the fame radii the diftances *pq*, *pq*, for terminating the covered flanks, of which the common centre *x* is found by defcribing from the extremities D*l*, C*l*, of the right lines C*l*, D*l*, arcs with a radius equal to three-fourths of C*l* or D*l*.

The diftance between the two covered flanks on each flank of every baftion is equal to 12 rods of 12 Paris feet each, or twenty-four toifes, and the parapets every where are 10 fuch rods or 4 toifes thick.

The cafemates which Mr. Bombelle adds at the points of the baftions, and which, in cafes of neceffity, may ferve as retrenchments, are defcribed by taking on the capitals of the baftions the right lines G*s*, H*s*, equal refpectively to half the lines G*r*, H*r*, and defcribing from the points *s, s*, as centres, arcs, *rr*, *rr*, for the cafemates, each of which has its parapet 4 toifes broad. They are fomewhat lower towards the points of the baftions than the other parts of the baftions, and the ways to them are through paffages as *o, o*, in the baftions.

This author covers his ravelin with a fort of counterguard or tenaille beyond its ditch, which he makes 8 rods of 12 Paris feet each, or 16 toifes broad, or a third part of the breadth of his great ditch, thus rendering his ravelin a tenailleid, or horned half-moon.

Round covered flanks were firft invented by the Italians; and Mr. Bombelle ufes them in order to render them the more capacious, and the fitter for refifting the fhock and effects of the enemies' cannon. They feem, however, to have too much convexity, advancing too far towards the centre of each baftion, and leaving too fmall a diftance between the two high flanks.

As his flanks are great, he makes ufe of no fecond flanks on the curtains. But contrary to found fenfe and reafon, and inconfiftently with the genuine principles of conftruction, he makes them of the fame lengths or fizes in all polygons. His angle *diminué* alfo is invariably of a given magnitude, *viz.* of 20° 56′, which by his conftruction on the fides of a fquare leaves the flanked angle, or angle of each baftion, equal only to 48° 8′ in a pentagon, to 66° 8′, in a hexagon, to 78° 8′, and fo on. His angle *diminué* in a fquare, is therefore more than double what it ought to be, by upwards of two degrees. And in a pentagon it does not fail quite $7\frac{1}{2}$ degrees fhort of being twice as great as it fhould be in reality. He makes it even greater in a fquare than it ought to be in an octagon.

Mr. Vauban in his method fortifies inwards; and like Count Pagan, from whom he has borrowed his perpendicular for the hexagon and all higher polygons, begins with the perpendicular to the exterior fide, and the rafant lines or lines of defence. He does not, however, make the faces of his baftions fo long, or his flanks quite fo fhort. And he omits fecond flanks as not of very great moment, as they can be added at any time, without changing either the flanks or curtains.

Bifect, as in Count Pagan's conftruction, the exterior fide AB in the point C. (*fig.* 5.) At the point C erect a perpendicular, CD, equal to an eighth part of AB in the fquare, to a feventh part of AB in the pentagon, and to a fixth part of AB in the hexagon and all higher polygons. From the extremities A, B, through the point D, draw the lines of defence ADH, BDG. On thefe take AE, BF for the faces of the baftions, equal each to two feventh parts of AB, and take EH, FG, each equal to EF, the diftance between the fhoulders E and F. Then join the points G, H, for the curtain GH. And if a fimilar conftruction be made on each of the other fides of the figure or polygon, we get the mafter-line of the curtains and baftions, or the principal or outline of the body of the place. To this muft be added a rampart from 10 to 12 toifes broad at the bafe, and elevated more or lefs above the level of the place, on the outer part of which, at top, there is raifed a parapet three toifes broad at the bafe, and elevated above the rampart from fix feet to $7\frac{1}{2}$. The ditch of the body of the place, or the great ditch, is 20 toifes wide oppofite to the flanked angles or faliant angles of the baftions, and it is formed by defcribing from thefe angles with a radius of 20 toifes, circular arcs, and drawing right lines from the *epaules*, or fhoulders, to touch thefe arcs. For the parts of thefe lines lying between their interfections and the points of contact, together with thefe arcs, form the outline of the ditch.

The foregoing figure is a regular hexagon, and the exterior fide is here fuppofed to be equal to 180 toifes.

To determine the faliant angle S (*fig.* 6.) of the half-moon or ravelin, fet off 50 toifes on the perpendicular DC, produced beyond the exterior fide AB; from the point S draw right lines to the counterfcarp of the great ditch, fo that if produced acrofs the fame, they would, according to fome authors, terminate on the *epaules* or fhoulders of the baftions, but according to others, about 3 toifes from the fhoulders on the faces of the baftions. Thefe lines fo drawn

from

from the faliant angle S, of the ravelin to the counterfcarp, form the faces SL, SM, of the half-moon or ravelin. It is generally fuppofed that when the faces SL, SM of the ravelin terminate when produced acrofs the great ditch on the faces of the baftions a few toifes from the *epaules* or fhoulders, they cover the flanks much better than they do when they terminate on the fhoulders themfelves.

The ditch before each ravelin is 12 toifes broad; its counterfcarp is parallel to the faces, and is made of a circular form, before the faliant angle of each like the ditches before the faliant angles of all works in general.

When the ravelin is made with flanks, as PN, QO, the faces SP, SQ, when produced acrofs the great ditch, ought to terminate on the faces of the baftions 5 toifes at leaft from the *epaules* or fhoulders.

When a ravelin has flanks, they are commonly made by fetting off 10 toifes from L to P, and M to Q, from the extremities of the faces, and by drawing them from the points P, Q, parallel to the capital rS of the ravelin.

There is fometimes a redoubt made in a ravelin, which is done by fetting off from the extremities, L, M, of the faces on the femi-gorges Lr, Mr, and then drawing right lines for its faces parallel to thofe of the ravelin. The ditch before fuch a redoubt fhould be 6 toifes broad, and its counterfcarp parallel to its faces.

Orillons and retired flanks are defcribed in the following manner.

The front, AEG, HFB, being defcribed as above taken, Ea equal to a third part of the flank EG. From the oppofite flanked angle B, draw the right line Ba, on which produced take ab, equal to 5 toifes. Take alfo on the line of defence, BG, produced, Ge equal to 5 toifes, and join b, c. On be as a bafe defcribe the equilateral triangle bcf, and from the angular point f as a centre, defcribe the circular retired flank be with the radius fb or fe.

Again, if Ea be bifected in the point c, and cd be drawn perpendicularly to Ea to meet a perpendicular to the face AE, from the point E in the point d, and if from the point d as a centre a circular arc be defcribed with dE as radius, we fhall get the circular orillon Ea.

ab is called the revers, or back part of the orillon, and Ge, the *enfoncement* or depth of the cafemate or concave flank bc.

In like manner are the retired or concave flank hi, and the circular orillon Fg defcribed.

The orillons are ufeful in covering the retired or concave flanks, which by means of them cannot be feen but directly in front. And as Mr. Vauban makes his orillons round, they cannot be fo eafily deftroyed as they might be were they of any other figure or form.

The calculation of the lines and angles of a conftruction on a polygon, according to this method of Mr. Vauban, is as follows:

If AB be fuppofed to be the fide of a hexagon, the angle of the centre will be equal to 60°, and the angle of the polygon to 120°. And as the perpendicular CD is by the conftruction equal to a fixth part of AB, the angle *diminué* ABD or BGH is determined by the following analogy:

As AC or BC, the half of AB, } or, As 3
Is to CD the perpendicular, } Is to 1,
So is radius
To the tangent of the angle CAD or CBD, which is nearly equal to 18° 26′ 6″. Wherefore the flanked angle or angle of the baftion is equal to 83° 7′ 48″ nearly. And fince the triangle EFG is ifofceles by the conftruction, and the angle EFG, which is equal to the angle ABD, is of courfe equal to 18° 26′ 6″, we have the angles FEG, FGE, equal each to half the excefs of 180° above 18° 26′ 6″, or to 80° 46′ 57″ nearly. Wherefore the angle EGH of the flank, which is equal to the angle FGE, together with the angle FGH, or angle *diminué*, is equal to 99° 13′ 3″. And the angle AEG of the *epaule*, or fhoulder, being equal to the angle EGF or EGD, together with the angle EDG, which is equal to the angles ABD, BAD, taken together, or to twice the angle *diminué*, is equal to 117° 39′ 9″.

Now fince AC, half of the exterior fide AB, is given, and CD is found by the foregoing analogy, AD is known, its fquare being (47 E. 1.) equal to the fquares of AC and CD; and as AE is equal to two-fevenths of AB, the exterior fide ED is known. But AD is to ED, as AB is to EF or FG, which are of courfe known. Or, either of thefe lines may be found by the following analogy.

As the fine of the angle EFD, which is equal to the angle *diminué*, or to 18° 26′ 6″,
Is to its oppofite fide DE,
So is the fine of the angle EDF, which is equal to 180°, twice the angle *diminué*, or to 143° 7′ 48′,
To the oppofite fide EF, the diftance between the epaules.

And if from EF, or its equal EH, there be taken ED, the complement DH, or its equal DG, will be known. Wherefore the curtain GH is determiued by either of the two following analogies.

As AD
Is to the exterior fide AB,
So is the complement DG or DH
To the curtain GH.
Or, As the fine of the angle *diminué* DGH
Is to the fine of the angle GDH, which is = 143° 7′ 48″ nearly,
So is the complement DH
To the curtain GH.

The flank EG is eafily found by means of either the triangle EFG, or the triangle EDG, as in the following analogies.

As the fine of the angle FGH, which is = 80° 46′ 57″ nearly,
Is to the fine of the angle EFG, which is = angle *diminué*, or 18° 26′ 6″ nearly,
So is EF the diftance between the two oppofite epaules
To the flank EG.
Or, As the fine of the angle EGD, which is = 80° 46′ 57″ nearly,
Is to the fine of the angle EDG, which is = twice the angle *diminué*, or 36° 52′ 12″ nearly,
So is ED the diftance from the epaule to the interfection of the lines of defence
To the flank EG.

And as half the flanked angle is equal to 41° 33′ 36″, and the angle AHG, which is equal to the angle *diminué*, to 18° 26′ 6″ nearly; the angle formed by the capital of the baftion, and the lengthened curtain, or the curtain HG produced to meet the fame, will be equal to 120° 0′ 18″ nearly. Wherefore the lengthened curtain is found by this analogy.

As the fine of 120° 0′ 18″
Is to the fine of 41° 33′ 36″, half the flanked angle,
So is AH
To the lengthened curtain: from which, if the curtain HG be taken, we get the demi-gorge.

And the capital of the baftion is found by this analogy:
As the fine of 120° 0′ 18″

Is

Is to the fine of 18° 26′ 6″, the angle *diminué*,
So is AH
To the capital of the baftion.

And the perpendicular diftance, DI, of the curtain from the interfection of the lines of defence is found by the analogy,
As AB is to CD, fo is GH to DI.

Suppofing the exterior fide AB, as in his mean fortification, to be equal to 180 toifes, the principal lines belonging to the conftruction may eafily be found, as in the following manner.

The perpendicular CD being by conftruction $= \frac{AB}{6}$ is $= 30$ toifes.

The *tenaille* AD or BD being equal to $\sqrt{BC^2 + CD^2}$ is equal to $\sqrt{9000}$ toifes $= 30\sqrt{10} = 94.8683298$ nearly.

The face BF of the baftion is commonly equal to 50 toifes, or two-fevenths of AB nearly.

The diftance DF of the *epaule* F from the interfection D of the lines of defence being equal to BD − BF, is equal to $10\sqrt{90} - 50 = 44.8683298$ toifes nearly.

If from the *epaule* F there be drawn Fl perpendicular to the exterior fide AB, we fhall have $Bl = \frac{BC \times BF}{BD} = 5\sqrt{90}$ toifes $= \frac{BD}{2} = 47.4341649$ toifes nearly; and Fl the perpendicular diftance of the *epaule* F from the exterior fide $= \frac{CD \times BF}{BD} = 5\sqrt{10}$ toifes $= \frac{BD}{6} = 15.8113883$ toifes nearly.

The diftance EF, between the two oppofite *epaules*, E, F, or its equal EH or FG, is equal to $AB - 2Bl = AB - BD = \overline{180 - 30\sqrt{10}}$ toifes $= 85.13167$ toifes nearly.

The complement DG or DH being equal to FG − DF is equal to $\overline{230 - 10\sqrt{360}}$ toifes $= 40.26334$ toifes nearly.

The perpendicular diftance DI of the interfection of the lines of defence from the curtain GH being $= \frac{CD \times DG}{BD}$ is equal to $\overline{23\sqrt{10} - 60}$ toifes, or 12.7323861846 toifes nearly. Confequently the perpendicular diftance CI between the exterior fide AB and the curtain GH being equal to CD + DI, is equal to 42.7323861846 toifes nearly.

The curtain GH being equal to fix times DI, is equal to $\overline{138\sqrt{10} - 360}$ toifes, or 76.3943171 toifes nearly.

If Fm be drawn perpendicularly from the *epaule* F to AH, the line of defence, Em, being equal to $\frac{EF \times BC}{BD}$ is equal to $\overline{54\sqrt{10} - 90}$ toifes, or 80.76299365 toifes nearly.

The perpendicular Fm being to Em as CD is to BC, is equal to a third part of Em or $\overline{18\sqrt{10} - 30}$ toifes, or 26.921 toifes nearly.

The diftance mH of the point m from the extremity H of the line of defence being equal to EH − Em, is equal to $\overline{270 - 84\sqrt{10}}$ toifes, or 4.3686765442 toifes nearly.

The diftance Dm of the point m from the interfection D of the lines of defence being equal to Em − DF or Em − DE, is equal to $\overline{24\sqrt{10} - 40}$ toifes, or 35.8946538448 toifes nearly. But fince FEH is an ifofceles triangle, the angle FEH or DBC is equal to twice the angle mFH, which is therefore equal to 9° 13′ 3″ nearly.

The flank FH being equal to $\sqrt{Fm^2 + mH^2} = 3\sqrt{16400 - 5100\sqrt{10}}$ toifes, is equal to 27.27322895 or 27.273 toifes nearly. And if from the extremity H of the line of defence AH there be drawn Hn to meet the face FB of the baftion in the point n, we fhall have Hn equal to $\frac{DH \times Fm}{Dm} = \frac{\overline{230 - 60\sqrt{10}} \times \overline{18\sqrt{10} - 30}}{\overline{24\sqrt{10} - 40}}$ toifes, or 30.1976 toifes, exceeding the perpendicular CD to the exterior fide by 0.1976 of a toife only.

And as Fn is a fourth proportional to Dm, mH, and DF, or is equal to $\frac{mH \times DF}{Dm} = \frac{\overline{270 - 84\sqrt{10}} \times \overline{30\sqrt{10} - 50}}{\overline{24\sqrt{10} - 40}}$ toifes, it is equal to 5.461 toifes nearly. And Dn is equal to 50.3292 toifes nearly.

Now in Count Pagan's conftruction, from whom Mr. Vauban has borrowed the length of his perpendicular, on which the other parts chiefly depend, the flank FH is equal to $\overline{18\sqrt{10} - 33}$ toifes, or to 23.921 toifes nearly, which falls fhort of the perpendicular Fm, drawn from the *epaule* F, in Vauban's conftruction, to the line of defence AH, by 3 toifes, and of the flank FH by 3.35222895 toifes. In any polygon, having its exterior fide equal to 180 toifes, their perpendiculars are equal, as well as the faliant angles of their baftions. And we are perfuaded, that even the greateft admirers of Vauban can affign no good reafon for his not having followed Count Pagan alfo, with regard to the pofition of his flank, and placed it at right angles to the line of defence, inftead of making them meet in an angle of 80° 46′ 57″. There is great reafon to fuppofe, that the Count would have made the face of his baftion confiderably fhorter than he did, had he not intended to have three flanks inftead of one. He makes it 55 toifes. But it is naturally to be prefumed, that, had he intended to conftruct with a fingle flank, he would have bifected the perpendicular diftance between his orillon and inner flank, (which is 19 toifes,) and drawn his flank at right angles to the line of defence through this point of bifection, thereby forming a more complete conftruction for the body of the place than Vauban has done. And it is fomewhat remarkable, that this line nearly coincides with the perpendicular Hn, to Vauban's line of defence, from its point H of interfection with the flank. Had he therefore, inftead of taking 5 toifes from the face of Count Pagan's baftion, taken 10, and then placed his flank at right angles to the line of defence, he would, without lengthening this line, have given the face of his baftion its proper length, and, at the fame time, made the flank itfelf about equal to the perpendicular, as it ought to be, fince perpendiculars to the exterior fides of polygons were firft introduced into conftruction for the fole purpofe of obtaining flanking defences. The lengths, however, with both thefe authors, as well as the other writers on fortification, are merely arbitrary, and by no means derived from reafoning either on the properties of the figures, or their relative degrees of importance and capability of defence. For there appears no reafon for giving the fame perpendicular to a hexagon and every other polygon of a greater number of fides, as Vauban has done, or to all regular figures above the fquare, as Count Pagan has done.

This author retains part of the fauffe-bray, which ufed to go round the whole body of the place, at the diftance of from 4 to 5 toifes from the fame, making ufe of it as *tenailles* oppofite to his curtains, which are made differently.

A tenaille is commonly from two to three feet only higher than the level ground of the ravelin. The tenaille *abcdefg*, (*Plate* VI. *fig.* 7.) is constructed by first setting off from the epaules E, F, on the lines of defence E*a*, F*g*, equal each to three toises, for a passage between it and the flanks of the bastions; then taking *ab.gf*, for its faces, equal each of them to 16 toises, by describing from the shoulders *b* and *f*, as centres arcs with a radius equal to *bf*, and then by intersecting these arcs from the same shoulders as centres, with a radius equal to 10 toises, for its flanks *bc, fe*. Some, however, make the faces *ab, gf*, equal to half the lines *a*D, *g*D respectively, and place the flanks at right angles to the lines of defence, which is certainly the best position for them.

The tenailles *abcd, efgh*, (*fig.* 8.) are without flanks, and have their faces on the lines of defence. The passage between them, as well as the passages between them and the flanks, are three toises wide. These are called *simple tenailles*, and the foregoing is called a *reinforced tenaille*. There is also a third sort of tenailles, which have only faces *ab, gf*, and flanks *bc, fe*, without a curtain *ee*.

Simple tenailles, with their faces on the lines of defence, but without flanks, are not so well calculated for scouring and defending the ditch as either the *reinforced tenailles* are, or those with faces, and flanks without curtains. However, as they are not liable to be enfiladed, Mr. Vauban has generally preferred them to the other two, in most of the places which he fortified.

The *reinforced tenailles* defend the ditch much better, and add low flanks to those of the bastions, but are liable to have their own flanks enfiladed, an inconvenience that might be remedied by constructing them in such a manner as to be covered by the extremities of the parapets of the opposite ravelins, or by the adjoining *lunettes*. These are well calculated for scouring not only the ditch, but also the level ground of the ravelin, and the ditch before the *corps de guard*, *reduit*, or redoubt, commonly made within it, which cannot be so well seen or defended from any other parts.

Those with faces and flanks only, have the same advantages with these as to the defending or scouring of the ditch, but are also, like them, liable to have their flanks enfiladed, which should be guarded against in the same manner.

The better to scour and defend the ditch, and oppose its passage, this fortifier places in it, opposite to the middle of the *tenaille*, or of the curtain, a caponiere, or double way, covered with a parapet raised three feet above the bottom of the ditch. It is about 12 feet broad, is perpendicular to the curtain, and is palisaded on both sides. This work is good, and very useful, as it commands without being commanded, and serves as a passage for the musketeers from the body of the place to the outworks. He thus has four flanks for the defence of his ditch, namely, that of the body of the place, that of the orillon, that of the tenaille, and the caponiere.

Tenailles are reckoned so necessary, that it is with good reason that there are few places fortified without them. For when the ditch is dry, the spaces behind them serve as places of arms, from which the troops may sally to oppose the enemies' descent of the ditch, to retard his operation, and destroy his works in it. and then retire to them as places of safety. They also render the communication between the body of the place and the ravelins more easy and secure, which is a great advantage, as the ravelins are thereby enabled to make a much better defence than they otherwise could do, being readily supplied at any time with troops and necessaries. And when the ditch is wet, the spaces behind them serve as harbours for boats, which armed men can make use of, both for opposing the passage of the ditch, and for facilitating the communication between the tenailles and the ravelins.

This fortifier, in order to increase the strength of a place, places frequently works called *lunettes* (which literally signify spectacles) on both sides of his ravelin. He sometimes makes one face of his lunette perpendicular to the middle of the face of the ravelin, and sometimes perpendicular to the face of the ravelin, and so as produced to the same about one-third from the saliant angle. In the former case he makes that face of the lunette equal to 30 toises, and determines its other faces by taking for the demi-gorge 25 toises, on the counterscarp of the great ditch from that of the ditch before the ravelin; and in the latter he makes the demi-gorge equal to 20 toises only. The ditch before the lunettes is 12 toises broad, the thickness of the parapet is equal to three toises, and that of the rampart to eight, as in the ravelin.

When he makes use of lunettes, he sometimes covers the saliant angle of the ravelin with a work called *bonnet*, of which the faces are parallel to those of the ravelin, and when produced bisect those of the lunettes. The ditch before it is ten toises wide.

Tenaillons. The term *tenaillon* is sometimes applied to a reinforced tenaille; but it is generally confined to a work somewhat like a lunette, made on each side of a ravelin, but differing from a lunette in this circumstance, that one of the faces of a tenaillon, though it is 30 toises long, like that of the lunette, is in the direction of the ravelin produced beyond its ditch, whereas that of the lunette is perpendicular to it. The other face of the tenaillon is determined by taking 15 toises on the counterscarp of the great ditch from that of the ravelin. There is sometimes in a tenaillon a battery 15 toises long, and 10 toises retired from the front and parallel thereto.

There are generally retrenchments in tenaillons which have their parapets either parallel to their fronts or perpendicular to their other faces, which, when produced, terminate on the faces of the bastions. The ditch before such a retrenchment is about three toises wide; and as these works are commonly made of earth, without any revetement of masonry, there is a banquette, called *berm*, before the parapet, next to the ditch, about eight feet broad, to prevent it from falling into the same.

As to the construction of counter-guards, horn-works, crown-works, covert-ways and glaces, detached redoubts, second ditches, and covert-ways, and profiles. See the same under these articles respectively.

Mr. Vauban, in his second method with tower-bastions, according to the plans of Landau and Besford, begins with his construction inwards, and fortifies outwards in the following manner.

Supposing A B (*fig.* 9.), to be the interior side of the hexagon of 120 or 130 toises, draw A C, B D from the centre thereof, through the extremities A, B; set off six toises from A to *b*, and from B to *c*; through the points *b* and *c*, draw right lines at right angles to A B, on which set off six toises from *b* to *f*, and *c* to *h*, and four toises from *b* to *d*, and *c* to *g*; and from the points *f, d*, draw perpendiculars *fr, dn*, to the capital A C, as also from the points *h, g*, perpendiculars to the capital B D. Then, if *r* E be taken equal to *rf*, and *p* F to *ph*, the points E, F, will be the saliant angles of the tower-bastions, of which E*fdn* and F*hgq* are the halves.

If on the capitals A C, B D, there be taken E C, F D, equal each to 40 toises, the points C, D, will be the saliant angles of the counter-guards before the towers. From the points C, D, draw the lines of defence C*c*, D*b*, to the points *c, b*, where the flanks of the towers intersect the curtain,

tain. On these set off 56 toises, from C to G, and D to H, for the faces CG, DH, of the counter-guards. The flanks and tenailles are found or determined as in his first method.

The ditch before the saliant angles of the towers is six toises broad, and its counterscarp is drawn to the extremities of the flanks of the counter-guards. The right line, which joins the ends of these flanks, determines the inside of the tenailles.

The ditch before the counter-guards is 12 toises broad at the saliant angles, and its counterscarp is drawn towards the opposite shoulders, in the same manner as in his first method.

The capital of the ravelin is 45 toises, and its faces, when produced, terminate on those of the counter-guards, about 10 toises from the shoulders. Ten toises, however, are cut off from the faces of the ravelin, for the flanks which are parallel to its capital.

The ditch before the ravelin is 10 toises broad, the covert-way five, the semi-gorges of the places of arms 12 each, the faces 17 each, and the glacis is 20 toises broad.

The construction of Mr. Vauban's third method, according to the plan of New Brisach, is applied to an octagon, of which the exterior side is equal to 180 toises, and is made inwards. The perpendicular to the exterior side is, as in his first method, equal to 30 toises. The faces of the counter-guards are each of them equal to 60 toises. The flanks are found by setting off 22 toises, in arcs described from the opposite shoulders, as centres, and with the distance between as radius. A right line drawn through the extremities of the flanks, parallel to the exterior side, to meet the capitals of the counter-guards, determines both the inside of the tenailles, and the saliant angles of the tower-bastion.

And if another right line be drawn parallel to this, at the distance of nine toises from it, the points, where it meets or intersects the capitals of the counter-guards, will be centres of the towers; from which points, if seven toises be set off each way for their demi-gorges, the positions of their flanks, which are perpendicular to the said line, will be determined. For each of these flanks, five toises are set off outwards, and four from the said line. And the line joining the inside of the flanks at the end of four toises completes the towers.

The ditch is six toises broad before the saliant angles of the towers, and its counterscarp meets the line joining these angles, within ten toises of the extremities of the flanks of the counter-guards.

The great ditch before the counter-guards is 15 toises broad, and its counterscarp is parallel to the faces. The capital of the ravelin is 55 toises in length, and that of the redoubt within it, is equal to 23 toises. The faces of the ravelin are drawn towards those of the counter-guards, within 15 toises from the shoulders, and those of the redoubt are parallel to these. Twelve toises are cut off from each face of the ravelin, and six from each of the redoubts by the flanks, which are parallel to its capital. The ditch before the ravelin is twelve toises wide, and that before the redoubt is six. The covert-way and glacis are the same as in his second method. The profiles also are nearly the same in both. This method, indeed, differs but little from his second, except in two small flanks, of about four toises each, which in this he makes in each curtain, that are not in the other. The parapets of his counter-guards, on both sides of the saliant angles for the distance of about twenty feet, are raised four feet higher than the rest, to prevent these works from being annoyed by ricochet-batteries.

In Mr. Vauban's first method of military construction, it may not be amiss to give a table of the principal parts thereof, for drawing the master-line by, as also an ichnographical one of the principal dimensions of the body of the place, tenailles, ravelin, covert-way, traverses, and places of arms, as published with his approbation (for he never published any thing himself respecting it.)

TABLE for the Construction.

	Forts.						Little Fortification.				Mean.		Great.	
Side of Figure, or Polygon.	80	90	100	110	120	130	140	150	160	170	180	190	200	260
Perpendiculars.	10	11	$12\frac{1}{2}$	14	15	16	20	21	23	25	30	31	25	22
Faces of Bastions.	22	25	28	30	33	35	40	42	45	47	50	53	55	60
Capitals of Ravelins.	25	28	30	35	38	40	45	50	50	52	55	55	60	50

And the following is an ichnographical table of the thicknesses, &c. of the works composing the body of the place, &c.

		Toises.
Of the Body of the Place.	Thickness of the rampart at its base	11
	Thickness of the parapet at its base	3
	The breadth of the ditch	20

		Toises.
Of the Tenaille.	Its distance from the orillon of the bastion	3
	Thickness of its rampart in the face and flank at the base	7
	Thickness of the rampart of its curtain at the base	5
	Thickness of its parapet at the base	3

Thickness

		Toiſes.
Of the Half-moon or Ravelin.	Thickneſs of its rampart at the baſe	10
	Thickneſs of its parapet at the baſe	3
	The breadth of its ditch	12
Of the Covert-way, Traverſes, and places of Arms.	The breadth of the covert-way	5
	Length of the demi-gorge of the places of arms at the re-entering angles	10
	Length of the faces, each of the places of arms	12
	Length of the traverſes at the re-entering angles	5
	Length of the traverſes at the ſaliant angles	$4\frac{1}{4}$
	Thickneſs of each traverſe at the baſe	3

The traverſes on the ſides where their banquettes are, or on their inſides, are from 5 to $5\frac{1}{2}$ feet high, and from 3 to 4 on the outſide, towards the covert-way, which they ſcour at the re-entering angles.

He gives his caponiere a banquette on each ſide, and the parapet of the place two or three, to ſuit men of different heights or ſtature, that they may all of them fire on the ſame level.

He makes a cut oppoſite to each traverſe in the parapet of the covert-way, $4\frac{1}{2}$ or 5 feet deep, for the ſoldiers to paſs, which he ſhuts up with a ſmall merlon, except at the ſaliant angles, where ſuch cuts could not be ſeen by thoſe who defend the place.

When he gives flanks to his ravelin, he makes places of arms in its ditch, perpendicular to its faces, and near the angles of the epaules, to prevent the paſſage of the ſame. When the counterſcarp of the ditch is reveted, or faced with maſonry, he makes ſteps at all its angles for the convenience of the troops, and the ſervice of the covert-way. Each detached piece or work ſhould, for a ſimilar reaſon, have a pair of ſtairs to lead up to it.

He makes the countermines of a place under the terreplain of the rampart, on a level with the ditch, and about ten feet diſtant from the *revetement*, to which they are parallel, and have a communication with it through ſmall arched *heads*, or paſſages. From the countermines of the place men go down into the caponieres, and then up into the countermines of the covert-way, from which *heads* or paſſages are carried on under the field to *fourneaux* or ſmall mines, made for blowing up the beſieger's works, and retarding their approaches.

He was of opinion, that when an eminence falls gradually from its ſummit towards the glacis of a place, works ought to be made one before another, with their ſaliant or flanked angles ſufficiently raiſed; that the moſt diſtant ought to cover all the reſt, and draw its defence from them; and that they ought all of them to be built in ſuch a manner, as to prevent an enemy from making a retrenchment in the firſt, without being expoſed to the fire of the ſecond; or in the ſecond, without being expoſed to that of the third, and ſo on.

The glacis ſhould as often as poſſible be compoſed of pebbles, or of ſtones covered with turf, ſince the beſiegers can work but ſlowly in it when ſo made, and the parapets thrown up in it by the pioneers, are apt to occaſion their being killed or wounded, as the cannon-ſhot of the place ſtriking againſt, ſcatter the ſtones, and make them fly in different directions.

He obſerves, that the bridges of his curtains do not interfere with the fire from his flanks along the faces of the baſtions in the ditch, and he prefers that ditch which, by means of ſluices, can be filled or emptied at pleaſure.

The conſtruction of the Chevalier de Ville's method of fortifying is the following.

He begins inwards, and conſtructs outwards. He makes his flanks equal to the demi-gorges, and each of them equal to a ſixth part of the ſide of the figure or polygon on which he conſtructs. In the ſquare and pentagon, he determines the flanked angle or ſaliant angle of the baſtion by a raſant line; but in all figures and polygons of a greater number of ſides than five, he makes it equal to a right angle, by deſcribing a ſemicircle, as E G N on a right line, (*fig.* 10.) E N joining the epaules E and N, thereby making a ſecond flank, as D I, C H, which increaſes with the number of ſides in the figure or polygon. The length A G, of the capital of the baſtion is, in this caſe, equal to the gorge line C P, or the diſtance between the points where the flanks of the baſtion meet the adjoining curtains, a circumſtance which furniſhes an eaſy method of finding the points of the baſtions.

In conſtructing his caſemates, or retired flanks and orillons, he ſets of from C and D, on the flanks C E, D F, lines equal each to a third part of C E or D F, or of the demi-gorge, as D a, for inſtance, on D F. He alſo takes F b in the face H F produced, equal to D a, and then draws bc parallel to F a, to meet a right line joining a, and G the point of the oppoſite baſtion. Then bc is the front of the orillon, when it is made ſquare. But when he makes it round, he deſcribes two arcs from b and c, as centres, with a radius equal to bc, and from their interſection as a centre through the points b, c, he deſcribes the arc of his orillon.

The calculation of the lines and angles, according to his conſtruction, may be made in the following manner.

If we ſuppoſe A B to be the ſide of a hexagon, the angle A O B of the centre will be equal to 60 degeees, and the angle B A S, or A B T, of the figure, equal to 120°. And as the flank is by the conſtruction perpendicular to the curtain, the angle E C D of the flank is, of courſe, equal to 90 degrees. But as the flanked angle E G N is alſo equal to 90 degrees, the half of it, A G I, is equal to 45 degrees, and conſequently the angle *diminué* A I G, being equal to half the exceſs of the angle of the polygon above the flanked angle, is equal to 15°. And the angle of the epaule is of courſe equal to 105°.

Wherefore, if A B be aſſumed of a given length, whether equal to 120 toiſes, or otherwiſe, the capital A G of the baſtion, and the gorge-line C P, which is equal to it, is eaſily found by the following analogy, and the iſoſceles triangle C A P.

As the ſine of the angle A C P, or A P C, half the exceſs of 180° above the angle of the polygon, or half the angle of the centre,

Is to the ſine of the angle of the polygon or centre,

So is the flank of the baſtion or $\frac{AB}{6}$

To the gorge-line C P, or capital of the baſtion A G.

And the raſant line G I, in the oblique-angled triangle A G I, is found by this analogy.

As the ſine of the angle *diminué* A I G

Is to the fine of the angle G A I, or its fupplement O A I, half the angle of the polygon,
So is the capital A G of the baftion
To the rafant line G I.

And the line A I is obtained from the fame triangle, by this analogy.

As the fine of A I G the angle *diminué*
Is to the fine of A G I, half the flanked angle,
So is the capital A G of the baftion
To the line A I.

From which, if there be taken the flank or demi-gorge, there will remain the complement C I; which, taken from the curtain C D, leaves the fecond flank D I. The complement C I is alfo eafily found from the right-angled triangle, E C I, by the following.

As radius
Is to the tangent of the angle C E I = 90° — the angle *diminué*,
So is the flank E C, a fixth part of A B,
To the complement C I.

The fide G H of the exterior polygon is determined by taking a fourth proportional to O A, A B and O A + A G.

The foregoing methods of conftruction have been called the *French manner*, particularly thofe of Count Pagan and Mr. Vauban, who borrowed from him the length of his perpendicular, which is the principal part of conftruction, and that on which all the other parts chiefly depend. Vauban's method, however, has been chiefly followed on account of its plainnefs and fimplicity, with a fingle flank. It is proper, neverthelefs, to give the conftructions of fome of thofe methods of fortifying that have been made ufe of in other nations.

The Italians, who have not been anxious about making the flanked angle, or angle of the baftion, either right or obtufe, but prefer having it acute for the purpofe of getting a fecond flank on the curtain, have feveral methods of fortifying delivered by their authors, amongft which that of Sardi has been efteemed one of the beft.

He begins inwards and conftructs outwards, fuppofing A B equal to 800 geometrical paces or feet (*fig.* 11.). Of thefe he allows 150 for the demi-gorge A C or B D, and the fame for the flank C E or D F, which he places perpendicularly to the curtain C D, on which he takes an eighth part D I for the fecond flank, making I the point in the curtain, from which the rafant line drawn through E the extremity of the flank or angle of the epaule, gives the faliant point G of the baftion on the lengthened radius O A. And this operation, continued round the figure or polygon, completes the conftruction.

He makes a cafemate in each flank, capable of holding three pieces of cannon, by fetting off from the extremity of the curtain on the demi-gorge, a line equal to a third part of the flank, and the fame on the flank itfelf. And he makes his orillons either fquare or round.

He places fquare cavaliers on the middle of his curtains, of which the faces are parallel to the parapet of the rampart, and 30 feet diftant from the fame. In each of thefe he puts 7 pieces of cannon, three of which look into the field, and the other four towards the two adjoining baftions to flank fuch breaches as the befiegers may make in the faces of them, and prevent them from giving the affault.

The calculation of the principal lines and angles in Sardi's conftruction, may be made in the following manner.

Since the interior fide A B is by fuppofition equal to 800 geometrical paces or feet, and the demi-gorge A C, and flank C E, each equal to 150 of thefe, the curtain C D is equal to 500, and the fecond flank D I, which is the eighth part thereof, is equal to $62\frac{1}{2}$. Confequently the complement C I is equal to $437\frac{1}{2}$ fuch feet or paces.

But if we fuppofe A B to be the fide of a hexagon, the angle A O B of the centre will be equal to 60°, and the angle S A B or A B T of the polygon will be equal to 120°. And the angle E C D of the flank is by the conftruction equal to 90 degrees.

The angle *diminué* C I E is therefore found from the right-angled triangle E C I by this analogy.

As the complement C I
Is to the flank C E,
So is the radius
To the tangent of the angle *diminué* C I E, which is about 18° 55′. If this be added to the angle of the flank, which is equal to 90°, we get 108° 55′ for the angle C E G of the *epaule*. And if the faid angle *diminué* of 18° 55′ be taken from the angle O A I, or half the angle of the polygon, which is here equal to 60°, we get 41° 5′ for the angle A G I half the flanked angle. Confequently the flanked angle is about 82° 10′.

If to the complement C I we add the demi-gorge A C, we get A I equal to $587\frac{1}{2}$ fuch feet or paces, and the rafant line G I is therefore found from the oblique-angled triangle A I G by the following analogy.

As the fine of half the flanked angle A G I
Is to the fine of the angle G A I, or of half the angle of the polygon,
So is the line A I
To the rafant line G I.

The capital A G of the baftion is alfo obtained from the fame triangle by this analogy.

As the fine of half the flanked angle A G I
Is to the fine of the angle *diminué* A I G,
So is the line A I
To the capital A G of the baftion.

If to the curtain C D we add the demi-gorge A C, we get the lengthened curtain A D, equal to 650 fuch feet or paces, and from thence by means of the oblique-angled triangle G A D the fichant line G D in the following manner.

As the fum of the lengthened curtain and capital A D, A G,
Is to their difference,
So is the tangent of half the fum of the angles A G D, A D G, or of one quarter of the angle of the polygon,
To the tangent of half their difference, which is found to be about 12° 31′. This taken from 30° one quarter of the angle of the polygon, or 120°, leaves 17° 29′ for the angle A D G, and added to the fame gives 42° 31′ for the angle A G D. Wherefore,

As the fine of the angle A D G
Is to the fine of the angle G A D, or of half the angle of the polygon,
So is the capital A G of the baftion,
To the fichant line G D.

The Italian writers on fortification feem fond of having the flanked angles, or angles of the baftions acute, in order that the faces of the baftions, on the fame fide of the place, may defend one another, and ferve as flanks when the cafemates and flanks are battered down or ruined. But the fecond flank on the curtain is by this conftruction too fmall to make the flanked angle always acute. To make it anfwer this purpofe, it would be an improvement of it to make the fecond flank increafe in length, as the number of the baftions or of the fides of the figure increafes.

It is perhaps worthy of remark, that the angle A D G by

by this constitution on a hexagon, exceeds that subtended by the true perpendicular of a hexagon by about 17′ only.

The angles of the square and pentagon are too small for a second flank. And the Chevalier de Ville, whose construction much resembles Sardi's in several respects, appears to have borrowed from him the idea of making his flanks equal to his demi-gorges. He takes care however to avoid second flanks in the square and pentagon, and in other figures to make them increase with the number of the sides of the figure.

The following is the construction of the Dutch method of fortifying according to Marolois.

Before he begins his construction he ascertains the magnitude of the flanked angle, or angle of the bastion, by adding 15° to half the angle of the polygon, which makes it in the square equal to 60°, in the pentagon equal to 69°, in the hexagon equal to 75°, in the heptagon equal to about 79° 17′, in the decagon equal to 87°, in the dodecagon equal to 90°, which he also allows for it in all figures or polygons of a greater number of sides.

He makes the curtain I K (*fig.* 12) equal to 36 rods of 12 Paris feet each, or 72 toises, the face of the bastion A F equal to 24 such rods or 48 toises, making the ratio of the curtain to it a sesquialteral one, or that of 3 to 2. He makes the flank-forming angle F M I equal to 40°, when he wishes to have only a single flank, in order that the demi-gorge I M may be to the flank in the ratio, nearly of 6 to 5, and equal to 35° only, when he intends to have a covered flank, making then the ratio of the demi-gorge to the flank about that of 7 to 5.

Let A B be an exterior side. Make the angle B A O equal to half the angle of the polygon. Bisect the same by the right line A P. Take the angle P A E equal to 7° 30′. On the rasant line A E set off from A 48 toises for the face A F. From the epaule F draw the perpendicular F G, and produce G F indefinitely towards I, making at the point F an angle I F M of 50°. Draw through the point M, where the line F M meets the radius A O, an indefinite right line, M N, parallel to the exterior side A B, which will be a side of the inward polygon. Take the curtain I K, equal to 72 toises, and the line G H equal to it. Join K H, and on it take K L equal to the flank I F. Make the demi-gorge K N equal to the demi-gorge I M, and H B equal to A G. Draw the face B L, and the capital B N, which, being produced, will meet the capital A M also produced in the centre O.

The calculation of the principal lines and angles of the construction on the sides of a polygon fortified, according to Marolois's method, may be made in the following manner.

If we suppose A B to be the side of a hexagon, we have the angle of the centre equal to 60°, the angle of the polygon equal to 120°, and consequently O A B half the angle of the polygon equal to 60°. Wherefore O A E, half the flanked angle, is equal to 37° 30′, which taken from O A B, half the angle of the polygon or 60°, leaves 22° 30′ for the angle *diminué* E A B. But the angle of the flank is a right angle by the construction. If to this then there be added the angle *diminué*, we shall have 112° 30′ for the angle A F I of the *epaule* or shoulder, from which if the angle I F M, which is equal to 50°, be taken, there will remain 62° 30′ for the angle A F M. The angle A M F is = 80°.

The capital A M of the bastion is found from the oblique-angled triangle A M F by this analogy.

As the sine of the angle A M F
Is to the sine of the angle A F M,
So is the face A F of the bastion
To the capital A M.

And the line M F is found by this analogy.

As the sine of the angle A M F
Is to the sine of the angle F A M,
So is the face A F of the bastion
To the line F M.

The flank I F is found from the right-angled triangle M I F by this analogy.

As radius
Is to the sine of the flank-forming angle I M F = 40°,
So is the line F M
To the flank I F, which is equal to about 19 toises.

And the demi-gorge M I is found from the same triangle by this analogy.

As radius
Is to the sine of the angle I F M = 50°,
So is the line F M
To the demi-gorge M I, which is equal to about $22\frac{3}{4}$ toises, the double of which or $45\frac{1}{2}$ toises added to the curtain I K, which is equal to 72 toises, gives the interior M N, equal to about $117\frac{1}{2}$ toises.

The exterior side A B is determined by means of the line A G, which is found from the right-angled triangle A G F, by this analogy.

As radius
Is to the sine of the angle A F G = 67° 30′,
So is the face A F of the bastion, which is equal to 48 toises,
To the line A G, which is equal to about $44\frac{1}{3}$ toises, the double of which added to G H, that is, equal to 72 toises, gives $160\frac{2}{3}$ toises for the exterior side A B.

The second flank E K is determined by means of the complement E I, which is found from the triangle E I F, by either of the following analogies.

As the sine of the angle *diminué* I E F = 22° 30′
Is to the sine of the angle E F I = 67° 30′,
So is the flank I F
To the complement I E.

Or, As radius
Is to the tangent of the angle E F I = 67° 30′,
So is the flank I F
To the complement I E, which is equal to about $45\frac{5}{6}$ toises, and which taken from the curtain, which is equal to 72 toises, leaves $26\frac{1}{6}$ for the second flank E K or I C.

The perpendicular distance of the intersection of the lines of defence, from the middle of the exterior side A B, is found by this analogy.

As radius
Is to the tangent of the angle *diminué*, which is = 22° 30′,
So is half the exterior side A B
To the perpendicular from it to the intersection of the lines of defence, which is therefore equal to about $32\frac{1}{2}$ toises.

This construction furnishes an easy method of working on the ground, when through interruptions from buildings, hedges, thickets, &c. and from the unevenness and irregularity of the ground itself, a regular polygon cannot easily be described by finding the centre of the circumscribing circle. For such a polygon may be traced on the ground by means of the master-lines of the curtains and bastions, setting off first successively the angle of the polygon without any reference to the centre. This author, however, instead of making his flank equal to his perpendicular, as it ought to be, makes it fall short of the same by not less than $13\frac{1}{2}$ toises.

There are other methods of construction delivered by Dutch writers, which, however, are hardly deserving of notice. And

as in all their methods, they make a fecond flank on the curtain, and for the moft part draw at the fame time the counterfcarp of the great ditch parallel to the faces of the baftions, they render the defence very defective. For the branches of the counterfcarp being thus parallel to the fichant lines, will, when produced, frequently meet the curtains, and will of courfe cover the greateft part of the ditch itfelf, from the view of the flanks of the baftions. And as the principal part of the ditch is thus feen by the fecond flanks only, which are eafily ruined, the entrance into it is rendered eafy to the befiegers.

The following is the conftruction of the Spanifh method of fortifying.

Take the interior fide A B (*fig.* 13.) equal to 120 toifes. From A to C, and B to D, fet off 20 toifes or a fixth part of A B, for each of the demi-gorges A C, B D. On perpendiculars to A B at the points C, D, take C E, D F, equal refpectively to A C, B D, or to 20 toifes each, or a fixth part of A B. Let O be the centre of the circle, which circumfcribes the polygon, of which A B is a fide. From D through E, and C through F, draw right lines to meet the radii O A, O B, of the faid circle, produced in the points G, H. Then E G, F H will be the oppofite faces of the baftions C E G P Q, D F H R S, and A G, B H their capitals. And the fame conftruction continued on the other fides A M, M T, T V, V N, N B, completes the operation.

The calculation of the principal lines and angles of this conftruction is made in the following manner.

Since A B is equal to 120 toifes, and A C, B D, each equal to 20, the curtain C D is equal to 80 toifes. And fince C E, D F, are each equal to 20 toifes, or the fixth part of A B, and alfo perpendicular to A B by the conftruction, C D is to C E as four to one, and as radius to the tangent of the angle C D E, which is therefore equal to about $14^\circ\ 2'$. Wherefore the angle C E D is equal to about $75^\circ\ 58'$, and the angle C E G of the epaule or fhoulder is equal of courfe to about $104^\circ\ 2'$. Thefe angles, therefore, are the fame in all polygons. But the flanked of confequence, with the angles of the polygons.

Now, if we fuppofe A B to be the fide of a hexagon, we have the angle A O B of the centre equal to 60°, and the angle M A B or A B N of the polygon equal to 120°. Confequently half the flanked angle O G D or A G D, which is equal to the excefs of O G H or O A B, half the angle of the polygon, above the angle *diminué* A D G or C D E, is equal to $45^\circ\ 58'$: and the whole flanked angle, or angle P G E of the baftion, is equal to $91^\circ\ 56'$.

The capital A G of the baftion, is found from the oblique-angled triangle A G D, by this analogy.

As the fine of half the flanked angle A G D, which is $=45^\circ\ 58'$
Is to the fine of the angle *diminué* A D G$=14^\circ\ 2'$,
So is the lengthened curtain A D, which is$=100$ toifes,
To the capital A G of the baftion, which is equal to about 33.73 toifes.

And the rafant line or line of defence D G, is found from the fame triangle by this analogy.

As the fine of half the flanked angle A G D$=45^\circ\ 58'$
Is to the fine of the angle D A G$=120^\circ$,
So is the lengthened curtain A D, which is$=100$ toifes,
To the rafant line or line of defence D G, which is equal to about 120.46 toifes, or $120\frac{1}{2}$ toifes nearly.

But D E is equal to $\sqrt{\overline{CE}^2+\overline{CD}^2}=\sqrt{\overline{20}^2+\overline{80}^2}=4\sqrt{425}$ toifes$=$to 82.86 toifes nearly. Wherefore the face G E of the baftion is equal to 37.6 toifes nearly.

The gorge-line C Q is found from the ifofceles triangle C A Q, by the following analogy.

As the fine of the angle A C Q$=$half the angle of the centre
Is to the angle of the polygon C A Q,
So is the demi-gorge A C, which is $=20$ toifes,
To the gorge-line C Q, which in a hexagon, as this figure is fuppofed to be, is equal to about 34.64 toifes.

The line O G being equal to about 153.73 toifes, the exterior fide G H, when A B is the fide of a hexagon, will alfo be equal to about 153.73 toifes. But G H is always determined by taking a fourth proportional to O A, A B, and O G.

The perpendicular diftance K L of the interfection of the lines of defence, from the exterior fide G H, is found by this analogy.

As radius
Is to the tangent of the angle *diminué* L G K$=14^\circ\ 2'$,
So is G L or the half of G H, the exterior fide,
To the perpendicular K L, which in the hexagon, as this figure is fuppofed to be, is equal to about 19.2 toifes, falling fhort of the flank C E by about 0.8 of a toife, or eight-tenths of a toife.

The Spaniards, who are rather partial than otherwife to obtufe flanked angles, have no fecond flank on the curtain, but always conftruct their fortifications with a rafant, and never with a fichant line of defence, not minding whether the flanked angle or angle of the baftion be acute, right, or obtufe. Their mode of conftruction, except as to the fecond flanks, and the making of the flanked angle right, is the fame with that of the Chevalier de Ville, above defcribed, which being compounded of the Italian and Spanifh methods, has on that account been called the compofed draught, or the compofed method of conftruction.

Let A B (*Plate* VII. *fig.* 14.) be the fide of a regular hexagon infcribed in a circle, and equal to 160 toifes. Set off from its extremities A and C on it A C, B D as demi-gorges, and each equal to an eighth part of A B, or to 20 toifes. From the points C and D on right lines perpendicular to A B take C E, D F, as flanks equal each to 20 toifes, or an eighth part of A B alfo. Take the curtains C I, D K, from the points C D, and A B, each equal to 40 toifes, or a fourth part of the interior fide A B; and from the points I, K, on right lines, drawn perpendicularly to A B inwards, take I L, K M, for the retired flanks, each equal to 20 toifes, or the eighth part of the interior fide. Join the points L, M, by drawing L M for the retired curtain. From the extremities L, M, thereof through the points K, I, draw the right lines L K, M I, which being produced, will pafs through the outward extremities E, F, of the flanks C E, D F, and will meet the lengthened radii O A, O B, in the points G, H, which will determine the faliant points of two of the baftions. And a fimilar operation continued quite round on the other fides of the polygon, will complete the conftruction.

As the foregoing figure is fuppofed to be a regular hexagon, the angle of the centre is equal to 60°, and that of the polygon to 120°. And as M L is to L I, as 40 to 20 or 2 to 1, the natural tangent of the angle *diminué* L M I, or M G H to unity, as radius is equal to $\frac{1}{2}$ or to 0.5000000, which is nearly equal to the natural tangent of $26^\circ\ 34'$. If this angle be taken from 60°, half the angle of the polygon, there will remain $33^\circ\ 26'$ for half the flanked angle, or half the angle of the baftion. The flanked angle therefore, or the angle of the baftion, is in a hexagon equal to $66^\circ\ 52'$.

Now the line G I is found from the oblique-angled triangle A G I, by this analogy.

As the fine of $33^\circ\ 26'$, half the flanked angle, or A G I
Is to the fine of the angle G A I$=120^\circ$,
So is the line A I, which is equal to 60 toifes

6 To

To the line G I, which is equal to 94.31 toifes nearly.

And the capital A G of the baftion is found from the fame triangle by this analogy.

As the fine of A G I, half the flanked angle $=33° 26'$

Is to the fine of the angle *diminué* A I G $=26° 34'$,

So is the line A I, which is equal to 60 toifes,

To the capital A G of the baftion, which is equal to about 48.704 toifes.

But the line I M is equal to $\sqrt{\overline{I L}^2+\overline{L M}^2}=\sqrt{\overline{20}^2+\overline{40}^2}=$ $4\sqrt{125}=44.72$ toifes nearly.

But E I is equal to I M. Wherefore G E, the face of the baftion, being equal to G I − E I, is equal to about 49.59 toifes, or 49.6 toifes nearly.

The fhort or little line of defence G M or H L, being equal to G I + I M, is equal to $\overline{94.31+44.72}$ toifes, or 139.03 toifes, or 139 toifes nearly.

The lengthened radius O G, and confequently the exterior fide G H, when A B is the fide of a hexagon, is equal to $\overline{160+44.72}$ toifes, or to 204.72 toifes.

The perpendicular diftance of the interfection I, of the lines of defence, from the exterior de G H, is found by either of the two following analogies.

As radius

Is to the tangent of the angle *diminué* *i* G H $=26° 34'$,

So is half the exterior fide G H, or 102.36 toifes,

To the perpendicular diftance of *i* from the fame.

Or, As radius

Is to the fine of the angle *diminue* *i* G H $=26° 34'$,

So is the little line of defence G M $=139$ toifes

To the perpendicular diftance of the point *i* from G H, which is equal to about 62.166 toifes.

This method was adopted for the purpofe of conftructing on a large front, and thereby leffening the number of baftions. And to keep the lines of defence G M, H L, within mufquet-fhot, a curtain L M retired inwards, is made equal to a fourth part of the interior fide A B, and oppofite to the middle thereof. This manner of fortifying has been called the *ordre renforce* or re-inforced order, concerning which feveral Italian and Spanifh authors have written large treatifes. Like moft other writers on fortification, who have delivered different methods of conftruction, they very abfurdly make their angle *diminué* invariably the fame in all polygons, without affigning any good reafon for doing fo, drawn from the natures or properties of the polygons themfelves, the facility or difficulty of embracing them refpectively, or from their relative degrees of capability of defence. In this method, the perpendicular diftance of the interfection *i* of the lines of defence, from the exterior fide G H, is more than thrice the length of the flank C E or D F.

Of Coehorn or Koehoorn's methods.

The famous Minno, baron of Koehoorn, who took many of the places, which the celebrated marfhal Vauban had fortified, publifhed three methods of conftruction, the firft for a hexagon, the fecond for a heptagon, and the third for an octagon. The publication of his treatife on fortification however took place before he had acquired that great experience, which juftly procured him the reputation of being one of the firft engineers, that has ever appeared in Europe; and the methods delivered in it are not reducible to practice. That he afterwards thought fo himfelf is evident from the towns which he fortified. For if, after acquiring experience in the attack of places he had really been of opinion that the methods he had publifhed, were capable of making fuch a prodigious refiftance or defence as he endeavoured in his book on fortification to fhew, that they were, it is a circumftance difficult to be accounted for, that he never once thought of ufing them, when he had frequent opportunities of doing fo. It ought alfo to be remembered, that his fyftem of fortification was publifhed before the method of firing *en ricochet* was either practifed or invented.

In his firft method the works occupy twice as much ground as they do in Mr. Vauban's, and being entirely of earth, low, and liable to be eafily furprifed, would require thrice as many men, at leaft, for their defence. His fecond and third methods are, in fact, impracticable, as the fortification in each of them takes up five times as much ground as the town or place it furrounds.

This being the cafe, we will juft give a general defcription of them. In all the three he begins inwards and conftructs outwards. The firft he applies to a hexagon and fuppofes the furface of the water to be only about four feet lower than the level ground. In this he conftructs from an interior fide of 150 toifes, from the extremities of which he fets off on the fame 39 toifes for each of the demi-gorges and 80 toifes on the lengthened radii of the hexagon for the capital of each of the baftions. He thus leaves 72 toifes for the length of his curtain. From the extremities of the interior fide he takes, on the lengthened radii refpectively, 40 toifes for the points of interfection of the higher faces of the baftions, which are alfo equal each to 40 toifes, and parallel to the lower faces that are in the lines of defence. The fpace between the lower and higher faces of the baftions is a dry ditch, the bottom of which is only about fix inches above the level of the water in a wet ditch. Behind the lower parapet there is a banquette of three feet and a rampart of five, and under this rampart is a ftone gallery, that runs from one end of it to the other, and is divided into feveral apartments, which are fhut with doors. There is alfo a gallery, which goes from the faliant angle formed by the lower faces to that formed by the higher with loop-holes at fmall diftances from one another, looking into the dry ditch. There are likewife rows of palifades placed parallel to the higher face at the diftance of four toifes from them.

The great ditch is 24 toifes broad, and its counterfcarp is parallel to the lower faces of the baftions. The demi-gorges of the ravelin are each equal to 29 toifes, and the faces each to 45 toifes. The dry ditch between the lower and upper faces of it is 16 toifes broad. The rampart is 28 feet broad, the banquette three, and the parapet 20. The lower faces are parallel to the higher ones.

The angle *diminué*, or the angle formed by the exterior fide, and either line of defence, is in this method equal to $24° 38' 48''$.

His fecond method he applies to a heptagon, and fuppofes the level of the ground to be only about three feet above that of the furface of the water. In it he conftructs outwards from an interior fide of 126 toifes in length, from the extremities of which he takes on the fame 30 toifes for each of the demi-gorges. On the lengthened radii of the heptagon he fets off 72 toifes for the capital of each of the baftions, at the extremities of which he draws right lines forming with the faid capitals angles each of 40°, and on thefe lines he fets off 66 toifes for the faces of the baftions refpectively. From the faliant angles of the baftions as centres with radii equal to the diftance from the fame to the extremities of the demi-gorges 30 toifes diftant from thofe of the interior fides he defcribes arcs, in which he fets off refpectively chords equal each to 30 toifes, and on thefe chords defcribes the mean flanks which are arcs of 60°.

The outline of his higher flank is 13 toifes diftant from that

that of the mean, and this flank is an arc defcribed from the fame centre, that the mean flank is defcribed from, having its chord equal to 40 toifes.

The dry ditch round the body of the place is 20 toifes broad before the faces of the baftions, to which its counterfcarp is parallel. There is a wet ditch before his tenailles 10 toifes broad with two bridges at each end near the orillons, the one of which leads directly acrofs it and the other along the face of the baftion.

The faliant angle of the ravelin is 125 toifes diftant from the curtain of the body of the place and is of 70 degrees of magnitude. The faces are each 50 toifes long, and the faces of the redoubt in it are 16 toifes diftant from thofe of the ravelin, and each 14 toifes long. The wet ditch before the lower faces of the ravelin is 24 toifes broad, and the work beyond that ditch, which he calls the fecond counterfcarp, is 20, and parallel to the ditch.

The flanked angle or angle of the baftion in this method is equal to 80°, and the angle *diminué* or the angle formed by the exterior fide and either line of defence is equal to twenty-four degrees and two fevenths. In his firft method the angle of the baftion or flanked angle is equal to 70° 42′ 24″.

He applies his third method to an octagon, of which the fide is equal to 110 toifes, and from which he conftructs outwards; from its extremities he fets off 21 toifes for each of the demi-gorges. On the lengthened radii, or radii of the octagon produced, he fets off from the faid extremities of the interior fide 64 toifes for the capitals of each of the baftions, the faces of which he fuppofes to be each equal to 54 toifes, and the faliant or flanked angle equal to 85°. He thus makes his curtain equal to 68 toifes.

In his firft and fecond methods he has three flanks including that of the tenaille. But in this he has only two, the lower of which is determined or found by defcribing an arc through the extremity of the tenaille from the faliant angle of the oppofite baftion as centre and fetting off from the faid extremity in the faid arc a chord equal to 20 toifes, on which an arc of 60 degrees is defcribed for the flank. The upper flank is defcribed from the fame centre, that the lower one is defcribed from through one extremity of the curtain, and its chord is equal to 30 toifes.

The wet ditch before the body of the place is 20 toifes broad, and its counterfcarp is parallel to the faces of the baftions.

The capital of the detached baftion is equal to 100 toifes, its faces are directed towards the faliant angles of the inner baftions. The dry ditch between the lower and higher faces of the detached baftions is 20 toifes broad; and the higher faces are parallel to the lower, and each of them 31 toifes long. The ditch before the detached baftions 24 toifes broad. It is evident, that in this third method of Coehorn the angle *diminué* or the angle formed by the exterior fide and either line of defence is equal to 25 degrees. For fince the angle of the centre in an octagon is equal to 45°, that of the octagon is equal to 135°, from which, if the flanked angle, that by the conftruction is equal to 85°, be taken, we get 50° for the double of the angle *diminué*, which is of courfe equal to 25°.

Of Mr. Belidor's methods.

This author delivers three methods of conftruction, the firft he applies to an octagon, of which the fide is equal to 200 toifes. In the three he begins outwards and conftructs inwards. In the firft he makes the perpendicular to the exterior fide equal to 50 toifes, the faces of his baftion equal each to 70 toifes, and he finds his flanks in the fame way with Mr. Vauban in in his firft method. He makes his baftion with flanks equal each to about 26 toifes. On the line joining the extremities of thefe flanks he conftructs inwards, erecting a perpendicular to the middle thereof equal to 13 toifes, through the inner extremity of defence and takes on them the faces equal each to 22 toifes. The parts of the lines of defence from their interfection to the points where they terminate the flanks, are each equal to 14 toifes. The dry ditch before this front is 10 toifes broad at the inner extremities of the baftion, and its counterfcarp produced terminates at the oppofite fhoulders. He connects the flanks of the baftions with the curtains or lines joining the faces of the interior front by means of works in the form of arcs called ram's-horns, which are defcribed from the middle points of the faid faces as centres with a radius of 25 toifes. The faliant angle of the redoubt in his baftion is in the interfection of the two adjoining curtains produced, and the faces of it terminate on thofe of the inner front within three toifes of the *epaules* or fhoulders. The ditch before it is 3 toifes broad. It has a ftone wall in the faces from three to four feet thick with loop-holes. Mr. Belidor adds no outworks to this method of conftruction, which has certainly the advantage of all thofe with detached baftions. The retrenchments within are capable of a good defence, but occupy too much ground, particularly the ditches, that might be better difpofed of. The flanks of fuch large baftions as his are too fmall. The great ditches are too large, being 20 toifes broad at the faliant angles of the baftions with its counterfcarp directed towards their fhoulders.

In this method his angle *diminué* or the angle formed by the exterior fide and either line of defence is equal to 26° 33′ 54″, and of courfe the angle of his baftion or the flanked angle, as the conftruction is applied to an octagon, is equal to 81° 52′ 12″.

His fecond method of conftruction he alfo applies to an octagon, of which the exterior fide is equal to 200 toifes, the perpendicular to which, from the middle point thereof, he makes equal to 55 toifes. The faces of his baftions, which are detached, are each equal to 70 toifes, as in his firft method. And the flanks as well as in the firft are found in the fame way as Mr. Vauban's.

The right line, that paffes through the inner extremities of his baftion, ferves as an exterior fide for conftructing the inward polygon on, the perpendicular to which, at the middle point thereof, is equal to 5 toifes, through the inner extremity of which the lines of defence are drawn. On thefe the faces are fet off, each equal to 24 toifes; and the flanks are chords of arcs defcribed from the oppofite fhoulders of the detached baftions as centres.

The inward polygon is in fact nothing elfe than a ftrong wall, behind the curtain of which, and at the diftance of about 18 feet from it, there is an epaulement or a parapet of earth 3 toifes thick. And within the baftions there are cavaliers, of which the fronts are circular arcs, defcribed with a radius of from 23 to 24 toifes. Their flanks are each equal to 7 toifes, and their gorges to 32 toifes each.

The counterfcarp of the ditch before this inner polygon is diftant from it at the faliant angles, and is parallel to the curtain.

His tenailles, called ram's-horns, touch the outer lines of defence within three toifes of the *epaules* or fhoulders of the detached baftions, and are fo defcribed as to meet the faid lines of defence inwards, beyond their interfection in the points, where the counterfcarp of the inner ditch meets the fame.

The

The outline of the curtain between the ram's-horns is 9 toises beyond or without the inner ditch.

The exterior line, from the retrenchment within his detached baſtion is conſtructed, runs acroſs the ſame, and meets the faces thereof about 20 toiſes from the *epaules*, or ſhoulders, the perpendicular to which line at the middle point thereof is equal to 17 toiſes. Through the inner extremity of this perpendicular the lines of defence for the retrenchment are drawn. On theſe lines, from the faces of the baſtion, thoſe of the retrenchment are ſet off equal each to 20 toiſes. The chord, on which the orillon is deſcribed, is equal to 5 toiſes, as is alſo that on which the retired flank is deſcribed. Both are made according to Mr. Vauban's method. The circular curtain of this retrenchment, and the rounded part of the ditch adjoining it, are deſcribed from the ſaliant angle of the inner conſtruction next to it, with a radius of 25 toiſes. The great ditch before the ſaliant angles of the detached baſtions is 20 toiſes broad, and as it is ſuppoſed to be dry, Mr. Belidor made a *caponiere* from the curtain between the ram's-horns to the ravelin of about 18 or 20 feet wide, the parapets of which he made terminate on both ſides in a ſlope or glacis.

The capital of the ravelin he makes equal to 66 toiſes, and that of the redoubt within it equal to 30 toiſes. The faces of the ravelins are directed towards thoſe of the retrenchments within the detached baſtions, and thoſe of the redoubt within it to the ſhoulders of the ſaid baſtions. The batteries in the ravelin are retired 8 toiſes back from the faces of it. The ditch in front of the ravelin is 12 toiſes, and the breadth of that before the redoubt is equal to 7 toiſes.

The demi-gorges of the *lunettes* are each equal to 25 toiſes, and their faces are perpendicularly directed towards thoſe of the ravelin and detached baſtions. The ditch before them is 8 toiſes wide, and the batteries in them are retired 8 toiſes back from their faces, and are each of them 15 toiſes long. The covert-way is 6 toiſes broad.

In this method the angle *diminué*, or the angle formed by the exterior ſide and either line of defence, is equal to 28° 48′ 39″; and as the conſtruction is applied to an octagon, the angle of the baſtion, or the flanked angle, is of courſe equal to 77° 22′ 42″.

It is manifeſt that in this conſtruction the perpendicular to the exterior ſide, or of the great polygon, is much longer than it ought to be, ſince it exceeds the true perpendicular belonging to a polygon of 30 ſides. For the angle *diminué*, which it gives, is greater than the true angle *diminué* belonging to a polygon of 30 ſides, by upwards of one degree. And the angle of the baſtion, or flanked angle, falls ſhort of the real flanked angle in a polygon of 30 ſides, by not leſs than 33°. The baſtions are thereby made by far too large and extenſive. The great ditch appears alſo to be too wide, as the excavation of it will furniſh more earth than what is wanted for raiſing the ramparts. The works indeed, taken altogether, are too expenſive to be erected. For it would require almoſt a whole army to defend them, beſides ſuch a prodigious quantity of ſtores and ammunition, as cannot be allotted for the ſervice or defence of any one place.

Mr. Belidor applies his third method of conſtruction, as he does his firſt and ſecond, to an octagon, of which the exterior ſide is equal to 200 toiſes. But he makes the perpendicular to it at the middle point thereof equal only to 40 toiſes, which is very nearly indeed equal to the true perpendicular of an enneagon of the ſame exterior, and therefore comes nearer to the true perpendicular of an octagon than that which has been deſcribed for it by any other writer on fortification. On this account we will give the conſtruction of part of the body of the place on an octagon according to this method.

Let A B (*Plate* VIII. *fig.* 15.) be equal to 200 toiſes inſide of an octagon. Biſect A B in the point C, and draw C D perpendicular thereto. From C to D ſet off to D, equal to 40 toiſes, and from the extremities A, and B, of the exterior ſide A B, through the point D, draw the lines of defence. On them take A E and B F for the faces of the baſtions, equal each to 55 toiſes. The parts D *n*, D *r*, between the interſection, D, of the lines of defence, and the broken parts of the curtain, take each equal to 30 toiſes, and the length of each of the broken parts remains equal to 25 toiſes. The orillon is equal to 9 toiſes, and is part of a flank found according to Mr. Vauban's method. The flanks are retired 8 toiſes, and are arcs of 60° each. The outlines of the ram's-horns are 13 toiſes diſtant from one another. The paſſages at their extremities are each 3 toiſes wide. The outermoſt or loweſt is deſcribed with a radius of 30 toiſes, and the other is deſcribed from the ſame centre. By making the ſame conſtruction on two other ſides of the octagon, the poſitions of the other faces, A G, B H, of the baſtions is determined as well as the magnitude of the ſaliant angle of each. He places cavaliers in the gorges of the baſtions.

The capital of his ravelin is 44 toiſes, the demi-gorges of it are each equal to 31 toiſes, and its flanks, which are directed towards the ſhoulders of the baſtions, are each of them equal to 9 toiſes. The ditch before the ravelin is 10 toiſes wide, and the covert-way is 6 toiſes broad.

The glacis before the ſaliant angles of the baſtions is 15 toiſes broad. The demi-gorges of the places of arms are each equal to 26 toiſes, and thoſe of the redoubts or ſtone walls within them to 20. And the faces are parallel to the oppoſite demi-gorges. He makes arrows and detached redoubts after the manner of Mr. Vauban, but gives flanks to his arrows, which are parallel to the paſſages of 10 toiſes wide, that lead to them.

In this his third method of conſtruction, the angle *diminué*, or the angle B A D, or A B D, formed by the exterior ſide and either line of defence, is equal to 21° 48′ 5″, which differs from the true angle *diminué* of an enneagon by about 3 minutes only. And as it is applied to an octagon, the angle of the baſtion, or the flanked angle, is of courſe equal to 91° 23′ 50″.

It muſt be allowed that this conſtruction for the body of the place is good. The ram's-horns are unqueſtionably well contrived, and are much preferable to tenailles, as they cannot be enfiladed from any one place, as they reſiſt better, by their bending or curvature outwards, the enemies' batteries, and render the flanks much ſuperior to any batteries that the beſiegers can erect againſt them. Like a mere conſtructor on paper, however, he makes ſo many outworks, that they occupy a vaſt extent of ground, cannot be defended but by a very numerous garriſon, and uncommonly large ſupply of ammunition, artillery, and proviſions, and cannot be erected but at an immenſe expence.

The learned and ingenious Mr. Ozanam has given four methods of conſtruction, in all of which he begins inwards, and fortifies outwards, from an interior ſide of 120 toiſes, and at the ſame time places or takes his flanks on right lines drawn from the centre of the polygon through the extremities of the demi-gorges ſet off on the interior ſides.

In his firſt method he makes each demi-gorge equal to as many toiſes more than 20 as the polygon to be fortified has

has ſides. In the ſquare the demi-gorge is therefore equal to 24 toiſes, in the pentagon to 25, in the hexagon to 26, in the heptagon to 27, and ſo on to the decagon, in which the demi-gorge being equal by this rule to 30 toiſes, he makes it continue of this length in all higher polygons. He makes each flank equal to four times as many toiſes as the number of the ſides of the polygon, allowing 16 toiſes for it in the ſquare, 20 in the pentagon, 24 in the hexagon, 28 in the heptagon, and ſo on to the decagon, where the flank being by this rule equal to 40 toiſes, continues of that length in all higher polygons.

The angle formed by right lines from the ſaliant angle, and either ſhoulder or *epaule* of his baſtion, he calls the *flank-forming angle.*

The following is a table of the lines and angles of a fortified polygon, from the ſquare to the dodecagon, according to his firſt method of conſtruction, the inward or interior ſide being equal to 120 toiſes.

Polygons	Sides. 4	5	6	7	8	9	10	11	12
Angle of the centre	90° 0′	72° 0′	60° 0′	51° 26′	45° 0′	40° 0′	36° 0′	32° 44′	30° 0′
Angle of the polygon	90° 0′	108° 0′	120° 0′	128° 34′	135° 0′	140° 0′	144° 0′	147° 16′	150° 0′
Flank-forming angle	14° 2′	13° 1′	11° 53′	10° 36′	10° 2′	9° 21′	8° 44′	7° 50′	7° 22′
Angle of the flank	120° 58′	112° 59′	108° 7′	105° 7′	102° 28′	100° 39′	99° 16′	98° 32′	97° 38′
Angle diminué	9° 42′	13° 19′	16° 49′	20° 14′	23° 46′	27° 16′	30° 43′	30° 49′	31° 16′
Angle of the epaule	130° 40′	126° 18′	124° 56′	125° 21′	126° 14′	127° 55′	129° 59′	129° 21′	128° 54′
Flanking angle.	160° 36′	153° 22′	146° 22′	139° 32′	132° 28′	125° 28′	118° 34′	118° 22′	117° 28′
Flanked angle	70° 36′	81° 22′	86° 22′	88° 6′	87° 28′	85° 28′	82° 34′	85° 38′	87° 28′
Demi-gorge	Toiſes. Feet. 24 0	25 0	26 0	27 0	28 0	29 0	30 0	30 0	30 0
Curtain	72 0	70 0	68 0	66 0	64 0	62 0	60 0	60 0	60 0
Flank	16 0	20 0	24 0	28 0	32 0	36 0	40 0	40 0	40 0
Great line of defence	117 3	117 5	119 0	120 3	122 5	126 0	129 0	127 0	125 4
Face of the baſtion	36 1	37 5	40 1	42 2	45 2	48 5	52 3	50 0	49 1
Capital of the baſtion	28 0	33 3	39 4	46 1	53 4	61 2	69 4	67 5	67 3
Little radius	84 5	102 1	120 0	138 2	156 5	175 2	194 1	217 5	231 5

The following is this conſtruction on a hexagon, of which the exterior ſide is equal to 120 toiſes.

Let A B C E F D (*fig.* 16.) be a regular hexagon, inſcribed in a circle, of which the radius, A O, is equal to 120 toiſes. From the extremities A and B, ſet off A L, B M, for demi-gorges, equal each to 20 + 6 or 26 toiſes. In like manner ſet off A P, C Q; B *a*, D *b*; C T, E V; E *c*, F Y; F Z, D X; equal each to 26 toiſes. From the centre O, through the points, L, M, *a*, *b*, P, Q, T, V, *c*, Y, Z, X, draw the right lines O I, O H, O *d*, O *e*, O N, O S, O *m*, O *l*, O *k*, O *h*, O *g*, O *f*, and take I L, K M, *a d*, *b e*, Q S, T *m*, V *l*, *c k*, Y *h*, Z *g*, X *f*, equal each to 6 × 4, or 24 toiſes. From the points L, M, through the points K, I, draw right lines to meet the radii O B, O A, lengthened or produced in the points H, G. From the points *a*, *b*, through the points *e*, *d*, draw right lines in like manner, and ſo on round the figure. This operation will determine the ſaliant angles of the baſtions, and all the parts of the conſtruction.

The calculation of the different lines and angles in this conſtruction may be made in the following manner.

Since A B is equal to 120 toiſes, if from it there be taken the demi-gorge A L, or B M, which is equal to 26 toiſes, there will remain 94 toiſes for the lengthened curtain, A M, or B L, from which, if 26 toiſes be taken, we get the curtain L M, equal 68 toiſes. But as this figure is a hexagon, the angle of the centre is equal to 60°, and the angle of the polygon to 120°. The little radius is alſo of courſe equal to 120 toiſes.

The angle, I L M, of the flank, or its equal, A L O, is found by means of the following analogy,

As the ſum of the ſides O L + A L = 146 toiſes,

Is to their difference O L − A L = 94 toiſes,

So is the tangent of half the ſum of the angles A L O, A O L = 60°,

To the tangent of half their difference, which is equal to about 48° 7′. This angle added to 60° gives 108° 7′ for the

the angle I L M of the flank, and taken from 60° leaves 11° 53′ for the flank-forming angle A O L, or A O I.

In like manner the angle *diminué*, L M I, or M G H, is found from the oblique-angled triangle I L M, by means of this analogy.

As the ſum of the ſides L M, L I, which is equal to 92 toiſes,

Is to their difference, which is equal to 44 toiſes,

So is the tangent of half the ſum of the angles L I M, L M I=35° 56½′,

To the tangent of half their difference, which is equal to about 19° 77′. This angle, taken from 35° 56½′, leaves about 19° 49′ for the angle *diminué* L M I, or M G H, and added to 35° 56½′ gives about 55° 4′ for the angle L I M; conſequently the angle G I L of the epaule is equal to 124° 56′. And if 33° 38′, which is equal to twice the angle *diminué*, be taken from 180° we get 146° 24′ for the flanking angle G *i* H, or I *i* K. Double the angle *diminué*, or 33° 38′, taken from 120°, the angle of the polygon leaves 86° 22′ for the flanked angle, or angle of the baſtion.

The angle *diminué*, 16° 49′, taken from 108° 7′ the angle of the flank leaves 91° 18′ for I L K, or I L H, the inner or inward flanking angle.

The line of defence, G M, is found from the oblique-angled triangle, A G M, by means of the following analogy.

As the ſine of A G M, half the flanked angle, or 43° 11′,

Is to the ſine of the angle of the gorge, G A M = 120°,

So is the lengthened curtain A M = 94 toiſes,

To the line of defence G M, which is equal to about 119 toiſes.

And the capital, A G, of the baſtion, is found from the ſame triangle, by means of this analogy.

As the ſine of A G M, half the flanked angle, or 43° 11′,

Is to the ſine of the angle *diminué* = 16° 49′.

So is the lengthened curtain A M = 94 toiſes,

To the capital A G of the baſtion, which is equal to about 39⅔ toiſes, to which, if we add the little radius O A, which is equal to 120 toiſes, we get 159⅔ toiſes, for the great radius O G, to which the exterior ſide, G H, is equal, as the figure is a hexagon. And in every polygon, the exterior ſide, G H, is a fourth proportional to the little radius O A, the great radius O G, and the interior ſide A B.

The face, G I, of the baſtion, is determined by finding the line I M from the oblique-angled triangle, I L M, by this analogy.

As the ſine of the angle *diminué* I M L = 16° 49′,

Is to the ſine of the angle I L M of the flank = 108° 7″,

So is the flank I L, which is equal to 24 toiſes,

To the line I M, which is equal to about 79⅙ toiſes, and when taken from I M, the line of defence, leaves about 40⅙ toiſes for G I, the face of the baſtion.

The angle A O B is called the angle of the centre.

The angle B A C is called the angle of the polygon.

The angle N G I is called the flanked angle, or angle of the baſtion.

The angle I *i* K, or G *i* H, is called the outward flanking angle.

The angle G I L is called the angle of the epaule or ſhoulder.

The angle I L M is called the angle of the flank.

The angle I M L, or M G H, is called the angle *diminué*.

The angle A O L is called the flank-forming angle.

P N G I L is called a baſtion.

A P, or A L, is called the demi-gorge of the baſtion.

The line joining the points P, L, is called the gorge of the baſtion.

The angle I L K, or I L H, formed by the flank I L and the line of defence L H is called the inner flanking angle.

A B is called the inward or interior ſide.

G H is called the outward or exterior ſide.

O A is called the little radius.

O G is called the great radius.

I L, or K M, is called a flank.

L M is called the curtain.

A M, or L B, is called the lengthened curtain.

G M, or L H, is called a line of defence.

A G is called the capital line, or capital of the baſtion.

A I, or H K, is called the face, or *pan* of the baſtion.

The flank I L is called right flank, when it makes a right angle with the curtain; oblique flank when it makes an oblique angle with the ſame; and acute flank when it makes an acute angle with the curtain; as it does by Errard's method in figures up to the octagon. When the orillon is rounded or formed by the arc of a circle, it is called a round orillon, and when it is rectilinear, or formed by the face of the baſtion, produced a few toiſes beyond the *epaule*, and a right line drawn from the extremity of the ſaid prolongation, either parallel to the flank, or nearly ſo, it is called a ſquare orillon. It is made for the purpoſe of covering part of the flank, which for that reaſon, or in order to be the more effectually covered, is taken a few toiſes inwards from the flank itſelf towards the centre of the baſtion, and is generally made in an arc of a circle, though it would be better in a right line, or on the chord of an arc. It is on this account called the *retired*, or *covered flank*, and ſometimes the *caſemate*, and *place-baſſe*. And its depth, or enfoncement on the line of defence, produced beyond its interſection with the curtain, as well as its diſtance from the outſide of the orillon, is called the *retirade* or *retrenchment of the flank*, or the *platform of the caſemate*.

The line Q S is called flank, becauſe it defends the face G N of the oppoſite baſtion. For, in fortification, *to flank* has the ſame meaning or ſignification with the phraſe *to defend*. When the line G Q is not compoſed of the face G N of the baſtion, and a prolongation thereof to the angle Q of the flank, it is called *flank-fichant*, becauſe a muſketeer, at its extremity Q, can fire, or *ficher*, as the French term it, at or againſt any part of the face G N. Hence the line Q G, drawn from the ſaid extremity Q of the flank, is called the *fichant-line of defence*, and ſometimes only the *fichant-line*. It is alſo called the *great line of defence*. But when the face, G N, of the baſtion produced, meets the curtain Q P, in any point, R, between the points Q and P, or in any point R nearer to the ſaid baſtion, the line G R is called the *raſant-line of defence*, or ſimply the *raſant-line*, and alſo the *little line of defence*, being ſhorter than the line G Q, becauſe a muſketeer cannot from the point R fire at or againſt any part of G N, the face of the baſtion, but can only raſe or fire along it. The part Q R of the curtain intercepted between the lines G Q, G R, is called the *ſecond flank*, as alſo the *fire* or *the curtain*, becauſe from every point in it, except the extremity R, one may ſhoot or fire againſt every part of the face G N. Second flanks are not always, nor indeed frequently, made. And when there are none, there are no *fichant lines*, but only *raſant-lines of defence*, in which caſe the flanks are called *raſant flanks*, becauſe from their extremities, that join the curtains, one can only raſe or fire along the faces of the oppoſite baſtions, but from any intermediate points between thoſe extremities and the *epaules*, he can fire at or againſt the ſaid faces. The flanks form the principal defences, ſince an enemy cannot, whilſt they remain entire, approach the body of the place. And they

are, for that very reaſon, the parts which he firſt endeavours to deſtroy, in order to facilitate his paſſage of the great ditch.

The angle ILM, which the flank IL makes with the curtain LM, is called the *angle of the flank*, and the angle GIL, which the flank IL forms with the face GI of the baſtions, is called the *angle of the epaule*, or ſimply the *epaule*, from which comes the word *epauler*, to cover on one ſide, or to cover the flank or the ſhoulder of the beſieged in ſuch a manner, that he cannot be ſeen or diſcovered on that ſide from without. The face GI, which thus covers the *epaules* or ſhoulders of thoſe who aſſiſt in defending the place in the flank IL, is therefore called *epaulement*. The point or angle A, of the inward or interior polygon, is called the centre of the baſtion.

When the flank, IL, is on a right line, drawn from the epaule I, to the centre O of the polygon, as it is in all his four methods of conſtruction, it forms, when produced to the ſaid centre O, an angle AOL, which is called the *flank-forming angle*. The angle IGN, which the two faces GI, GN, form at the point G of the baſtion, is called the flanked angle, or angle of the baſtion, becauſe it is flanked or defended by the two oppoſite flanks QS, MK. The right line GH, drawn from one flanked angle to another, and which marks the diſtance between them, is called the *baſe-line*, and the ſide of the outward or exterior polygon, which in regular conſtruction is always parallel to AB, the correſponding ſide of the inward or interior polygon. A re-entering angle is that which retires inwards; and in terms of fortification it is called a *tenaille-angle*, or ſimply a *tenaille*. And ſuch of them as are formed by the meeting or interſection of two raſant lines, making an obtuſe angle, are called *flanking angles*, as for inſtance the angle G*i*H; and the lines G*i*, H*i*, forming it, are alſo called *tenailles*. The angle G*i*H is alſo called the *outward flanking angle*, to diſtinguiſh it from the angle ILH, formed by the flank IL, and the raſant line GL, when the flank is raſant, which is called the *inward*, or *inner flanking angle;* or from the angle GRQ, when there is a ſecond flank RQ, which is alſo called an *inward flanking angle*.

The raſant lines, GM, HL, always make acute angles with the curtain LM, either of which, as IML or GML, is called the *angle diminué*, or *angle diminiſhed*, and is equal to the angle MGH, which GM forms with the baſe-line, or exterior ſide GH. The angle GAL, formed by the capital AG and the demi-gorge AL, is called the *gorge-angle*, or angle of the gorge, and is always equal to the exceſs of 180° above half the angle of the polygon OAB; which half angle is called the *baſe-angle*.

In his ſecond method of fortifying or conſtructing, he ſuppoſes the demi-gorges to be the ſame as in his firſt method: but inſtead of making each flank equal, as in it, to four times as many toiſes as the number of the ſides of the figure or polygon, he, in this, makes each flank equal to 10 toiſes, together with twice as many more as the figure or polygon has ſides. He thus allows 18 toiſes for each flank in the ſquare; 20 for each in the pentagon; 22 in the hexagon; 24 in the heptagon; 26 in the octagon; 28 in the enneagon; and 30 in the decagon, in which the flank and demi-gorge being equal to each other, and to 30 toiſes reſpectively, he makes them continue ſo in all higher polygons.

But as it happens by this method of conſtruction, that in the octagon, and all the higher polygons, the flanked angle or angle of the baſtion becomes obtuſe, in order to limit it to a right angle, he deſcribes on a right line, joining the epaules or outer extremities of the flanks of each baſtion, a ſemicircle, which occaſions a ſecond flank upon the curtain, and two lines of defence, one raſant and the other fichant.

The calculation of the principal lines and angles in this conſtruction is eaſily made.

In his third method of conſtruction he makes his demi-gorges, as in the ſecond, of the ſame length as in the firſt, and his flanks of the ſame length as in the ſecond: but inſtead of limiting the flanked angle or angle of the baſtion to a right one, by ſuppoſing a ſemicircle to be deſcribed on a right line, joining the two epaules, he ſuppoſes it to remain always acute, by making the capital AG equal to the gorge-line PL.

The calculation of the principal lines and angles is eaſily made on this ſuppoſition.

In his fourth method he has no ſecond flanks, but makes all the defences raſant. He conſiders this method as more general than the three foregoing ones, which it certainly is, ſince it does not limit the lengths either of the demi-gorges or of the flanks, which, in this as well as in the others, are always on right lines, drawn from the centre of the polygon, through the extremities of the demi-gorges. And although the demi-gorges become greater with the number of the ſides of the polygon, they increaſe ſo ſlowly, that in one of 60 ſides the demi-gorge is only equal to about $37\frac{1}{2}$ toiſes. The following is his conſtruction for this method.

From the centre O of the polygon or figure, draw a right line perpendicular to the inward or interior ſide AB. Divide this perpendicular into ſuch a number of parts, as exceeds the number of the ſides of the figure or polygon by unity. Set off two of thoſe parts from each extremity of the inward or interior ſide, which is always ſuppoſed to be equal to 120 toiſes for each demi-gorge, and take three of them from the ſaid extremities on the little radii produced for the capital of each baſtion. Then, from the outer extremities G, H, of theſe capitals, which are the points of the baſtions, draw right lines to the points M, L, where right lines, drawn from the centre through the extremities M, L, of the demi-gorges, interſect the interior ſide. And theſe raſant lines, ſo drawn, will determine both the faces GI, HK, and the flanks IL, KM.

By this conſtruction, which is very ſimple and eaſy, the flanked angle or angle of the baſtion begins to become obtuſe in the enneagon, where it is equal to about 92° 6′, and grows more and more ſo in the higher polygons. This angle, however, increaſes but ſlowly, or at the rate of about one degree in each ſucceſſive polygon, amounting in the dodecagon to abont 96° 26′.

The calculation of the principal lines and angles, in this conſtruction, is eaſily made in the following manner.

The perpendicular, from the centre O of the polygon to the inward or interior ſide AB, is found by this analogy.

As radius
Is to the tangent of the angle OAB = 60°,
So is half the interior ſide AB, or 60 toiſes,
To the perpendicular from O to AB, which is equal to about 104 toiſes. Wherefore the gorge AL being, by this conſtruction, equal to two-ſevenths of this perpendicular, is equal to about $29\frac{2}{3}$ toiſes; and the capital AG, being equal to three-ſevenths of it, is equal to about $44\frac{1}{2}$ toiſes. The lengthened curtain AM is conſequently equal to about $90\frac{1}{3}$ toiſes. Wherefore the angle *diminué* AMG, or IML, is eaſily found from the oblique-angled triangle AMG, by this analogy.

As the ſum of the ſides AM, AG, which is equal to $134\frac{5}{6}$ toiſes,
Is to their difference, which is equal to $45\frac{5}{6}$ toiſes,

So

So is the tangent of half the angle OAM, or 30°,

To the tangent of half the difference of the angles AGM, AMG, which is equal to about 11° 6′. Consequently the angle AGM, or half the flanked angle, is equal to about 41° 6′, and the angle *diminué* LMI to about 18° 54′. Wherefore the flanked angle, or saliant angle of the bastion, is equal to about 82° 12′, to which adding the angle of the centre, or 60°, we get the flanking angle G*i*H, equal to about 142° 12′.

The angle ILM, in this construction, is obtained by means of the following analogy.

As the sum of the perpendicular from O to AB and half LM, or 134½ toises,

Is to their difference, which is equal to 74⅝ toises, or as 403 to 224,

So is the tangent of 45°, which is equal to radius,

To the tangent of 28° 42′, which added to 45°, gives 73° 42′ for the angle OLM, and consequently 106° 18′ for the angle ALO, or its equal ILM, the angle of the flank; to which if the angle *diminué* LMI = 18° 54′ be added, we get the angle GIL of the epaule, equal to 125° 12′. And if from the angle OLM there be taken the angle OAB, or half the angle of the hexagon, we get 13° 42′ for the flank-forming angle AOL.

The flank IL is found from the triangle ILM by this analogy.

As the sine of the angle LIM, which is equal to about 54° 48′,

Is to the sine of the angle *diminué* IML, which is equal to about 18° 54′,

So is the curtain LM, which is equal to about 60⅝ toises,

To the flank IL, which is equal to about 24 toises.

And the perpendicular distance of the intersection *i* of the lines of defence, from the exterior side GH, is found by this analogy.

As radius

Is to the tangent of the angle *diminué* *i*GH = 18° 54′,

So is the half of the exterior side GH, which is equal to about 82.25 toises,

To the perpendicular distance of *i* from GH, which is equal to about 28.1605 or 28.16 toises nearly, exceeding the flank by 4.16 toises.

Mr. Muller, in his "Elements of Fortification," has delivered what he is pleased to call a new construction. It differs, however, from Mr. Vauban's first method only in the following particulars.

1st. Instead of supposing, like Vauban, each flank to be the chord of an arc described from the shoulder or *epaule* of the opposite bastion as centre, he supposes it to be the chord of an arc described from the intersection of the line of defence and counterscarp produced.

2dly. He makes his retired flanks rectilinear, instead of making them in circular arcs.

3dly. Instead of using Vauban's tenailles before the flanks, he places ram's-horns before them.

4thly. He makes his orillon 5 toises long only, instead of 9, like Mr. Vauban.

Lastly. Instead of drawing the right line, which terminates the retired flank from the saliant angle of the opposite bastion, like Mr. Vauban, he draws it from a point on the face 5, or rather 10, toises within the said angle.

For, in his construction of this method, he begins, like Vauban, in his first method outwards, and constructs inwards. Like him he also supposes the exterior side of the polygon to be equal to 180 toises; and after observing that the perpendicular may be of any length, as the 6th, 5th, or 4th part of that side, he, like him, also fixes on 30 toises for its length. Like him also he makes the face of his bastion equal to 50 toises, or to ⅖ths of the exterior side.

He determines the saliant angle of his ravelin in this manner: he sets off on the face of his bastion from 12 to 15 toises from the shoulder or epaule, and from the opposite angle of the flank as centre, with the distance therefrom on the line of defence to the extremity of the line, set off from the shoulder on the face of the bastion, he intersects the perpendicular to the exterior side, produced beyond it outwards.

He also gives the construction of a place with detached bastions from an inward or interior side of 130 toises, applied to an octagon, in which he substitutes small bastions instead of Vauban's tower-bastions. In this method, he makes the demi-gorges of his small bastions each equal to 12 toises, the capitals of his detached bastions each equal to 55 toises, and their faces equal each to 60 toises. He determines the saliant angle of his ravelin, by describing from the extremity of the flank, as centre, through a point in the face of the opposite bastion, about 20 toises from the shoulder, an arc to intersect the right line, in which is the capital of the ravelin.

He likewise gives the construction of a place with detached orillon-bastions, beginning outwards, and constructing inwards from an exterior side of 200 toises, and applying it also to an octagon.

He makes his perpendicular, in this construction, equal to 40, or a fifth part of the exterior; the faces of his bastions equal each to 55 toises; the radius of the arc, that serves to determine the position of his flank, equal to 22 toises; the width of the ditch of the saliant angles equal to 16 toises; his orillon equal to 5 toises; and he keeps his flank retired 5 toises.

The marquis de Montalembert has published a large treatise on fortification, in which he makes much use of casemates and arches so much condemned by the Chevalier de Ville. His construction is in fact the same with Mr. Blondel's, applied to a right line or polygon, of an infinite or indefinite number of sides. For in this extreme case, which is of all others the most defective, Mr. Blondel's construction leaves no curtain, but gives the perpendicular equal to half the exterior side, and the angle *diminué* equal to 45°. In descending, however, from the right line or polygon of an indefinite number of sides, Mr. Blondel's construction affords a curtain, which gradually increases as the number of the sides of the polygon decreases, whilst the angle *diminué* at the same time gradually decreases, which in a hexagon, by his rule for determining it, *viz.* by taking from 45°, a third part of the angle of the centre of the polygon, is equal to 25°. But the marquis de Montalembert makes his angle *diminué* in every polygon, and on all occasions, invariably equal, to 45°. His construction is formed by the placing of triangles contiguous to one another, or by the juxtaposition of the angles at the bases of triangles in such a manner, as to make the other sides form re-entering angles equal each to a right angle, from which circumstance it is called *la fortification perpendiculaire*. It therefore affords no curtains or bastions, but when the section is of only an ordinary height, it necessarily creates dead parts from the re-entering angles quite to the saliant ones, or throughout its whole extent.

It may indeed be alleged, that these dead parts can be removed by casemates in the revetements, counterscarps, caponiers, &c. &c. and no doubt they may. But what good reason can be assigned for adopting a mode of construction, which creates every where those very defects, which in constructing the body of any place, it has hitherto been the first object and principal business of every fortifier to avoid, and then

then having recourfe to a number of expenfive, and otherwife unneceffary, contrivances, merely to get rid of the defects thus created.

As we underftand that this fyftem of fortification has been much difapproved of by fome of the ableft engineers, on the Continent of Europe; and as the late duke of Richmond, when mafter-general of the ordnance, was fo partial to it, that it was with much difficulty and after a great deal of difcuffion, that the engineers in the Portfmouth divifion, could perfuade him to adopt Vauban's firft method in preference to it, for the new pentagonal fort, that has been erected on Portfea ifland, near Lancaftown harbour; a candid and impartial comparifon between thefe two methods of conftruction may not be ufelefs to profeffional men, or unacceptable to the public. But we cannot make a comparifon between them more ably, correctly, and fcientifically, than it is drawn in an anonymous publication of 1794, re-publifhed in 1805, in the following words.

"It is manifeft then, that after a work is once adapted to the ground it is to occupy, &c. the firft confideration is to conftruct it in fuch a manner, as to leave no dead parts; that is, to leave no fuch parts as cannot be feen, fired on, or flanked from fome other parts. That this is a fundamental maxim, and ought to be a primary object of attention in the conftruction of every work, is manifeft from this circumftance: that, were it not with a view to obtain flanking defences for the different parts, a rampart and parapet might as well be raifed along the exterior fides of figures themfelves, or the curves circumfcribing them, as along the feveral parts of thofe figures, into which the fides are ufually broken for this purpofe. The ftrength of a work, indeed, depends chiefly on its flanks; fince an enemy cannot approach the body of the place, whilft the flanking defences remain entire. But if there be dead parts, the moment an enemy gets to them, he finds himfelf in a ftate of fecurity, and out of the reach of the befieged's fire. An idea therefore of the neceffity of avoiding them has always made fuch a forcible impreffion on the minds of able fortifiers, as to induce them to limit the heights of fections. For even when the fide of a polygon is 180 toifes long, and is broken into two demi-baftions, and a curtain with flanks, if the fection of the work be very high, the guns in thefe flanks cannot fee or fcour the ditch but at too great a diftance. When it is only of an ordinary height, it is well known that the guns in the flanks do not fee the ditch effectually nearer than the interfection of the lines of defence, which in Vauban's conftruction is 44.8683 toifes, or 45 toifes nearly from the fhoulders of the baftions, and 40.2632, or 40 toifes and a quarter nearly from the re-entering angles formed by the curtain and flanks. When the exterior fide, therefore, is lefs than 180 toifes, the fection ought to be kept proportionally lower, provided only it be not fo low as to expofe the body of the place to furprife. But if it once be admitted as a maxim, that a fortification ought to be conftructed without the leaft regard to any flanking defence, and that the avoiding of dead or unfeen parts is an object not worthy of attention, it is evident that the rectilinear and curvilinear are greatly preferable to the zig-zag or triangular conftruction formed by conftituting triangles on the fides of any right-lined figure or polygon. The fire from a ftraight line is the beft of the direct kind that can be obtained, being equally and uniformly diftributed. And the enemy cannot advance againft it directly, without a good deal of delay, inconvenience, and trouble, but muft carry on his approaches fomewhat in the way commonly practifed, till he gets to the dead parts in front of it: when, unlefs contrivances be made ufe of that have no natural or infeparable connexion with the conftruction itfelf, it will ceafe to be formidable for want of flanking defences. This obfervation likewife holds good in a great meafure with regard to regular curves, from which the fire is alfo regularly diftributed. The interior area too in each of thefe comprehended within the fame enceinte, length of enclofure, or extent of rampart, is much greater than in the triangular conftruction, which naturally, inftead of producing any fire that is direct or at right angles to the exterior fides, produces no good flanking one for itfelf, but caufes a continuity of dead parts, when the fection is high and the lines of defence but fhort, to reign throughout its whole extent. An enemy can approach it without annoyance from the befieged in lines bifecting either the faliant or re-entering angles, or in fhort in lines directed to any intermediate points whatever between thefe angles.

It muft therefore be allowed, that the triangular conftruction, whether the re-entering angles be right ones (as in the "Fortification perpendiculaire" of the marquis de Montalembert), or acute or obtufe ones, is naturally the moft defencelefs and ill contrived of any, that can poffibly be thought of or conceived: for it creates dead parts throughout the whole extent almoft of the work, and is equally deftitute of flanking fires for itfelf, and of a good or well diftributed direct one againft the enemy.

The marquis, fig. 4, planche 15, vol. i. of his performance, gives what he calls his regular conftruction in a dodecagon, of which the exterior fide is 180 toifes. The radius of the circumfcribing circle is of courfe equal to 347.733297 or 347.7333 or 348 toifes nearly, and the perpendicular diftance from its centre to the exterior fide 335.884572, or 335.8846, or 336 toifes nearly. Confequently the annular area occupied by his conftruction is equal to that of the infcribed circle, in the circumference of which are his re-entering angles of 90°, or which comes to the fame thing, to half the area of the circle circumfcribing the dodecagon. But if Vauban's conftruction be made on the fides of the fame figure, the annular area occupied by it will be to that of the infcribed circle, to which the curtains are tangents at the points, where the perpendiculars produced meet them, as 34980.228 to 85938.24, or as 17490 to 42969 nearly, or in fmall numbers as 20 to 49 nearly.

The exterior area between the conftruction and the fides of the dodecagon in Momtalembert's method is to that in Vauban's as 8100 to 4270.2687, or in fmall numbers, as 19 to 10 nearly; and as both the faliant and re-entering angles in the former are lefs than in the latter, this difference of loft area will be confiderably increafed in practice. For in the marquis's conftruction, each of the faliant angles contains 60 degrees, and each of the re-entering ones 90; whereas in Vauban's the faliant angle of each baftion is 113° 7′ 48″, and each of the re-entering ones formed by the flanks and curtains is 99° 13′ 3″.

Montalembert's conftruction gives the enceinte or boundary of the body of the place equal to 3054.70128 toifes, exceeding Vauban's, which is equal to 2771.2836, by 283.41768 toifes.

When he inferts or intercalates triangles having their faliant angles right ones and in ftraight lines, as in figures 3, 5, 7 and 8, planche 15, after the method pointed out in fig. 1, he lofes ftill more area in proportion to the interior fpace. And the very circumftance of his having recourfe to different centres of conftruction, even on figures that are regular, is fufficient to create a fufpicion, that he did not underftand even his own method in its full extent.

Although he muft certainly be confidered as a very fhallow and fuperficial geometer, the reafon for his not fixing on any polygon under a dodecagon for illuftrating his regular conftruction, is very obvious; for no regular figure of a fmaller number

number of ſides, will by it give ſaliant angles of ſixty degrees, which is the ſmalleſt angular magnitude that engineers have generally reckoned admiſſible in fortification. I can ſee no good reaſon, however, (ſays our author) for his abandoning regular polygons, when he has occaſion for more triangles than twelve, and by way of interpolation inſerting the additional ones to this number between right lines parallel to the ſides of triangles, ſquares, or rectangles; ſince a conſtruction on the ſides of a regular polygon furniſhes much more interior area, with a comparatively but trifling increaſe of length in the enceinte or encloſure of the body of the place.

The compariſon, which he draws, p. 197, (illuſtrated by fig. 9, planche 15.) between Vauban's method on the ſides of a ſquare, of which each is equal to one hundred and eighty toiſes, and his own on the ſides of a dodecagon inſcribed in the circle circumſcribing this ſquare, is a very improper and unfair one. In this figure, each of thoſe lines, which he calls his lines of defence, is equal to 46.5874 toiſes, and muſt, with a ſection of an ordinary height, have dead parts in front of it throughout its whole extent. Each of the ſides is equal to 65.8846 toiſes very nearly, and not to 66 toiſes one foot, as from his ſcale he erroneouſly ſtates it to be. The moſt candid and impartial mode of comparing theſe two methods of conſtruction together is to ſuppoſe both to be made on the ſides of one and the ſame figure. The marquis's conſtruction, however, on the ſides of a ſquare, neither leaves interior area nor ſaliant angles. For its re-entering angles meet in the centre of the circumſcribing circle. But as in it the lines of defence when equal form angles of 45° with the exterior ſide, each of the ſaliant angles, which it gives in any polygon, is equal to the exceſs of the angle of that polygon above 90°; or which comes to the ſame thing, to the exceſs of the re-entering angle formed by the lines of defence above the angle at the centre of the figure, ſince the exceſs of the angle of any regular polygon above 90° is equal to the exceſs of 90° above the angle at the centre of the circumſcribing circle ſubtended by one of its ſides. Conſequently, when the polygon has an indefinite number of ſides, or becomes a ſtraight line, the ſaliant angle is equal to ninety degrees. Thus a ſquare with this conſtruction gives no ſaliant angle at all; a pentagon one of 18 degrees; a hexagon one of 30 degrees; a heptagon one of 38 degrees and four ſevenths; an octagon one of 45 degrees; an enneagon one of 50 degrees; a decagon one of 54 degrees; an endecagon one of 57 degrees and three elevenths; a dodecagon one of 60 degrees; a polygon of 18 ſides one of 70 degrees; a polygon of 36 ſides one of 80 degrees; and ſo on indefinitely. By this conſtruction on a pentagon, of which the ſide is equal to 180 toiſes, the re-entering angles come within 34 toiſes of the centre of the circumſcribing circle; and within 19, if the exterior ſide be only equal to a hundred toiſes. How little interior area then would have been left, had this conſtruction been made uſe of for the new pentagonal work on Portſea iſland, called Fort Cumberland, of which one of the exterior ſides is equal to 120 fathoms, and each of the other four to a hundred! Even on a hexagon, of which the ſide is equal to 180 toiſes, it brings the re-entering angles within 66 toiſes of the centre of the circumſcribing circle, and gives the annular area occupied by it to the area of the inſcribed circle as $2\sqrt{3}$ to $4-2\sqrt{3}$, or as 6.4641 to 1, or in ſmall numbers as thirteen to two nearly. If it be even made on parts of one and the ſame ſtraight line as exterior ſides, of which each is equal to 90 toiſes only, the perpendicular diſtance between that line and the right line paſſing parallel to it through the re-entering angles exceeds that between the parallel right lines, limiting Vauban's conſtruction on parts of one and the ſame ſtraight line as exterior ſides equal each to 180 toiſes, or two of the others, by 2.2676 toiſes, and only becomes equal to it, when the exterior ſide is reduced to 85.4648 toiſes.

The angle (108°) of a pentagon exceeds 90° by 18°, which are equal to the exceſs of 90° above (72°) the angle of the centre. But 18° are equal to $90° \times \frac{1}{5}$ or $360° \times \frac{1}{4 \times 5}$. In like manner the exceſs of (120°) the angle of a hexagon above 90° is equal to 18° + 12° (= 30°) the exceſs of 90° above (60°) the angle of the centre, that is, to $360° \times \left(\frac{1}{4.5} + \frac{1}{5.6}\right)$. Wherefore we get $360° \times \left(\frac{1}{4.5} \times \frac{1}{5.6} + \frac{1}{6.7} \times\right.$, &c. indefinitely or *ad infinitum*) = 90°, and of courſe $\frac{1}{4.5} + \frac{1}{5.6} + \frac{1}{6.7} +$, &c. *ad infinitum* $= \frac{1}{4}$. Whence it is obvious, that methods of ſumming an endleſs variety of ſuch ſeries, together with ſuch ſeries, as $\frac{n+m}{n\,.\,\overline{n+1}\,.\,\overline{n+m+1}} + \frac{n+m+1}{\overline{n+1}\,.\,\overline{n+2}\,.\,\overline{n+m+2}} +$, &c. *ad infinitum*, and innumerable other forms, may eaſily be derived from common geometry and the angular relations of rectilinear figures. But the ſummation of infinite ſeries is a ſubject which it is not my intention to enter into the conſideration of at preſent.

There is a circumſtance attending this conſtruction, which, I dare ſay, never occurred to the marquis. It is this: though on the ſides of a ſquare it brings the re-entering angles to the centre of the circumſcribing circle, and leaves neither interior area nor ſaliant angles; yet, if it be made on the ſides of any given regular polygon, and the re-entering angles be joined by right angles forming a ſimilar polygon, and on them a ſimilar conſtruction be made, and ſo on indefinitely or *ad infinitum*, it will never bring the re-entering angles to the centre of the circle circumſcribing the given polygon, but nearer to it than by any given right line or diſtance. And if ſpirals be ſuppoſed to paſs from the angles of the polygon through the angular points of equal angles in endleſs or indefinite ſucceſſion (each equal to 45 degrees, together with the ſaliant angle of the conſtruction and the complement of its half) formed by the lines of defence taken ſingly from the firſt in the indefinitely ſucceſſive conſtructions, will paſs round the centre of the circle circumſcribing the given polygon an indefinite number of times without ever reaching it; and the area between any two of theſe ſpirals commencing from one of the exterior ſides of the polygon will become nearer in point of equality than by any given ſpace or area to ſuch a part of the polygon, as is expreſſed by the number of its ſides, without ever equalling it. The ſum or aggregate of theſe lines of defence, in decreaſing geometrical progreſſion and endleſs ſucceſſion, can always be expreſſed by a given definite ſtraight line.

From what has been obſerved, the following inferences may certainly be very fairly and impartially drawn reſpecting Montalembert's conſtruction:—1ſt, When the exterior ſides are ſhort, it naturally creates, with a ſection of an ordinary height, dead parts throughout its whole extent. It may perhaps be alleged, that this capital defect can be removed by caſemated defences with artillery near the re-entering angles on a level almoſt with the ditch. To a certain degree it certainly may: but that method of conſtruction, which by itſelf naturally removes every ſuch defect without any ſubſequent or adventitious contrivance, is ſurely entitled to preference in the opinion of every able or intelligent fortifier.

2dly,

2dly. His faliant angles are too fmall, being lefs in a dodecagon than Vauban's are even in a fquare; for in a dodecagon his faliant angle is only equal to fixty degrees, whereas in a fquare Vauban's is equal to 60° 55′ 39″, and in the dodecagon 113° 7′ 48″. This is unqueftionably an effential defect.

3dly. It furnifhes no fire that is direct or perpendicular to the exterior fides. That this is a great defect cannot be denied.

4thly. Oppofite to each re-entering angle, at the diftance only of 90 toifes from the exterior fide, there is a quadrangular fpace (which no fire from the place fcours, commands, or touches), commencing in an angle of 90 degrees, and terminating in one of 30 degrees, at the fame diftance from the exterior fide with the centre of the dodecagon.

5thly. Oppofite to every faliant angle, and at the diftance from it only of about 254 toifes and a half, there is a fpace that is not fcoured or commanded by the fire of the place, which commences in an angle of 60 degrees, widens till its breadth becomes equal to the radius of the circle circumfcribing the dodecagon, and then runs on indefinitely at that width between parallel lines.

6thly. The greateft width of each of the firft-mentioned fpaces not traverfed by the fire of the place is to the correfponding width of each of the fpaces traverfed by it as 104 to 147, nearly: and the greateft width of each of the laft-mentioned fpaces not traverfed by the fire is to the correfponding width of each of the fpaces traverfed by it as the radius of the circle circumfcribing the dodecagon to 131.769 toifes, or as 264 to 100, nearly.

7thly. As the refpective breadths of thefe fpaces not covered by the fire of the place bear fo great proportions to the correfponding breadths of thofe covered by it, and, as the diftance between every two of them is only equal to one of his lines of defence, or 127.2794 toifes, the befiegers may advance almoft to the very creft of the glacis without any interruption from the fire of the befieged. But it is an important object in defence to keep the befiegers at a diftance from the body of the place as long as poffible. For when they once get within the diftance of ferious mufketry from it, they will infallibly filence artillery, whether the embrafures be open or covered at top, or whether the guns be in cafemates or not.

8thly. The befiegers may eafily deftroy his principal covered mufketry-defences before they are expofed to his principal cafemated defences with artillery, which being low, to take off the dead parts unavoidably occafioned by the very nature and badnefs of his conftruction, are chiefly calculated for defending the paffage of the ditch, and cannot annoy an enemy till he gets to the very creft of the glacis, after which every thing almoft, except battering in breach, is determined without artillery.

Laftly. The great proportion which the annular area, occupied by his conftruction, bears to that of the infcribed circle, will for ever render it unfit for the purpofe of fortifying any confiderable town or city.

The marquis de Montalembert's conftruction has no claim even to originality, if we except the great impropriety (I had almoft faid folly) of making the lines of defence in it form the fame angle in all figures, and on all occafions; for when applied to a ftraight line (as in fig. 1, planche 15, vol. i.) it is the fame with Mr. Blondel's. In this cafe both give the perpendicular equal to half the exterior fide, the angle *diminué* equal to 45°, the faliant angle of the baftion equal to 90°, the fame line of defence, the fame flanking or re-entering angle, and no curtain. The only difference between them confifts in this, that Mr. Blondel, in defcending from the right line or polygon of an indefinite number of fides to inferior polygons, makes his angle *diminué* gradually decreafe according to the rule he has delivered for afcertaining its magnitude, whereas the marquis keeps his in all figures invariably the fame. [Mr. Blondel's rule for afcertaining the angle *diminué* is the following: add fifteen degrees to one-third part of the excefs of the angle of the polygon above 90 degrees.] Mr. Blondel's conftruction on an indefinite right line gives the perpendicular nearly double what it ought to be; and the marquis, by keeping this prepofteroufly large perpendicular in all figures on the fame exterior fide and his angle *diminué* invariable, finds the faliant angle of his dodecagon equal only to 60°, the fmalleft that is generally confidered by engineers as admiffible in fortification. This circumftance, therefore, by the marquis's own acknowledgment, renders his conftruction inapplicable to any polygon of a fmaller number of fides than twelve, and is certainly fufficient of itfelf to demonftrate not only its impropriety, but, I believe I may venture to fay, even abfolute abfurdity. It in fact furnifhes nothing but ftar-figures with re-entering angles of 90°; and it is manifeft that no regular figure of this fort under a dodecagon will give faliant angles of 60°.

Notwithftanding thefe obfervations, which I have certainly made with the ftricteft attention to truth, and, I flatter myfelf, alfo to candour, I am heartily difpofed to allow every fort of merit to the marquis's voluminous performance, that either his grace or any other perfon can point out as really belonging to it. I never can be hoftile to any perfon who even endeavours to enlarge the pomœria either of abftract fcience or profeffional knowledge; for the very attempt is laudable. And I muft confefs I am inclined to believe, that fome of his cafemated contrivances might, in certain fituations and circumftances, be advantageoufly united with Vauban's conftruction. I cannot help confidering him however as rather a fuperficial geometer, and as a very loofe and incorrect writer. But to prevent the poffibility of charging me with mifreprefentation in regard of his incorrectnefs, I will briefly quote his own words.

In his "Difcours Préliminaire," p. 38, he fays, "Le premier fyfteme de M. de Cohorn eft abfolument le même que celui du Comte de Pagan, auquel il a feulement ajouté une tour cafmatée à chaque orillon, pour défendre les faces hautes des baftions."

That he fhould have hazarded fuch an affertion is to me aftonifhing. For thefe two methods differ widely and effentially. In Coehorn's firft method, which is applied to a hexagon, for inftance, the ratio between the perpendicular and exterior fide is very different from what it is in Count Pagan's; fince in the firft the angle formed by the exterior fide and line of defence is equal to 24° 38′ 48″, whereas in the laft it is only equal to 18° 26′ 6″. The difference is 6° 12′ 42″. The faliant angle of the baftion in a hexagon by Count Pagan's method is equal to 83° 7′ 48″, whereas in Coehorn's firft method it is only 70° 42′ 24″, falling fhort of the other by 12° 25′ 24″. Thefe are capital and effential differences. And every perfon who choofes to examine them will find them very different in many other refpects. Vauban indeed appears to have borrowed more from Pagan than Coehorn has done. For, in any polygon having its exterior fide equal to 180 toifes, their perpendiculars are equal as well as the faliant angles of their baftions; and I am perfuaded that even the greateft admirers of Vauban can affign no good reafon for his not having followed Count Pagan alfo with regard to the pofition of his flank, and placed it at right angles to the line of defence inftead of making them meet in an angle of 80° 46′ 57″. There is great reafon to fuppofe that the Count would have made the face of his baftion confiderably

siderably shorter than he did, had he not intended to have three flanks instead of one. He makes it 55 toises. But it is naturally to be presumed, that had he intended to construct with a single flank, he would have bisected the perpendicular distance between his orillon and inner flank (which is 19 toises), and drawn his flank at right angles to the line of defence through this point of bisection, thereby forming a more complete construction for the body of the place with single flanks than Vauban has done. And it is somewhat remarkable, that this line nearly coincides with a perpendicular to Vauban's line of defence from its point of intersection with the flank. Had he therefore, instead of taking five toises from the face of Count Pagan's bastion, taken ten, and then placed his flank at right angles to the line of defence, he would, without lengthening this line, have given the face of his bastion its proper length, and at the same time made the flank itself about equal to the perpendicular, as it ought to be, since perpendiculars to the exterior sides of polygons were first introduced into construction for the sole purpose of obtaining flanking defences. Were I at present treating formally of fortification, I would deliver a very simple method of construction for rendering the flanks always equal to the perpendiculars to the sides of the polygons. The lengths however assigned to these perpendiculars are merely arbitrary, and by no means derived from reasoning either on the properties of the figures or their relative degrees of importance and capability of defence. For there appears no reason for giving the same perpendicular to a hexagon and every other polygon of a greater number of sides, as Vauban has done, or to all regular figures above the square, as Count Pagan has done. In like manner Coehorn's perpendiculars are too long, and merely arbitrary: for in his first method, which is applied to a hexagon, the angle formed by the exterior side and line of defence is, as I have already observed, equal to 24° 38′ 48″; in the second, which is applied to a heptagon, 24 degrees and two sevenths; and in the third, which is applied to an octagon, 25 degrees. This angle in Belidor's first and second methods applied to an octagon is also too great, being in the former equal to 26° 33′ 54″, and in the latter to 28° 48′ 39″. In his third method however, which is also applied to an octagon, it is equal to 21° 48′ 5″, and is not so much distant from what it really ought to be, as it differs only about three minutes from the angle subtended by the true perpendicular of an enneagon.

The perpendiculars are also a great deal too long in Blondel's method, which, when it is applied to a straight line or polygon of an indefinite number of sides, gives one equal to half the exterior side.

The marquis, vol. i. p. 193, says, "Mais dès que lignes de défense peuvent avoir jusqu'à cent cinquante toises, et les hypoténuses environ deux cent dix-huit toises, il suit que le rayon de ce polygône régulier inscrit dans le cercle peut être de quatre cent vingt-une toises et demie, le rapport du côté du dodecagône à son rayon étant comme quinze est á vingt-neuf environ, et ce rayon est à-peu-près celui d'un polygône à bastions de quinze côtés, par conséquent de quinze bastions."

A right-angled triangle however, having each of the sides containing the right angle equal to 150 toises, does not give the hypothenuse equal to 218 toises, but to 212.132 toises, which, as the side of a dodecagon, gives the radius of the circumscribing circle equal to 409.876 toises very nearly, and not to 421 and a half, as he states it to be.

In page 203 he falls into the same mistake.—Take however his own words:

"Mais l'on a vu, comme il est aisé de le sentir, qu'il est un terme où le rayon d'un cercle ne pourroit plus déterminer le côté de notre maniere de fortifier: et ce terme est celui où la corde de l'angle au centre de trente degrés que le rayon donneroit, passeroit deux cent vingt toises, puisqu'alors cette corde prise pour diagonale auroit deux côtés de plus de cent cinquante toises chacun, qui est une distance plus grande que celle admise pour la portée des armes à feu de but en blanc."

Here he mentions 150 toises as the greatest admissible length for each of the lines of defence, and 220 for the corresponding hypothenuse, or exterior side, which he calls the diagonal. But the fact is, that a hypothenuse of 220 toises, gives either side of an isosceles right-angled triangle constituted on it greater than 155 toises and a half. There are many mistakes of a similar nature in this gentleman's performance, who appears to have used scales much more than calculation. The exposure of error, however, is an unpleasant task, even when the elucidation of truth is the object."

From the whole of what is above delivered, it appears evident, that the magnitude of the angle *diminué*, and of the perpendicular to the exterior side, on which the other parts of the construction chiefly depend, is with all the writers on fortification a mere arbitrary assumption, for which they do not even attempt to assign any reason, and much less any good one, drawn from the nature of the polygons themselves, the relative degrees of difficulty in embracing them, or their respective degrees of capability of defence. The truth is this, that every polygon has a perpendicular belonging to itself, of a precise and determinable length, or bearing a given ratio to the exterior side. And the ascertaining of the true perpendiculars belonging to all different polygons is the great desideratum now wanted for perfecting military construction. We understand, that Mr. Glenie, formerly of his majesty's corps of engineers, has had in his possession a complete investigation of this important problem for upwards of twenty-five years. But as he has not yet chosen to make it known to any person, we could not expect him to communicate it to us. He has, however, been pleased to furnish us with the following rules, which have been made known to several individuals, both for regular and irregular construction, on the latter of which nothing of extensive application or much deserving of notice has as yet been delivered by the writers on fortification.

A short paper on fortification, delivering a method of construction for always making the flanks either equal to the perpendiculars to the exterior sides, or in any given ratio to them, and also a rule alike applicable to regular and irregular construction; and, in its application to the latter of these, infinitely more extensive than all that has been hitherto published on the subject. By James Glenie, esq. A. M., and fellow of the Royal Societies of London and Edinburgh.

"After the invention of gun-powder, the ancient method of securing and fortifying places was gradually departed from. Various and important alterations were by degrees introduced into fortification, as the construction and management of artillery became more and more improved. Many treatises have been written on the subject in different nations and languages. And could we for a moment suppose improvements in the *ars muniendi* to have kept pace with these publications, we must naturally conclude, that military construction has by this time reached almost all the perfection it is capable of. But although war has been a profession in Europe, and the attack and defence of places has been studied as a science for almost these two centuries past, it is a certain and undeniable fact, that no writer on fortification has as yet either discovered or demonstrated the true lengths of those lines, on which the other parts of the construction of a work chiefly depend; *viz.* the perpendiculars

culars to the fides of a polygon, from which the body of the place is to be conftructed. No writers on this fubject have affigned any fufficient, good, or even plaufible reafons for the lengths they give to thefe lines. With them all, without a fingle exception, the perpendiculars to the exterior fides of a work are mere arbitrary affumptions, and not the refult either of any fcientific or profeffional inveftigation. Even Mr. Muller, in the three new conftructions which he gives in his "Elements of Fortification," in imitation of others, affumes thofe lines in a manner altogether arbitrary, without affigning any reafon whatfoever for fuch affumptions. In page 76 of his faid elements, in his problem "for determining the feveral parts of a front of a fortification," he makes ufe of the following words: "But as to the length of the perpendicular C D, it is no ways determined; for fome engineers make it twice as long as others; they feem indeed to differ from one another merely out of contradiction; fince none of them, that I know of, has given any reafon for this practice." This obfervation fufficiently fhews, in what an imperfect ftate military conftruction remains even at prefent. For the true lengths of the perpendiculars form the great defideratum in it, fince on them the flanking defences chiefly depend; for the fole purpofe of obtaining which, and preventing *dead* parts, the fides of a polygon are broken, each of them into a curtain with two demi-baftions to form the refpective fronts of the work. And it muft be allowed, that when a work is once adapted to the ground, it is intended to occupy, and its pofition is fixed on, the firft confideration after determining the true lengths of the perpendiculars to the exterior fides, is to conftruct the whole of it in fuch a manner, as to have no dead parts; that is, to leave no fuch parts, as cannot be feen, fired on, or flanked from fome other parts. That this is a leading or fundamental maxim, and ought to be a primary object of attention in the conftruction of every work, is manifeft from this circumftance, that were it not with a view to obtain flanking defences for the different parts, a rampart and parapet might as well be erected on the exterior fides themfelves of a fortification as on the figures, into which they are ufually broken for that purpofe. The ftrength of a work, indeed, it muft be confeffed, depends chiefly on its flanks, fince an enemy cannot approach the body of the place, whilft the flanking defences remain entire. But if there be any dead parts through a deficiency of fuch defences, the moment an enemy gets to them, he finds himfelf in a ftate of fecurity, and out of the reach of the befieged's fire. The abfolute neceffity of avoiding them, has always made fuch a forcible impreffion on the minds of able fortifiers, as to make them limit the height of fections. For even when the fide of a polygon is not more than 180 toifes, or 360 yards long, and is broken into a curtain with two demi-baftions, if the fection of the work be very high, the guns in the flanks cannot *fee* or fcour the ditch but at too great a diftance; and it is well known, that when it is only of an ordinary height, they cannot fee or command it effectually, nearer than the interfection of the lines of defence. But were it even to be alleged, which would however be an allegation altogether inadmiffible, that a fortification ought to be conftructed without the leaft regard to any flanking defences, and that the avoiding of dead or unfeen parts is an object unworthy of attention, it is evident that the rectilinear is preferable to the zig-zag or angular conftruction formed by the placing of triangles contiguous to one another, or by the juxta-pofition of angles at the bafes of triangles. For the fire from a ftraight line is the beft of the direct kind that can be obtained, being equally and uniformly diftributed. And the enemy cannot advance againft it directly, without a good deal of delay, inconvenience, and trouble, but muft carry on his approaches fomewhat in the way commonly practifed, till he gets to the dead parts in front of it, when it will ceafe to be formidable for want of flanking defences. The angular or zig-zag line, on the other hand, has no good direct fire, and indeed no flanking fire whatever, where it is moft wanted, or can be of any utility; but a continuity of dead parts, when the fection is of a fufficient height, reigns throughout its whole extent. An enemy can approach it without being expofed to any direct fire from the befieged, that can annoy him, in the lines bifecting either the faliant or re-entering angles, or, in fhort, in lines directed to any other intermediate points whatfoever, between thefe angles.

And it is no lefs evident, that the direct fire from the circumference of a circle, or from any other curve, that returns into itfelf, is much more equal and uniform, and better diftributed than that from an angular or zig-zag line.

That able general and fortifier, the celebrated marfhal Vauban, whofe fyftem has been moft generally followed in Europe, in conftructing from the fides of a fquare, made the perpendicular an eighth part of one of them, in a pentagon a feventh part, and in a hexagon, and all polygons of a greater number of fides, a fixth part. For this practice, however, he has not affigned any reafons. It is impoffible indeed to affign any good reafon for giving to a polygon of twenty or thirty fides, or to a conftruction on part of a right line, which may be regarded as a polygon of an indefinite or infinite number of fides, and to a hexagon, or a figure of only fix fides, the fame length of perpendicular. Any perfon, without even a knowledge of geometry, to enable him to draw deductions from the properties of figures themfelves, who reflects but a little on the fubject, muft naturally conclude, that there can be no found or good reafon for doing fo. The truth, in fact, is this, that every polygon has a precife and determinate perpendicular of its own, proportional to and connected with its capability of being defended, and of being embraced by a befieging enemy, as, fays Mr. Glenie, I fhall clearly demonftrate in a fubfequent paper, that may erelong be prefented to the fociety, as well as fhew, how an indefinite number of infinite feries may not only be derived from, but alfo fummed geometrically by means of polygons: and I make no doubt, that had Vauban poffeffed a fufficient knowledge of mathematics for the purpofe of applying them to the improvement of the theoretical part of his profeffion, he would have difcovered the precife or genuine lengths of perpendiculars, which different polygons ought to have, and would have regulated his practice accordingly, in the numerous works he conftructed. Unwilling to give into prolixity, I will not, at prefent, enumerate the different lengths of perpendiculars to the fides of one and the fame figure or polygon, which the various writers on fortification have affumed, although the enumeration would prove beyond controverfy, that in affuming them they were guided by their own whims and fancies, and not by any juft or determinate rule. It muft however be regarded as a fingular fact, that though perpendiculars to the fides of polygons were firft introduced into conftruction, for the fole purpofe of obtaining flanking defences, not one of thefe writers, in even treating formally of regular fortification, has either offered, or attempted to deliver, a method of conftruction for rendering the flanks always equal to the perpendiculars as they ought to be. To fupply this defect I will now proceed to give fuch a conftruction, which, like many other things in fcience, moft pregnant with utility, and moft extenfive in their confequences, has probably been hitherto overlooked chiefly on account of its fimplicity.

Con-

Conſtruction.

Let A B (*fig.* 17.) be a ſide of any given polygon, either regular or irregular. Let it be biſected in the point C, and let C V be an indefinite perpendicular to A B at the point C. Through the point O let indefinite right lines A S, B T, be drawn from the points A, B, and let C D, C E, be each equal to one-half of AO or BO. Draw the right lines DF, E G, parallel to C V till they meet A S, B T, in the points F, G; and from the ſaid points F, G, draw F K, G L, perpendicular reſpectively to B T, A S. Then I ſay that F K, G L, are each equal to C O.

Demonſtration.

Since by conſtruction A D is equal to B E, and A C to B C, and C O is perpendicular to A B, the angle C A O, or D A F, is equal to the angle C B O or E B G, and D F is equal to E G, being parallel thereto. Wherefore F G is parallel to A B, and equal to D E, which is equal to A O or B O. Conſequently, ſince F K is perpendicular to B T, and G L to A S, by conſtruction, the triangles A C O, G K F, F L G, are equiangular and equal, and C O, F K, G L are equal. Q. E. D.

Thus then the flanks G L, F K, drawn at right angles to the lines of defence A L, B K, or A S, B T, are by this very ſimple conſtruction always equal each of them to the perpendicular C O, whether A B be the ſide of a regular or an irregular polygon.

The perpendicular diſtances F L, G K, of the flanks G L, F K, from the ſhoulders F, G, of the demi-baſtions A F K, B G L, are each of them equal to half the exterior ſide A B. And each of theſe perpendicular diſtances F L, G K, is to the curtain K L, as the ſine of the angle formed by either flank, and ſaid curtain, to the ſine of the angle at the ſhoulder of either demi-baſtion, that is, as the coſine of the angle formed by the exterior ſide, and either line of defence, to the coſine of twice this angle.

From the ſimilarity of the triangles A C O, A D F, B C O, B E G, we have each of the faces A F, B G, of the demi-baſtions equal to $\frac{AO \times AD}{AC}$, or to $\frac{AO \times \overline{AC - \frac{AO}{2}}}{AC}$, or to $\frac{AO \times \overline{2AC - AO}}{2AC}$. Now if A B, or 2 A C, be denoted by 2 P and A O − A C by 2 Q, each of theſe faces will be expreſſed by $\frac{\overline{P + 2Q} \times \overline{P - 2Q}}{2P}$, or by $\frac{P}{2} - \frac{2Q^2}{P}$, which, when the perpendicular C O is but ſmall, is nearly equal to the half of A C, or to a fourth part of the exterior ſide A B.

Each of the angles A F K, B G L, of the ſhoulders of the demi-baſtions is equal to a right angle, together with the angles B A O, A B O, formed by the exterior ſide A B, and the lines of defence.

Scholium.

In like manner may a conſtruction be delivered, which will make each of the flanks F K, G L, have any given ratio $m : n$ whatſoever to the perpendicular C O. For if C D or C E be taken to $\frac{AO}{2}$ as $n : m$, we ſhall have D E equal to $\frac{AO \times m}{n}$, or $n : m :: AO : DE\,(FG) :: CO : GL$ or F H. And if A C be denoted as above by P and A O by P + 2 Q, each of the faces A F, B G, of the demi-baſtions, will, in this caſe, be equal to $\frac{2n - m}{2n} \times P + \frac{n - m}{n} \times 2Q - \frac{m}{n} \times \frac{2Q^2}{P}$.

Mr. Muller, in the preface to his "Elements of Fortification," expreſſes himſelf in the following words:

"Notwithſtanding the art. - - others."

"For the true art conſiſts in - - weakeſt."

Mr. Muller certainly treats of irregular fortification in a more direct and particular manner than any other author that wrote on the ſubject before him. But his conſtructions on the ſides of an irregular polygon are ſimilar to that which he makes uſe of on the ſides of a regular one. His perpendiculars in both are mere arbitrary aſſumptions, and the flanks, as well as the faces, of his demi-baſtions in each front of both are equal. The rules therefore delivered by him, as well as by the other writers on fortification, may juſtly be regarded as only applicable to regular conſtruction. For although they treat of irregular fortification, they ſuppoſe the perpendiculars to biſect the exterior ſides, the lines of defence, drawn from the extremities of any one of theſe ſides, to make equal angles with it, and the correſpondent parts, ſuch as the faces and flanks ſet off from the ſame, to be equal, alike, and ſimilar. They do not ſo much as even contemplate or once ſpeak of any caſe, wherein the lines of defence make different angles with the exterior ſide, or wherein either the flanks or faces of the ſame front are of different lengths, or unequal to each other. It frequently happens, however, that an engineer cannot preſerve this equality between either the faces or the flanks ſet off from the ſame exterior ſide, without loſing the principal advantages ariſing from the nature and ſituation of the ground, and deviating from what ought to be the leading maxim in the conſtruction of every work, namely, the proportioning of the fire of each part, as nearly as poſſible, to that which the enemy can bring againſt it; or, in other words, the defence in every place to the attack. To remove this difficulty and inconvenience, and to enable engineers to practiſe with facility and expedition the whole poſſible variety of irregular conſtruction, I will proceed to deliver a rule, which I have had in my poſſeſſion for nearly twenty-two years, but have not till now thought proper to communicate to the public. Its ſimplicity has, I ſuppoſe, been the principal cauſe of its being ſo long unnoticed or unattended to. It is eaſily and expeditiouſly carried into practice. It is alike applicable to regular and irregular conſtruction, and in its application to the latter is infinitely more extenſive than all, that has hitherto been publiſhed on the ſubject.

This rule is derived from the following very ſimple geometrical propoſition.

If from the extremities of any given right line, two right lines be drawn in any angles, either equal or unequal, and from any two points in theſe lines, two other right lines be drawn reciprocally meeting them, produced beyond their interſection in any given angle, the angles formed thereby at theſe points, will be equal between themſelves, and each of them equal to the two firſt mentioned angles, together with the given angle.

Demonſtration.

Let AB (*fig.* 18.) be the given right line, from the extremities A and B, of which right lines AF, BE are drawn, making any angles F A B, E B A, therewith whatever, either equal or unequal; and from any two points, C and D, in theſe lines, let other right lines C E, C D reciprocally meeting them, produced beyond their interſection I in angles C E I, D F I, equal each to the given angle. I ſay that the angles

 ACE,

A C E, B D F, formed thereby, are equal, and that each of them is equal to the angle C E I or D F I, together with the angles F A B and E B A.

For (by 32 E. 1.) the angle A C E is equal to the angle C E I, together with the angle C I E: and by the fame propofition, the angle C I E is equal to the angle I A B, together with the angle I B A. Therefore A C E is equal to C E I or D F I, together with F A B and E B A.

In like manner, B D F is equal to D F I or C E A, together with F A B and E B A, and confequently is equal to A C E. Q. E. D.

From the foregoing very fimple propofition is derived the following rule.

Whether the angles, which the lines of defence drawn from the extremities of any exterior fide make therewith, be equal or unequal, and the angle made by another flank with its line of defence be equal, or greater, or lefs than a right angle; in every cafe, the angle of either fhoulder is equal to thefe three angles taken together; that is, to the angle formed by either flank with its line of defence, together with the two angles formed by the lines of defence with the exterior fide.

By means of this rule, an engineer may trace out any work, however irregular, in a tenth part of the time requifite for tracing out even a regular work of the fame fize and dimenfions, by the methods of conftruction hitherto prefcribed and made ufe of. He is under no neceffity of finding the centre, or of erecting perpendiculars to the exterior fides, which, in irregular conftruction, cannot be fixed and afcertained without calculation, trouble, and inconvenience; but after determining in his own mind on the angles, which the lines of defence are to make with the exterior fides, and laying them down, fixes the pofitions of the flanks, and fets them off from the fhoulders, almoft as expeditioufly as he can walk over the ground. He may ufe it in woody places, with nearly as much eafe and facility as in thofe that are clear and open; and in every fituation, in fhort, where he can fee to the diftance of a few yards on each fide of him. By it he can trace out in the field, and even in the face of an enemy, with almoft mathematical exactnefs and accuracy, and much more expeditioufly than by the tentative and inaccurate random-methods commonly made ufe of, and without the aid of a theodolite, plain table, or other bulky or cumberfome mathematical inftrument: for a pocket Hadley's fextant, which will be ufeful on moft occafions, is all that is neceffary in any fituation.

It may not perhaps be improper to mention the circumftance that firft led me to think of this rule, and gave rife to the putting of it in practice. In fummer, 1783, Colonel Moncrief, Lieutenant Fiddes of the Engineer-corps, and myfelf, went one forenoon to trace out a large pentagonal work, near Stoke's Bay Houfe and Gomer Pond in the Gofport divifion, on one of the fronts of which it was thought advifable, from the nature of the ground, to have the flanks of different lengths, and thereby to vary the directions of their fire, and thofe of the faces of the demibaftions, from thofe which the ordinary method of conftruction would have given. Colonel Moncrief, who, though he was commonly and juftly reckoned a good judge of ground and pofitions, was, from the inapplicability of the cuftomary rules to fuch a cafe, totally at a lofs for the conftruction. He had Muller's "Elements of Fortification" in his hands, but could derive no aid or affiftance from them. His embarraffment, and the novelty of our fituation, which none of us had thought of beforehand, fet me a thinking ferioufly how we might furmount the difficulty. After a few minutes reflection, I difcovered the foregoing rule, which I immediately applied on the fpot, and very expeditioufly. I might, however, as well as others, have overlooked it even to this moment, had it not been for the incident now mentioned. For the fimpleft and moft ufeful things are generally leaft attended to. I gave copies of it in writing to thefe two gentlemen at their requeft, and another to his grace of Richmond.

There are various maxims delivered by the writers on fortification, which relate to the conftruction and defences of the works, independent of the general confiderations for or againft the erection of the fortifications themfelves, in different circumftances and fituations. Some of thefe maxims, however, are very queftionable, and, on due examination, would be found to be inadmiffible, having been laid down by men who did not underftand the true principles of conftruction.

The following may, perhaps, be juftly regarded as the moft unexceptionable of the maxims that are commonly delivered.

1. There ought to be no part in the whole circuit, or *enceinte*, of a fortrefs or fortification that cannot be feen, flanked, or defended from fome other part. That this is not only an admiffible but a fundamental maxim, and ought to be a primary object of attention in the conftruction of every work, is manifeft from this circumftance: that, were it not with a view to obtain flanking defences for the different parts, a rampart and parapet might as well be erected on the right lines themfelves, which form the exterior fides of polygons, as on the figures, into which they are ufually broken for this purpofe. The ftrength of a work indeed depends chiefly on its flanks, fince an enemy cannot approach the body of the place whilft the flanking defences remain entire. But if there be *dead* or *unfeen* parts, the moment an enemy gets to them he finds himfelf in a ftate of fecurity, and out of the reach of the befieged's fire. An idea, therefore, of the abfolute neceffity of avoiding them, has always made fuch a forcible impreffion on the minds of able fortifiers, as to induce them to limit the height of fections. For even when the fide of a polygon is equal to 180 toifes, or to 360 yards, and is broken into two demi-baftions and a curtain with flanks, if the fection of the work be very high, the guns in thefe flanks cannot fee or fcour the ditch, but at too great a diftance. When it is only of an ordinary height, it is well known, that the guns in the flanks do not fee the ditch effectually nearer than the interfection of the lines of defence, the diftance of which, in Vauban's conftruction, from the epaules or fhoulders, is equal to 45 toifes nearly. Mr. Blondel's conftruction, therefore, in polygons of a great number of fides, and that of the marquis de Montalembert, which is nothing but Mr. Blondel's on a ftraight line or a polygon of an infinite or indefinite number of fides, are in this refpect radically defective, creating dead or unfeen parts throughout their whole extent, which cannot be removed but by cafemates and contrivances, that have no natural connexion whatfoever with the conftructions themfelves.

2. The defence of every part ought to be always within the certain reach of mufket-fhot, in order to be defended both by great and fmall fire-arms: for if any parts be at too great a diftance from thofe that flank them, to be within the reach of a ferious and efficient fire of mufketry, or can be defended by cannon only, the enemy may difmount thefe cannon by the fuperiority of his, and thereby deftroy the defences of fuch parts at once. But if they be defended by

by both cannon and mufketry, fhould one of thefe two fpecies of defence be deftroyed, the other will ftill remain.

It has been frequently alleged, that a mufket-fhot will not kill at a greater diftance than 150 toifes, or 300 yards, or 900 feet. If this be true, the great line of defence, or the diftance from the flanked angle or faliant angle of the baftion to the oppofite flank, ought not to exceed 150 toifes, or even to be equal to fo many toifes. If, on the other hand, the line of defence were to be about two-thirds of that length only, or equal to about 100 toifes, the baftions would be too near to one another, and too fmall, which would both increafe their number in the fame circuit or enceinte, and leffen their ftrength or capability of defence. The length of the great line of defence, in order to render the fire more certain and efficient, is therefore commonly fuppofed to be equal to from 120 to 140 toifes only.

3. All the defences fhould be as nearly direct as poffible: for foldiers naturally fire directly before them. The lines of defence, therefore, fhould be either like Count Pagan's, perpendicular to the flanks, or nearly fo.

4. A fortification ought to be equally ftrong on all fides: for if it be not, an enemy may attack it on the weakeft, and avail himfelf of its inequality of ftrength.

To thefe maxims we will take the liberty to add a few others, that are not to be found in the writers on fortification, but which we, neverthelefs, conceive to be entitled to the moft ferious confideration. They are the following, and we are favoured with them by Mr. Glenie.

1. In regular conftruction, the two flanks in each front ought to be equal each of them to the perpendicular to the exterior fide of the polygon, or nearly fo, fince perpendiculars to the exterior fides of polygons were introduced into conftruction for the exprefs purpofe of obtaining flanking defences. And in regular conftruction, when it is neceffary (as it generally is, in order to make field-works fuit the ground they occupy) to make the two flanks in the fame front unequal, their fum or lengths taken together fhould be equal to twice the perpendicular diftance from the interfection of the lines of defence to the exterior fide, or nearly fo.

Mr. Glenie, in the foregoing paper, has given a very eafy method of making the flanks in regular conftruction, either equal to the perpendiculars, or in given ratios to them.

2. The face of the baftion, in regular conftruction, ought never to exceed one-fourth part, or two-eighths of the exterior fide. The conftruction, which gives each of the flanks in the fame front equal to the perpendicular, makes the face of the baftion equal to a fourth part of the exterior fide very nearly.

3. The flanked angle, or faliant angle of the baftion, ought never to be lefs than an angle of about $71\frac{1}{2}^\circ$, and fhould never exceed 120°. In Count Pagan's method, however, and that of Mr. Vauban, who has followed him, this angle in a polygon of only 18 fides is equal to about $123^\circ\ 7'\ 48''$; in one of 30 fides, to $131^\circ\ 7'\ 48''$; and in a conftruction on a right line, or part of a polygon of an infinite or indefinite number of fides, to $143^\circ\ 7'\ 48''$.

4. The angle of the epaule or fhoulder fhould not be lefs than an angle of about $108\frac{1}{2}^\circ$, and ought never to exceed an angle of 150°.

5. The angle of the flank ought not to be lefs than an angle of about $99\frac{1}{2}^\circ$, nor greater than one of about 120°.

6. The outward flanking angle, or the angle formed by the lines of defence at their interfection, ought not to be lefs than 120°, nor ever greater than $161\frac{1}{2}^\circ$.

Laftly. Different polygons have different perpendiculars, which have refpectively given ratios to the fides of the polygons. And the perpendicular that truly belongs to any polygon of a given number of fides, is different from that which belongs to any other polygon of a different number of fides; the exterior fide in each of the polygons being fuppofed invariable or the fame. A conftruction on the fides of any polygon of a given number of fides, ought to be made with the perpendicular that peculiarly belongs to it. An inveftigation, however, of the various perpendiculars that refpectively belong to various polygons, from the fquare up to the right line, which may be regarded as part of a polygon of an indefinite or infinite number of fides, has never as yet been delivered by any writer on fortification; and it now forms the great defideratum in military conftruction.

CONSTRUCTIVE Treason, in *Law*, was defined by 25 Edw. III. cap. 2. See Treason.

CONSUALES Ludi, among the Romans, the fame with Circenses *ludi*. See alfo Circus.

CONSUALIA, in *Antiquity*, feafts which were held among the ancients, in honour of the god Confus, *i. e.* Neptune; different from thofe other feafts of the fame deity called Neptunalia.

They were introduced with a magnificent cavalcade, or proceffion on horfeback; becaufe Neptune was reputed to have firft taught men the ufe of horfes; whence his furname of Ἵππιος, *Equeftris*.

Evander is faid to have firft inftituted this feaft: it was re-eftablifhed by Romulus, under the name of *Confus*; becaufe it was fome god under the denomination of Confus, that fuggefted to him the rape of the Sabines. It is faid, that it was with a view to this rape, that he formed this inftitution. This, however, is certain, that it was to this feaft all his neighbours were invited; when, taking advantage of the folemnities and facrifices, he feized the women. To draw the greater concourfe of people, he gave out that he had found an altar hid under ground, which he intended to confecrate, with facrifices to the god to whom it had been originally erected.

Thofe who take upon them to explain the myfteries of the heathen theology, fay, that the altar hid under ground, is a fymbol of the fecret defign of Romulus to feize his neighbours' wives.

The confualia were of the number of feafts called *facred*; as being confecrated to a divinity. Originally they were not diftinguifhed from thofe of the Circus: whence it is, that Valerius Maximus fays, that the rape of the Sabines was effected at the games of the Circus.

Plutarch obferves, that during the days of this folemnity, horfes and affes were left at reft, and were dreffed up with crowns, &c. on account of its being the feaft of Neptunus Equeftris. Feftus fays, the cavalcade was performed with mules; it being an opinion, that this was the firft animal ufed to draw the car.

Servius gives us to underftand, that the confualia fell on the thirteenth of Auguft; Plutarch, in the life of Romulus, places them on the eighteenth, and the old Roman calendar on the twenty-firft of that month.

CONSUBSTANTIAL, in *Theology*, a term of like import with *co-effential*; denoting fomething of the fame fubftance in kind with another. That this is the meaning of the term ὁμοούσιος has been fhewn by Petavius, Curcellæus, Cudworth, Le Clerc, Clarke, &c. &c.

The orthodox believe the Son of God to be confubftantial with the Father.

The term ὁμοούσιος, *confubftantial*, was firft adopted by the fathers,

fathers of the council of Nice, convened A. D. 325, and conſiſting of 318 biſhops, to expreſs the orthodox doctrine the more preciſely, and to ſerve as a barrier and precaution againſt the errors and ſubtilties of the Arians; who owned every thing excepting the *conſubſtantiality*.

At the Nicene council, Euſebius propoſed a creed, in which he avoided the word ὁμοȣσιος, and anathematized every impious hereſy, without ſpecifying any; but his advice was not followed; ὁμοȣσιος was inſerted, and the Arian doctrines were anathematized. Diſputes enſued among the biſhops concerning the meaning and the conſequences of the word ὁμοȣσιος. Euſebius aſſented to it, declaring at the ſame time in what ſenſe he underſtood it. His ſenſe of *conſubſtantial* was, that the Son of God was not like created beings, but received his exiſtence and his perfections from the father in a different and in an ineffable manner. Others gave other ſenſes to it; and the debate, ſays Socrates, the eccleſiaſtical hiſtorian, (i. 23. et Soz. ii. 18.) was like a battle fought in the dark. Socrates however was a conſubſtantialiſt, ſo far as even to believe that miracles were wrought by the Monks in favour of that doctrine; though he intimates, that the biſhops of each party diſputed about words of which they had no ideas, and charged one another with conſequences and inferences, which neither ſide would own. By the word ὁμοȣσιος the Nicene fathers meant, not the ſame numerical or individual ſubſtance, but the ſame generical ſubſtance or ſubſiſtence. As amongſt men, a ſon is ὁμοȣσιος with his father, that is, of the ſame human nature; ſo, in their opinion, the Son of God is ὁμοȣσιος with the Father, that is, of the ſame divine nature. By this word, therefore, they intended to expreſs the ſame kind of nature, and ſo far a natural equality. But according to them, the natural equality did not exclude a relative inequality; a majority and minority, founded upon the everlaſting difference between giving and receiving, cauſing and being cauſed. They had no notion of diſtinguiſhing between perſon and being; between an intelligent agent, and an intelligent active ſubſtance, ſubſiſtence, or entity. When they ſaid, that the Father was God, they meant that he was God of himſelf, originally, and underived, Θεὸς αγεννητος, and ὁ Θεος. When they ſaid that the Son was God, they meant that he was God by generation or derivation, Θεος-γεννητος. The unity of God they maintained; and they defended it, firſt, by conſidering the father as the firſt cauſe, the only underived and ſelf-exiſting; ſecondly, by ſuppoſing an intimate, inſeparable, and incomprehenſible union, connection, indwelling, and co-exiſtence, by which the Father was in the Son and the Son in the Father; and thirdly, by ſaying, that in the Father and the Son there was an unity of will, deſign, and conſent, and one divine power and dominion, originally in the Father, and derivatively in the Son. In proceſs of time Chriſtians adopted a notion, that the Son was ταυτȣσιος and μονοȣσιος, of the ſame individual ſubſtance with the Father and the Holy Spirit; and they ſeem to have done this with a view of ſecuring the doctrine of the unity.

The Arians declared, that the word was God, as having been made God; but they denied that he was the ſame God, and of the ſame ſubſtance, with the Father; accordingly, they exerted themſelves to the utmoſt to aboliſh the uſe of the word. The emperor Conſtantine uſed all his authority with the biſhops to have it expunged out of the ſymbols; but it ſtill maintained itſelf, and is at this day, as it was then, the diſtinguiſhing criterion between an Athanaſian and an Arian.

Sandius will have it, that the word *conſubſtantial* was unknown till the time of the council of Nice; but it is certain it had been before propoſed to the council of Antioch, held A. D. 270, in which Malchion directed and governed, and in which Paul of Samoſata had been condemned; though it had there the fortune to be rejected. Curcellæus, on the other hand, maintains, that it was an innovation in doctrine in the council of Nice, to admit an expreſſion, the uſe whereof had been aboliſhed by the council of Antioch.

According to St. Athanaſius, the word *conſubſtantial* was only condemned in the council of Antioch, inaſmuch as it implied the idea of a pre-exiſtent matter, prior to the things formed of it; now, in this ſenſe, it is certain, the Father and the Son are not conſubſtantial, there having been no pre-exiſtent matter.

In another council, held at Antioch, A. D. 341, conſiſting of about 100 biſhops, the Arians made a creed and left out the term ὁμοȣσιος; but wanting it to be approved by both parties, they called the Son the unchangeable image of the eſſence, counſel, and power of the Father, the firſt born of every creature. The diſputes, however, between the conſubſtantialiſts and the Arians, and alſo the Semi-Arians or ὁμοιȣσιοι, *i. e.* the homoiouſians, continued to be carried on with great violence, particularly in the Eaſtern part, for ſeveral years. One remarkable difference has been obſerved between the creeds which were propoſed by the contending parties. The conſubſtantialiſts drew up their creed with a view to exclude and diſtreſs the Arians; whereas the Arians had no deſign to diſtreſs the conſubſtantialiſts, but uſually propoſed creeds to which Athanaſius himſelf might have aſſented; ſo that if the compilers were Arians, their creeds were not Arian. The Semi-Arians agreed with the Arians in rejecting the word ὁμοȣσιος, but differed from them in exalting the perfections and dignity of the Son higher than the Arians did, and in affirming that he was ὁμοιȣσιος, of *like* ſubſtance and *like* to his father in all things. Dr. Clarke's doctrine, in his "Scripture Doctrine, &c." as ſtated by Le Clerc, (Bibl. Choiſ. xxvi. 419.) ſeems to be the ſame with that of the Nicene council, excepting that he uſes not the word "conſubſtantial." Before the end of the fourth century the conſubſtantialiſts differed and diſputed among themſelves, whether in the Trinity there were three hypoſtaſes, or one hypoſtaſis. See Hypostasis and Trinity.

CONSUBSTANTIATION, a tenet of the Lutheran church, with regard to the doctrine of the real preſence of Chriſt, or the manner of the change made in the bread and wine, in the euchariſt; though the term *conſubſtantiation* was ſubſtituted in the room of tranſubſtantiation, at the cloſe of the thirteenth century, by John, ſurnamed Pungens Aſinus, a doctor of the univerſity of Paris.

The divines of that profeſſion maintain, that, after conſecration, the body and blood of our Saviour are ſubſtantially preſent, together with the ſubſtance of the bread and wine; which is called *conſubſtantiation*, or *impanation*.

This notion, as the biſhop of Meaux juſtly obſerves, has all the diſadvantages, which the Romaniſts, and Sacramentarians, charge on one another, without having a ſingle advantage that can be claimed by either. It has all the abſurdity which the latter charge upon the former, inaſmuch as it repreſents the ſame body exiſting in different places, at the ſame time; and inaſmuch as it repreſents a ſubſtance exiſting without its accidents, or under the accidents of another ſubſtance; but has not the advantage of ſimplicity which the Romiſh doctrine has, in interpreting literally the words, "this is my body." On the Lutheran hypotheſis the expreſſion ought to have been, not "this is my body," but "in, with, and under this is my body." For the Lutherans

therans maintain that the bread remains unchanged, and is that which is feen, touched, and tafted; but that the body of Chrift, the fame which he had upon the earth and has now in heaven, accompanies the bread. Hence it appears, that the words are to be underftood neither according to the letter, nor according to any figure of fpeech ever heard of before. It is neither literally Chrift's body, nor figuratively the fign or fymbol of his body; but it is fomething with which his body is accompanied. The Lutherans, by maintaining this doctrine of confubftantiation, were obliged to adopt another hypothefis not lefs abfurd, *viz.* the ubiquity, or the omniprefence, and confequently the immenfity of the body and human nature of Chrift; hence they were called *Ubiquitarians.* See alfo Impanation, Transubstantiation, and Lutheranism.

CONSUEGRA, in *Geography*, a town of Spain in New Caftile, containing two parifhes and three convents. It belongs to the knights of Malta; 25 miles S.S.E. from Toledo.

CONSUETUDINIBUS et Servitiis, in *Law*, a writ of right, which lies for the lord againft the tenant that deforceth his lord of the rent, or fervice due to him, by cuftom, or tenure, for his land. This compels a fpecific payment or performance of the rent or fervice, and there are alfo others, whereby the lord fhall recover the land itfelf in lieu of the duty withheld.

CONSUL, the appellation that was given to the firft, or chief, magiftrate in the Roman government, vulgarly and commonly called the Roman Commonwealth; though it was compofed of royalty, ariftocracy, and democracy, as much as the government of Great Britain is, and was, perhaps, in feveral refpects, the moft energetic and efficient mixture of thefe three fimple forms that has ever exifted in the world, particularly for the purpofes of conqueft and fecurity againft fubjugation.

After the deftruction of royalty at Rome, and the expulfion of Tarquinius Superbus, and his family from thence, in the 244th year of the city, a confular form of government was eftablifhed in the 245th year in its ftead; the people choofing to have fome fhare in the management of public affairs themfelves; they accordingly chofe two officers, or magiftrates, annually, who were invefted with fovereign authority, and were originally called prætores, *a præeundo*, according to fome writers, but *a præeffe* according to others. Thefe were afterwards called confules, *a confulendo*, becaufe it was their duty to confult with the fenate, with the people, and with each other. From their acting as judges, they were called *judices;* or from their poffeffing fupreme command they were denominated by the Greeks' ΥΠΑΤΟΙ. The firft confuls were Brutus and Collatinus. The office of the confuls lafted a year; and if either of them died in the courfe of the year of their confulate, a new one was to be elected. In the beginning of the republic the confuls entered on their office at different times; at firft, on the 23d or 24th of February, (vii. or vi. Kal. Mart.) the day on which Tarquin was faid to have been expelled, which was held as a feftival, and called "regifugium feftus;" afterwards on the 1ft of Auguft, (Kal. Sext.) which was at that time the beginning of the year, *i. e.* of the confular, not of the civil year, which always began with January:—in the time of the Decemviri, on the 15th of May, (Id. Maii);—about 50 years after, on the 15th of December, (Id. Decemb.);—then on the 1ft of July, (Kal. Quint.), which continued till near the beginning of the fecond Punic war, A. U. 530, when the day came to be the 15th of March, (Id. Mart.):—at laft, A. U. 598, or 600, it was transferred to the 1ft of January (in Kal. Jan.), which continued to be the day ever after. After this, the confuls were ufually elected about the end of July, or the beginning of Auguft. From their election to the 1ft of January, when they entered on their office, they were called "confules defignati," and whatever they did in public affairs, they were faid to do it by their "authority," not by their "power." This interval was made fo long, that they might have time to acquaint themfelves with the duties of their office, and that inquiry might be made whether they had gained their election by bribery. If, upon trial, they were convicted of that crime, they were deprived of the confulfhip, and their competitors, who accufed them, were nominated in their place. They were alfo fined, and declared incapable of bearing any office, or of coming into the fenate, by the Calpurnian and other laws. (Cic. pro Sylla, 17 and 32. Cic. pro Cornel. Muren. 23, &c. Sall. Cal. 18.) On the 1ft of January, the fenate and people waited on the new confuls at their houfes; from whence, being conducted to the capitol, they offered up their vows, and facrificed, each of them, an ox to Jupiter; and then began the exercife of their office, by holding the fenate, confulting it about the appointment of the Latin holidays, and about other things relating to religion. Within five days they were obliged to fwear to obferve the laws, as they had done when elected.

The confuls were at firft chofen only from among the Patricians, but afterwards alfo from the Plebeians. L. Sextius was the firft plebeian conful, and the fecond year after him Licinius Stolo; from whom the law, ordaining one of the confuls to be a plebeian, was called "lex Licinia." Sometimes, but rarely, both confuls were plebeians; the patricians generally engroffed this honour. The firft foreigner who obtained the confulfhip, was Cornelius Balbus, a native of Cadiz; who became fo rich, that, at his death, he left to each of the citizens, refiding at Rome, 25 drachmæ, or denarii, *i. e.* 16s. 1¾d.

The legal age for enjoying the confulfhip (ætas confularis,) was 43; and whoever was made conful at that age, was faid to be made in his own year; but we meet with fome few exceptions from this rule. (fee Age.) Before any perfon was made conful, it was neceffary for him to have gone through the inferior offices of quæftor, ædile, and prætor. No one could be created conful a fecond time till after an interval of ten years. But thefe regulations were not ftrictly obferved.

The infignia of the confuls were the fame with thofe of the kings, except the crown; namely, the toga prætexta, fella curulis, the fceptre, or ivory ftaff, and 12 lictors, with the fafces and fecuris. He who had the greater number of fuffrages was called "Conful prior," and his name was marked firft in the kalendar; he alfo had the fafces firft, and ufually prefided at the election of magiftrates for the next year. All perfons went out of the way, uncovered their heads, difmounted from their horfes, and rofe up to the confuls as they paffed by them. When a prætor happened to meet a conful, his lictors always lowered their fafces. Valerius, called Poplicola, took away the fecuris from the fafces; *i. e.* he took from the confuls the power of life and death, and only left them the right of fcourging, at leaft within the city; for without the city, when invefted with military command, they ftill retained the fecuris, *i. e.* the right of punifhing capitally. Poplicola likewife made a law, granting every one a liberty of appealing, from the confuls to the people; and that no magiftrate fhould be permitted to punifh a citizen, who thus appealed; a privilege which was alfo enjoyed under the kings. The confuls originally poffeffed kingly powers, both in civil and

military matters. But afterwards, when the consuls came to be much employed from home, or abroad in war, and could not be present either to hear or determine civil causes, there was an officer constituted, under the designation of *prætor urbanus*, and frequently called by Cicero *prætor Romanus*, with power to judge matters of law between citizen and citizen. And for the convenience and accommodation, in this respect, of the great number of strangers that were always at Rome, another officer was appointed to judge causes between them, with the appellation of *prætor peregrinus*. And as provinces came to be added to the Roman state, and the number of causes was of course greatly increased, there were eight prætors appointed, which number continued till the time of Julius Cæsar, who raised it to ten.

The consuls, whilst they remained in Rome, and before they led out Roman armies into the field, were masters of all public affairs. For all the other magistrates, the tribunes of the people alone excepted, were subject to them, and bound to obey their commands. They introduced embassadors into the senate and gave them audience; and they received all letters from the governors of provinces, and from foreign kings, and states. They also proposed to the senate the subjects of their debates, and directed all the forms that were observed in making their decrees. It was equally a duty likewise, belonging to their office, to attend to those affairs that were transacted by the people; to summon, or call together their general assemblies; to report to them, when assembled, the resolutions of the senate; and to ratify whatever was determined by the greater number. The laws which they proposed, and got passed, were commonly called by their name. The year was named after them, as it used to be at Athens, from one of the archons. The consuls had also command over the provinces, and could, when authorised by the senate, call persons from thence to Rome, and punish them. (See Province.) Their authority was so great, that kings, and foreign nations, in alliance with the republic, were considered to be under their protection. In dangerous conjunctures, the consuls were armed with absolute power by the senate. In all the preparations that were made for war, as well as in the whole administration, and management of things in the field, they possessed an authority almost absolute. For to them it belonged to impose on the allies whatever services they judged necessary or expedient; to appoint the military tribunes; to enrol the legions, and make the necessary levies; and to inflict punishments in the field on all that were subject to their command. In addition to all this, they had the power to expend whatever sums they might think convenient, or requisite, from the public treasure, and were attended for that express purpose by a quæstor, who was always ready to receive and execute their orders.

When a Roman army encamped, the consular tent was first pitched, and the ground on each side of it marked out for it, and on the breaking up of a camp, it was the first tent that was permitted to be struck; and one entire company of soldiers were always stationed round it.

When an action had taken place, in which any of the soldiers had shewn signal proofs of courage, the consul assembled the troops together, and commanded those to approach who had distinguished themselves by any eminent exploit. And after bestowing on each of them separately, or apart, the commendation that was due to that particular instance of their valour, and after recounting likewise all their former actions that had ever merited applause; he then distributed among them the following rewards:—To him who had wounded an enemy a javelin:—To him who had killed an enemy, and stripped him of his armour, a goblet, if he were in the infantry; and if in the cavalry, a javelin in ancient times, but afterwards furniture for his horse. These rewards, however, were not bestowed on soldiers, who, in a general engagement, or in the attack of a city, had wounded or spoiled an enemy; but on those only, who in separate skirmishes, and when any occasion offered, in which, though they were not necessarily required to engage in single contest, threw themselves voluntarily into danger, and with design, provoked the combat. In taking a city by storm, those who first mounted the walls, were honoured by the consul with a golden crown. And those who saved the lives of any of the citizens, or of the allies, by covering them from the enemy in the time of battle, received presents from the consul, and were also crowned by the persons whom they had thus preserved.

Although the consuls were the dispensers of military rewards and punishments; although they were entrusted with the absolute direction of the preparations that were made for war, and exercised an uncontrolled authority in the field; although their powers and authorities, when they were present in Rome, made strangers sometimes suppose the government to be a kind of simple royalty; they were in truth, so dependent in different respects, both on the senate and the people, that without their assistance, they were unable to accomplish any design. Armies require a continual supply of necessaries. But neither corn, nor habits, nor even the military stipends, could at any time be transmitted to the legions, without an express order of the senate. It was also the senate that either compelled the consuls to leave their designs imperfect, or enabled them to complete the projects that they had formed, by sending a successor into each of their several provinces on the expiration of the annual term, or by continuing them in their respective commands. The senate also had the power of either aggrandizing and amplifying the victories that were gained, or of depreciating and debasing them. It was also necessary for the consuls, however far they were removed from Rome, to preserve the good affections of the people. For though the consuls might make treaties, the power of annulling, or ratifying, rested entirely with the people. And what was of still greater moment, the consuls, on quitting their office, were bound to submit the whole of their past administration to the judgment of the people. On this occasion they made a speech, and swore that they had done nothing against the laws.

Consuls were even continued under the emperors after the republic was destroyed; but consul was here little more than an honourable title; which, however, the people were fond of keeping up; as esteeming it some remains of their ancient liberty. As long as the emperors condescended to disguise the servitude which they imposed, the consuls were still elected by the real or apparent suffrage of the senate. From the reign of Diocletian, even these vestiges of liberty were abolished, and the successful candidates, who were invested with the annual honours of the consulship, affected to deplore the humiliating condition of their predecessors. In the epistles which the emperor addressed to the two consuls elect, it was declared, that they were created by his sole authority. The title of consul, however, though the real dignity and substantial power that accompanied it were lost, was still the most splendid object of ambition, the noblest reward of virtue and loyalty. The emperors themselves, even after Constantinople became the seat of empire, who disdained the feint shadow of the republic, were conscious that they acquired an additional splendour and majesty as often as they assumed the annual honours of the consular dignity. It dwindled for a long time, and at last the succession of consuls finally ceased, in the 13th year of Justinian, A.D. 541, whose

whofe defpotic temper might be gratified by the extinction of a title, which admonifhed the Romans of their ancient freedom: after him, no emperor either created any conful, or affumed the dignity himfelf. Bafil is the laft in the confular lift, for the year 541. By this time, the dignity was depreciated to that degree, that it was conferred on the meaneft perfons: indeed, Juftinian endeavoured to retrieve it 25 years after, and created himfelf conful, but without effect. Indeed, the annual confulfhip long lived in the minds of the people; they applauded the gracious condefcenfion of fucceffive princes, by whom it was affumed in the firft year of their reign; accordingly Conftantine created two confuls, whofe office it was to exercife fupreme jurifdictions, the one at Rome, the other ar Conftantinople; and three centuries elapfed, even after the death of Juftinian, before that obfolete dignity, which had been fuppreffed by cuftom, could be abolifhed by a law of Leo the philofopher. Afterwards the title was vilified, as we learn from the emperor himfelf.

From the eftablifhment of the republic, and the confulate under L. Jun. Brutus, and L. Tarq. Collatinus, to the confulate of Bafil, *i. e.* from the year of Rome 244, or 245, 509 years before Jefus Chrift, to the year of Rome 1294, the fpace of 1049 years, the years were accounted by the confuls; but from the time of Bafil, in the year of Chrift 541, we find no mention made of confuls, or confulates; but the time was then computed by the years of the emperors' reigns, the indictions, and thofe of the Chriftian era.

Indeed, for fome time after the confulate of Bafil, the years are marked thus; *poft confulatum Bafilii*, 1, 2, 3, &c. (See the Fafti Confulares of M. D'Almeloveen.) That author reckons 1060 pairs of confuls, befides the fubftitute confuls, *fuffecti*, elected to fupply vacancies by death; and yet there were but 1049 years, and confequently only fo many confulates.

The perpetual confulates of the Eaftern emperors, which compofe the Fafti Byzantini, commenced in the year of Chrift 567, and ended in 668, in the laft year of Conftans.

Conftantine Pogonatus would have the confulate infeparable from the empire; which it continued to be till the time of Conftantine Porphyrogenetus.

In this form of government the empire and confulate were fo clofely united, that the emprefs Irene would needs affume the confulate when fhe was only regent of the empire.

But the French kings, thofe of Italy, and the Saracen princes who commanded in Spain, taking on them the title of confuls, as well as emperors of Conftantinople; thefe laft defpifed it, and laid it afide; fo that the name was only continued to the magiftrates of fome cities, and certain other officers, as is fhewn by F. Pagi.

Under the emperors there were *ordinary confuls*, *honorary confuls*, and *fuffecti*; which laft alfo fubfifted in the time of the republic.

In the middle age, we find the word conful ufed for *comes*, count, and proconful, for vifcount; as is obferved by Spelman, and De Marca.

And thus conful, in our law *books*, fignifies an *earl*. Bract. lib. i. cap. 8. tells us, that as *comes* is derived from *comitatu*, fo *conful* is derived from *confulendo*: and in the laws of Edward the Confeffor, mention is made of *vicecomites*, and *viceconfules*.

Consul, at prefent, is ufed for an officer eftablifhed by virtue of a commiffion from the king, and other princes, in the ports and factories of the Levant, on the coafts of Africa, Barbary, Spain, and other foreign countries of any confiderable trade; to facilitate and difpatch bufinefs, and protect the merchants of the nation.

Thefe commiffions were never granted to perfons, as confuls of the French nation, under the age of thirty years. When the confulate is vacant, the moft ancient of the deputies of the nation were to difcharge the function thereof, till the vacancy fhould be filled up by the king.

The confuls are to keep up a correfpondence with the minifters of England refiding in the courts whereon their confulates depend. Their bufinefs is, to fupport the commerce and intereft of the nation; to difpofe of the fums given, and the prefents made, to the lords and principals of places: to obtain their protection, and prevent the infults of the natives on the merchants of the nation. There are alfo confuls of other nations eftablifhed in the Levant, efpecially French and Dutch.

Consuls alfo denote judges elected among the merchants and dealers, in ports and trading towns, chiefly in France; to terminate, *gratis*, and on the fpot, without any procefs, fuch differences and demands as may arife relating to their merchandizes, bills of exchange, and other articles of commerce.

The firft jurifdiction of confuls eftablifhed in France, is that of Tholoufe; the edict of whofe eftablifhment bears date 1549, under the reign of king Henry II.; that of Paris followed fourteen years afterwards. By degrees, they were eftablifhed in moft of the confiderable trading towns in that kingdom.

Consul, *Chief*, or *Premier Conful*, the firft or chief of the magiftrates, who each of them bore the name of conful in the late conftitution of France, which has been fucceeded by its prefent military defpotifm. Napoleon Buonaparte, the prefent emperor of France, was appointed chief conful, in confequence of the revolution that took place in 1799.

CONSULAR, of or belonging to a conful: as for example, a confular camp, a confular army, the confular dignity, the confular authority, and fo on.

Consular *comitia*, and *medals*. See the fubftantives.

CONSULATE, or Consulship, the office of conful, which was inftituted by the Romans, in the year of Rome 245, after they expelled Tarquin the Proud.

CONSULTATION, in *Law*, a writ whereby a caufe, formerly removed by prohibition from the ecclefiaftical court to the king's court, is returned thither again.

If the judges of the king's court, upon comparing the libel with the fuggeftion of the party, find the fuggeftion falfe, or not proved; and therefore the caufe to be wrongfully called from the court-chriftian; then, upon fuch deliberation, or confultation, they decree it to be returned again, and the writ obtained hereon is called a confultation.

And, even in ordinary cafes, the writ of prohibition is not abfolutely final and conclufive. For, though the ground be a proper one, in point of *law*, for granting the prohibition, yet, if the *fact* that gave rife to it be afterwards falfified, the caufe fhall be remanded to the prior jurifdiction. If, *e. g.* a cuftom be pleaded in the fpiritual court, a prohibition ought to go, becaufe that court has no authority to try it; but, if the fact of fuch a cuftom be brought to a competent trial, and be there found falfe, a writ of confultation will be granted. For this purpofe the party prohibited may appear to the prohibition, and take a declaration, (which muft always purfue the fuggeftion,) and fo plead to iffue upon it; denying the contempt, and traverfing the cuftom upon which the prohibition was grounded; and if that iffue be found for the defendant, he fhall then have a writ of confultation. The writ of confultation may alfo be, and is frequently, granted by the court without any action brought; when, after a prohibition iffued, upon more mature con-

 fideration,

fi'eration, the court are of opinion that the matter fuggefted is not a good and fufficient ground to ftop the proceedings below. Thus careful has the law been, in compelling the inferior courts to do ample and fpeedy juftice; in preventing them from tranfgreffing their due bounds; and in allowing them the undifturbed cognizance of fuch caufes as by right, founded on the ufage of the kingdom or act of parliament, do properly belong to their jurifdiction. Blackft. Com. vol. iii.

CONSUMMATE ESTATE. See TENANT *by curtefy*.

CONSUMMATION, the end, period, or completion, of any work.—Thus, we fay, the confummation of all things: meaning the end of the world. By the incarnation, all the prophecies are to be confummated.

Confummation of marriage denotes the laft act of marriage, which makes its accomplifhment.

CONSUMPTION, in *Medicine*, popularly named a *decline*, is a generic term, occafionally applied to different difeafes, the moft obvious fymptoms of which are a gradual decline of the ftrength and functions of the body, and a diminution of its bulk, in confequence of the decreafe or confumption, as it were, of the fat and mufcular parts. From whatever caufe, therefore, the nutrition of the body is impeded, confumption will be the confequence. The nutrition of the body may be impeded either by fome great internal difeafe, which difturbs the functions, efpecially that of digeftion; or by deficiency of nutriment; or by great evacuations or difcharges of blood, or fluids fecreted from the blood. Thefe confiderations have led nofologifts to treat of confumption under three divifions or genera, with the titles of *Phthifis*, *Tabes*, and *Atrophia*: the two firft being produced by internal organic difeafes; the laft by the deficiency, or the abftraction, or corruption, of nutritious matter.

1. *Phthifis*, Φθίσις, fignifying *confumption* in general, is confined to that fpecies which originates from difeafe of the lungs: this form of confumption being the moft frequent and fatal. It is defined "emaciation, with hectic fever, cough, and commonly with purulent expectoration." The emaciation is occafioned by the difturbance in the function of digeftion, which the daily fever produces; by the impediment to the function of refpiration, which the difeafed lungs are unable to carry on; and by the great difcharges by expectoration, fweating, or diarrhœa, which latter frequently alternate with each other.

2. *Tabes*, which, in the Latin language, is fynonymous with *phthifis* in the Greek, has been arbitrarily reftricted by nofologifts to that form of confumption, which is not accompanied by cough. It is defined, "emaciation, with hectic fever." Any local difeafe of long continuance, fuch as abfceffes, ulcers, &c. which excites a hectic fever, may become the origin of a *tabes*. But the moft frequent occurrence of tabes is obferved in fcrofulous habits, the fcrofula being always flow in its progrefs: and one of the moft common varieties of tabes arifes, where fcrofula attacks the glands of the mefentery. In this cafe emaciation is produced, not only by the difturbance of functions, and the fweats of the hectic fever, but by the phyfical impediment to the nutrition of the body, occafioned by the morbid condition of the mefenteric glands, through which the chyle cannot pafs, in order to enter the thoracic duct, and thence to be poured into the blood-veffels.

3. *Atrophia*, derived from the primitive particle α, and τρέφω, *nutrio*, implying *defect of nourifhment*, has been adopted to denote the fimple emaciation and lofs of ftrength, which is not accompanied with hectic fever, nor originates from any organic difeafe; but depends altogether on the privation, corruption, or abftraction, of that which would otherwife fupport the ftrength of the body. It is defined, "emaciation, without fever." Hence atrophia occurs in thofe who have fuffered great evacuations, as from falivation, hæmorrhage, fweat, leucorrhœa, &c.; in thofe from whom nutriment is abftracted in undue proportion to their ftrength and digeftive powers, as in nurfes fuckling ftout children, or continuing them at the breaft too long; and in thofe whofe nutriment is corrupted, as the falt provifions, which excite fcurvy.

For a view of the nature and requifite treatment of the different kinds of confumption, fee the following articles: TABES *Mefenterica* (or Mefenteric Confumption), and ATROPHY. Savage's Nofol. Method. Clafs x. ord. I. Cullen's Synopfis Nofol. Clafs i. ord. 4. and Clafs iii. ord. I.

CONSUMPTION, *Pulmonary*, the *phthifis pulmonalis* of medical writers, from φθίω, or φθέω, *corrumpo*, *confumo*, a diftreffing and very fatal difeafe, diftinguifhed by the occurrence of a frequent cough, with expectoration of puriform matter, hectic fever, emaciation, and debility; to which, in the latter ftages, colliquative fweats, often alternating with diarrhœa, fupervene.

In this difeafe the number, degree, and progrefs, of the fymptoms are extremely various, in different cafes. It ufually commences in an infidious manner, with a flight and fhort cough, which is often little remarked by thofe affected with it, but foon becomes habitual; or with an occafional cough, which is more fevere. At the fame time, the breathing becomes eafily hurried by any bodily motion, the patient grows leaner, and becomes languid and indolent. In this ftate he fometimes continues for a year, or even for two years, without making any complaint, excepting that he is affected by cold more readily than ufual, which frequently increafes his cough, and produces catarrh. This, however, is fometimes relieved, is fuppofed to have arifen from cold alone, and therefore gives no alarm either to the patient or to his friends, nor leads them to take any precaution. But upon fome occafion of catching cold, as we commonly fpeak, the cough becomes more confiderable; is particularly troublefome, when the patient lies down at night, and in this ftate continues longer than is ufual in the cafe of a fimple catarrh. This may more particularly attract attention, if the increafe and continuance of cough occur during the fummer feafon.

The cough, in many inftances, continues for a long time dry, or without any expectoration; frequently, however, it is accompanied, from the firft, with an expectoration of a blackifh or blueifh mucus, or of tough phlegm; the expectoration being generally moft confiderable in the morning, in confequence of the accumulation of the matter during fleep. This matter becomes by degrees more copious, more vifcid, and more opake; at length of a yellow or greenifh colour, and of a purulent appearance, fometimes ftreaked with blood. As thefe changes take place, and the cough increafes, the breathing at the fame time becomes more difficult, and the emaciation and weaknefs go on alfo increafing. In the female, as the difeafe advances, and fometimes early in its progrefs, the menfes ceafe to flow; and this circumftance, although doubtlefs an effect, the fex themfelves are generally difpofed to believe to be the fole or principal caufe of the difeafe. During this progrefs fome pain is commonly felt in the thorax, at firft under the fternum, efpecially, or almoft folely, on the occafion of coughing: but very often there is a pain in one fide, fometimes dull and oppreffive, fometimes fharp and fhooting, and fuch as to prevent the perfon from lying eafy upon that fide. Even

when no pain is felt, it generally happens that phthifical perfons cannot lie eafily on one of their fides, the difficulty of breathing being increafed, and the cough excited by the attempt.

Thefe fymptoms have feldom continued long, before the pulfe becomes frequent, fometimes to a confiderable degree, without much of the other fymptoms of fever. As it proceeds, the fkin becomes dry and hot, efpecially the palms of the hands and foles of the feet ; a circumfcribed flufh appears on the cheeks ; tranfient chills are often felt by the patient, or he is exceedingly fenfible to cold ; and commonly a regular morning and evening febrile paroxyfm takes place, the evening exacerbation being always the moft confiderable, and terminating in fweats during the night.

The mind is generally little or not at all impaired during the progrefs of pulmonary confumption ; fometimes it is even more acute than in the previous ftate of health ; and the patient is generally confident of recovery, and his fpirits buoyed up by hope to the laft extremity. But the gradual lofs of flefh and ftrength, the fharpnefs of the features, the pearly whitenefs of the eyes, the incurvation of the nails, and fometimes the lofs of the hair, but too evidently mark the decay of the bodily functions. At length a colliquative diarrhœa, fometimes occurring together, but moft commonly alternating, with the night fweats, contributes ftill farther to reduce the patient's ftrength ; and death is frequently preceded by œdema of the feet and legs, and aphthæ in the mouth and throat, and occafionally by delirium.

Great numbers of people are repeatedly expofed with impunity to the circumftances which excite confumption of the lungs; it is only on a conftitution of a peculiar nature, predifpofed to the difeafe, that thefe exciting caufes operate. This predifpofition is frequently hereditary, defcending from parents whom the difeafe had attacked, or who had, at fome period of their lives, been affected with fome form of fcrofula. It is marked by a peculiar inftability and weaknefs of the vafcular fyftem, more efpecially of the lungs; inafmuch as the perfon is fubject to frequent catarrh, and fpitting of blood. It is alfo diftinguifhed by external peculiarities of form and appearance. Perfons poffeffing what has been denominated the fanguine temperament, namely, having fine fkin, with large veins, foft hair, light eyes, a florid complexion, tall and thin perfon, long flender neck, narrow cheft, and projecting fhoulders, may be confidered as having the phthifical predifpofition : and thofe of the fanguineo-melancholic temperament, combining with the fine fkin and complexion, and flender form of the former, the dark hair and eyes, and dilated pupils of the melancholic temperament. This combination conftitutes in general a temperament of peculiar beauty; but in the eyes of the medical phyfiognomift, a fenfe of its delicacy is not the leaft impreffion which it excites. Phthifis fometimes occurs alfo in perfons who may be faid to poffefs a fanguineo-phlegmatic temperament, *i. e.* who have the flender form and delicate conftitution, with an habitually pale complexion, and without the difpofition to acute inflammation, which belongs to the fanguine: it occurs occafionally too in temperaments almoft entirely melancholic. See Temperament.

In thofe who have a conftitutional predifpofition to the phthifical ftate of the lungs, the difeafe is excited by various caufes of irritation in thofe organs. Thus it is frequently induced by common inflammation of the lungs, or their membranes, by pleurify, peripneumony, catarrh, whooping-cough, afthma, and the cough connected with meafles; by frequent over-exertion of the lungs in fpeaking, finging, or blowing mufical inftruments; by infpiring certain kinds of duft or vapour; by hæmoptyfis, or fpitting of blood; by fudden variations of the atmofpheric temperature; by compreffing the cheft by tight bandages, &c. Of fome of thefe caufes we fhall fpeak more particularly.

A great majority of the cafes of pulmonary confumption is referred, by the fufferers, to a common cold or catarrh, as their origin; the expectoration of mucus, which belongs to catarrh, being gradually changed to an expectoration of pus, and a hectic fever fupervening. But Dr. Cullen thinks that this fuppofition is not eafily to be admitted; inafmuch as catarrh is properly an affection of the mucous glands of the trachea and bronchiæ, analogous to coryza, and lefs violent kinds of fore-throat, which very feldom terminate in fuppuration. He is of opinion, that the apparent catarrh, in fuch inftances, was in fact the beginning of phthifis, for which it may have been miftaken, as the refemblance between the two is fo great as commonly to preclude the means of difcrimination. This difficulty, however, he admits, preffes upon us the neceffity of paying minute attention to every catarrhal cough, efpecially in thofe who bear marks of the temperament which is predifpofed to confumption. This obfervation has been inculcated, indeed, from ancient times. "Quod fi mali plus eft," fays Celfus, "et vera phthifis eft, *inter initia* protinus occurrere neceffarium eft; neque enim facile hic morbus, cum inveteraverit, evincitur." lib. iii. cap. 22. The attention of friends and parents cannot, indeed, be too ftrongly urged upon this point; to neglect the flighteft catarrhal affection, which continues longer than the ufual fhort period of a few days, is to neglect the only period of fuppreffing a difeafe, which almoft invariably tends to fatality.

Hæmoptyfis, or fpitting of blood, is enumerated among the caufes of confumption, and certainly very frequently precedes it. But this occurrence may, perhaps, be confidered ftill more than catarrhal fymptoms, as a fign of the commencement, and not a caufe, of the difeafe; more efpecially when it occurs independently of external violence. Numerous inftances of hæmoptyfis have occurred, from blows and wounds, in which ulceration did not enfue, or at leaft was of fhort duration, and did not materially injure the conftitution. But when it comes on without any obvious external caufe, and efpecially in perfons of one or other of the *temperaments* already defcribed, ulceration, expectoration of pus, and all the diftreffing fymptoms of phthifis are generally to be apprehended. In fuch cafes, there is either a peculiar tendernefs of the vafcular fyftem in the lungs; or, what is perhaps more generally the fact, an incipient obftruction, as tubercles, which render the fmall veffels liable to give way, when the circulation through them is increafed by any exertion, or receives an irregular impetus from the action of coughing, occafioned by cold. In this way catarrh may lay the foundation of phthifis. Spitting of blood, however, if not among the firft fymptoms, very frequently occurs in the courfe of the difeafe, efpecially in the ftage of purulent expectoration.

When inflammation of the lungs terminates in extenfive fuppuration, producing one or more collections of purulent matter, termed *vomicæ*, the great irritation often produces hectic fever, which, together with the expectoration of pus, continues after the vomicæ burft, and the patient is cut off with the ordinary train of fymptoms belonging to phthifis.

Perfons who are occupied in various employments, by which the air they breathe is contaminated with various fubftances, in the form of a fine powder, are peculiarly liable to be feized with phthifis. Thus hair-dreffers, bakers, mafons, bricklayers'-labourers, laboratory-men, coal-heavers, and chimney-fweepers, are frequently fubject to the moft obftinate pulmonic difeafes; as are alfo, in an equal degree, the

dreffers

dreffers of flax and feathers, and the workmen in the warehoufes of leather-fellers. Many perfons, thus engaged, ftruggle a long time with a conftant, hard, troublefome cough, which at length terminates in confumption. See Willan on Difeafes in London, p. 301.

The exanthematous difeafes, fuch as fmall-pox and meafles, the latter of which, more particularly, often lays the foundation of confumption, feem to operate by occafioning fome morbid change in the conftitution, which may be confidered rather as a predifpofition than an actual ftate of difeafe. Dr. Cullen attributes this change to an acrimony left in the fluids by thefe exanthemata, which he believes to be the fame with the acrimony which prevails in fcrofula. But if we would avoid hypothetical language, all that can be faid is, fimply, that a predifpofition to phthifis and to fcrofula is occafioned by thefe difeafes. The meafles, indeed, may not only induce the predifpofition, but, by the irritating cough which it leaves behind, may actually occafion a confumption of the lungs.

The venereal difeafe, or the irritation of the mercurial medicines neceffary for its cure, or both combined, appear alfo to excite a predifpofition, and lay the foundation of confumption.

Dr. Cullen has enumerated, among the exciting caufes of phthifis pulmonalis, and as the moft frequent of them all, tubercles in the lungs. In the majority of cafes thefe undoubtedly exift; but we muft confider them as conftituting the effential part of the difeafe itfelf, and, if not originally induced by fome of the caufes above enumerated, excited into a ftate of activity by fome one of them, perhaps moft frequently by the common catarrh. Of the pulmonary tubercles, the beft morbid anatomift of the times gives the following account.

There is no morbid appearance, he fays, fo common in the lungs as that of tubercles. Thefe confift of rounded, firm, white bodies, interfperfed through their fubftance. They are, I believe, formed in the cellular ftructure, which connects the air-cells of the lungs together, and are not a morbid affection of glands, as has been frequently imagined. There is no glandular ftructure in the cellular connecting membrane of the lungs; and on the infide of the branches of the trachea, where there are follicles, tubercles have never been feen. They are at firft very fmall, being not larger than the heads of very fmall pins; and in this cafe are frequently accumulated in very fmall clufters. The fmaller tubercles of a clufter probably grow together, and form one larger tubercle. The moft ordinary fize of tubercles is about that of a garden pea; but they are fubject in this refpect to much variety. They adhere pretty clofely to the fubftance of the lungs, and have no peculiar covering or capfule, and have little or no vafcularity. When cut into, they are found to confift of a white fmooth fubftance, having great firmnefs, and often contain in part a thick curdly pus. But when the pus is in confiderable quantity, it is thinner, and refembles very much the pus from a common fore. In cutting into the fubftance of the lungs, a number of abfceffes is fometimes found, from pretty large tubercles having advanced to a ftate of fuppuration. In the interftices between thefe tubercles, the lungs are frequently of a harder, firmer texture, with the cells in a great meafure obliterated. The texture of the lungs on many occafions, however, round the boundaries of an abfcefs, is perfectly natural.

I have fometimes, Dr. Baillie continues, feen a number of fmall abfceffes interfperfed through the lungs, each of which was not larger than a pea. The pus in thefe is rather thicker than what arifes from common inflammation, and refembles fcrofulous pus. It is probable that thefe abfceffes have been produced by a number of fmall fcattered tubercles taking on the procefs of fuppuration. The lungs immediately furrounding thefe abfceffes are often of a perfectly healthy ftructure, none of the cells being clofed up by adhefions. See Baillie's Morbid Anatomy, p. 66, *et feq.*

This accurate delineation of the condition of the lungs in the laft ftage of confumption, fufficiently evinces the impoffibility of a cure by medicine, and may contribute farther to enforce an attention to its earlieft fymptoms.

It muft not be omitted, however, that although the flighteft fymptoms of catarrh often prove the commencement of a fatal phthifis; on the other hand, catarrh does occafionally put on the appearance of phthifis, yet terminate well. Dr. Willan obferves, in his "Reports on the Difeafes in London," "many perfons who had catarrhal coughs in March, were farther affected with fpitting of blood, thick, vifcid expectoration, pains within the cheft, hectic fever, and diarrhœa, interchanging with night-fweats, but recovered notwithftanding in the month of April." He concludes "that ulcerations in the lungs had not been produced, and that the expectorated fluid, fo alarming in its appearance, was perhaps only compofed of a puriform fecretion, and an increafed difcharge of mucus, circumftances ufual under other membranous inflammation." Reports, p. 4 and 147. But it muft be added, that diffection has fhewn, that even this condition of lungs has proved fatal, with the ufual fymptoms of phthifis.

To aid in diftinguifhing whether the matter expectorated be pus, or mucus only, feveral tefts have been propofed; which, taken together, may afford us the means of an accurate conclufion. 1. The colour; mucus being naturally tranfparent, and pus always opake. When mucus becomes opake, as it fometimes does, it becomes white, yellow, or greenifh; but the laft mentioned colour is hardly ever fo remarkable in mucus as in pus. 2. The confiftence; mucus is more vifcid and coherent, fo as not readily to be diffufed in water; pus is more readily friable, being broken into ragged fragments by a little agitation in water. 3. The fmell; no odour is in general perceived in mucus, but frequently in pus. 4. The fpecific gravity; it being ufual for the mucus of the lungs to fwim on the furface of water, and for pus to fink in it; but in this we may be deceived, as pus which has entangled a great deal of air may fwim, and mucus that is free from air may fink. 5. The mixture which is difcernible in the matter brought up; for if a yellow or greenifh matter appears furrounded with a quantity of tranfparent or lefs opake and lefs coloured matter, the more ftrongly coloured may be generally confidered as pus. 6. Chemical tefts. Mr. Charles Darwin's experiments fhewed that the vitriolic acid diffolves both mucus and pus, but moft readily the former; that if water be added to fuch a folution of mucus, this is feparated, and either fwims on the furface, or, divided into flocculi, is fufpended in the liquor; whereas, when water is added to a like folution of pus, this falls to the bottom, or by agitation is diffufed fo as to exhibit an uniformly turbid liquor. Again he fhewed, that a folution of cauftic potafs, after fome time, diffolves mucus, and generally pus; and if water be added to fuch folutions, the pus is precipitated, but the mucus not.

With refpect to the *prognofis* in confumption, its tendency in general muft be confidered as extremely bad. In conftitutions, where all the delicacy of the temperaments before defcribed is obferved, and more efpecially if an hereditary predifpofition can be traced, the moft trivial fymptoms are alarming. The particular degree of danger muft be eftimated from thefe circumftances, from the mode in which the difeafe commenced, from its duration, and the flownefs or

or rapidity of its progrefs, the number and degree of the fymptoms prefent, and the effects which medicine has already produced. The following aphorifms, the refult of Dr. Cullen's obfervation, are worthy of attention.

"A phthifis pulmonalis, from hæmoptyfis, is more frequently recovered from, than one from tubercles.

"A phthifis from a fuppuration, in confequence of pneumonic inflammation, is that which moft rarely occurs in this climate; and a phthifis does not always follow fuch fuppuration, when the abfcefs formed foon breaks, and difcharges a laudable pus: but, if the abfcefs continue long fhut up, and, till after a confiderable degree of hectic has been formed, a phthifis is then produced, equally dangerous as that from other caufes.

"A phthifis from tubercles has, I think, been recovered: but it is, of all others, the moft dangerous; and, when arifing from a hereditary taint, is almoft certainly fatal.

"The danger of a phthifis, from whatever caufe it may have arifen, is moft certainly to be judged of by the degree to which the hectic and its confequences have arrived. From a certain degree of emaciation, debility, profufe fweating, and diarrhœa, no perfon recovers.

"A mania coming on, has been found to remove all the fymptoms, and fometimes has entirely cured the difeafe; but, in other cafes, upon the going off of the mania, the phthifis has recurred, and proved fatal.

"The pregnancy of women has often retarded the progrefs of a phthifis, but commonly it is only till after delivery, when the fymptoms of phthifis return with violence, and foon prove fatal." Firft Lines, parag. 898.

Treatment. It will readily appear, from what has been faid above, that the cure of pulmonary confumption muft be exceedingly difficult; in the latter ftages, perhaps impoffible. Many inftances, however, have occurred, where the attention of the patient to the incipient fymptoms, and his early adoption and fteady purfuit of proper meafures, have averted the fatality of the difeafe. When it is deeply rooted, alleviation of the fufferings is all that can be hoped for.

The treatment of a beginning confumption will depend much upon the peculiar conftitution of the patient, as well as on the nature of its origin, and of the fymptoms which it exhibits; but moft particularly upon the prevalence of an inflammatory difpofition, or of a general debility of the habit; thefe oppofite ftates being both accompanied by great irritability; and the principal indications will be to diminifh the inflammatory action and irritability; and in the latter ftate, juft mentioned, to avoid debilitating meafures, and to fupport the ftrength as much as is confiftent with the inflammatory irritation that may exift.

Where there is confiderable ftrength, and a complexion ftill florid, if there is much pain in the cheft, or if the pulfe be quick and fharp, perhaps fmall bleedings from the arm may be reforted to, and occafionally repeated; or blood may be drawn from the cheft, near the feat of the pain, by means of leeches or cupping. But this difcharge fhould be always effected after a cautious examination of the circumftances; for the debility which is apt but too fpeedily to enfue, may be thus accelerated, and, with it, the worft fymptoms of the difeafe. It is now well underftood, that the appearance of the buffy coat on the blood drawn, is by no means alone an evidence of the neceffity of drawing more; for it will appear in phthifis, nearly as long as the arteries have power to propel it. The old doctrines refpecting the buffy coat, have doubtlefs led to much practical error; but no one now confiders pregnancy a difeafe which requires conftant bloodletting; or ufes the lancet in the hot ftage of an intermittent fever, although under both thefe circumftances, the buffy coat is conftantly found. In confumption occurring, as it moft commonly does, in delicate habits, the practice of repeated venefection decidedly accelerates the fatal courfe of the difeafe. Blifters, on different parts of the cheft, will better anfwer the purpofe of relieving a local inflammatory difpofition. Iffues and fetons have a fimilar effect, but the conftant difcharge tends to debilitate, and the irritation to counteract, in fome meafure, the good effects of the evacuation.

During the ufe of blifters, or other local difcharge, the internal ufe of medicines, which have been denominated refrigerant, may be alfo reforted to with fome advantage; fuch are acids, efpecially the vegetable, and certain neutral falts, as cryftals of tartar, nitre, &c. The laft named falt has been ftrongly recommended by Dr. Dickfon, (fee Med. Obf. and Inquiries, vol. iv. p. 208.) efpecially where there is hæmoptyfis, adminiftered in fmall dofes frequently; "when given early in an hæmoptöe," he fays, "I can almoft equally depend upon it, as upon the cortex peruvianus in a genuine intermittent." But general experience does not warrant this encomium to its extent. We believe the digitalis to be the moft efficacious medicine, in repreffing that inflammatory action of the arterial fyftem at large, and of the pulmonary arteries in particular, which commonly goes on at the commencement of phthifis, whether accompanied by fpitting of blood or not. The latter it commonly fuppreffes, and we have frequently feen a febrile irritation, bordering on hectic, attended with a fharp and quick pulfe, a dry ringing cough, and commencing emaciation, fpeedily fubfide under its adminiftration. The digitalis may be given in combination with the acids, or with nitre, in a mucilaginous liquid. The ceruffa acetata, or acetite of lead, was formerly employed in confiderable dofes, efpecially by the continental phyficians, with the view of counteracting inflammatory action, and of fuppreffing hæmoptyfis. The medicine, it would appear, is poffeffed of fome efficacy; but the danger of inducing paralyfis, and colica pictonum, and other effects, which refult from the poifon of lead, is fufficient to deter us from its ufe. Where the inflammatory action is high, we fhould be cautious in employing opiates, with a view to allay the cough; as, in fuch cafes, opium in any form proves too ftimulating; but where there is languor and debility, and lefs of the fanguine temperament, and the cough extremely haraffing, opiates may be employed with benefit; they will fave the ftrength of the patient, by appeafing the inceffant irritation of coughing, which tends to wear him down, and deprive him of fleep.

Medicine, however, will not alone fecure the patient from the deleterious progrefs of the difeafe. He will be required to pay ftrict attention to his diet, and to every external circumftance that can influence the functions of the body. His meat and drink, his cloathing, his exercife, his fleep, and even his amufements, muft be regulated with a rigid correctnefs, fo that the whole may combine, with medicine, to accomplifh the fame object, that of ridding the conftitution of a difeafe of fatal tendency, and reftoring it to its healthy condition. Diet, regimen, and medicine, muft become, as it were, the bufinefs of the patient. He muft regulate his life chiefly upon this principle; that every thing which can heat or irritate the body, or excite any increafed or irregular action of the arterial fyftem, muft be fhunned; and every meafure which can fupport the conftitution, without infringing on the laft-mentioned precept, zealoufly adopted.

The diet of the confumptive, in the early ftage, of which we now fpeak, fhould be light and nourifhing, and fuch as is found to be adapted to his digeftive powers. Animal food

fhould

ſhould be avoided; and vegetable matters, in the various forms of preparation, with the ripe ſaccharine and ſub-acid fruits, and milk, be made the excluſive nouriſhment of the patient. Milk is particularly ſerviceable, as being very nutritious, and eaſily digeſtible, without ſtimulating the ſyſtem, and ſhould be conſidered as the baſis of the patient's diet. In ſome habits, however, where the digeſtive powers are feeble, or where there is a peculiar idioſyncraſy, cow's milk is not readily digeſted; a load at the ſtomach, or aceſcency, or head-ach, enſue after it is taken. In ſuch caſes, the whey which is produced by ſeparating the cheeſy part, or the butter-milk which is left after the ſeparation of the oily part, or butter, may be ſubſtituted with advantage. Or the patient may have recourſe to the lighter milk of the goat or the aſs, which contains a ſmaller proportion of thoſe heavy parts. The acidity which milk occaſions in the ſtomach of ſome people, may be occaſionally corrected by the admixture of lime-water. Some of the amylaceous preparations from vegetables, may be uſed in conformity with this plan, ſuch as the arrow-root, tapioca, &c.; and it is ſcarcely neceſſary to add, that with theſe, as with all other food, wine, ſpirits, and fermented liquors, muſt be moſt ſtudiouſly avoided. A mucilaginous vegetable has lately been introduced, which, in feeble habits, ſeems calculated to aſſiſt this plan; namely, the lichen iſlandicus, which may be taken boiled in milk, and which, with its nutritive qualities, combines a very mild tonic power, which ſomewhat aids the digeſtion.

While every thing is done, by means of medicine and diet, to repreſs inflammatory action, while we moderately ſupport the ſtrength, another meaſure, ſtill more efficacious, ſhould be adopted, by thoſe who have the power; they ſhould remove to meet the winter in a warm and more equable climate. Cold, but eſpecially ſudden viciſſitudes of cold and heat, appear to be the moſt inimical circumſtances to a beginning conſumption; and there are many living teſtimonies of the benefits which have been derived from an *early* viſit to a more genial atmoſphere. Portugal, the ſouth of France, and Italy, have been reſorted to, as well as the more regular and moderate climates of Madeira and St. Helena. Where theſe countries cannot be viſited, ſome parts of our own iſland may be tried, as being milder than the reſt; as Devonſhire, and the neighbourhood of Briſtol; which latter place poſſeſſes the additional advantage of a wholeſome tepid water. Inſtances of the inefficacy of all theſe places, are, indeed, but too numerous; but much of this is to be attributed to the patients themſelves. They perſiſt in waiting the reſult of time, or of the leſs efficacious means of relief, until relief is altogether beyond their reach. "It ſeems too often to be the fate of conſumptive patients," ſays Dr. Fothergill, "to do that laſt which they ought to have done firſt; and, by this prepoſterous conduct, ſhorten their own lives, and afflict all who have any regard for them." (Med. Obſ. and Inq. vol. v. p. 369.) The ſame intelligent phyſician affirms, that the Briſtol water is, in his opinion, an efficacious medicine, and that he has "often found it of ſignal benefit to conſumptive patients;" but "it is before the approaches to a confirmed phthiſis that patients ought to repair to Briſtol; otherwiſe, a journey thither will be, not only without benefit, but will be probably detrimental." Ibid. Thoſe who have viſited the pump-room at the hot-wells, muſt have ſeen, with pity, the hopeleſs condition of the poor creatures who are dragged thither, to their perſonal detriment, and the diſcredit of an uſeful medicine.

Exerciſe, by various modes of geſtation, has been frequently employed as a remedy for conſumption. Sydenham, indeed, aſſerted, that riding on horſeback is as effectual in the cure of phthiſis pulmonalis, as the bark in agues, or mercury in the venereal diſeaſe, provided the journeys be long enough. An example is related in Dr. Darwin's "Zoonomia," vol. ii. (the caſe of the late ingenious Dr. Currie of Liverpool) in which an hereditary phthiſis was removed, by perſevering in a daily journey; at firſt in an eaſy carriage, and ſubſequently, as the ſtrength increaſed, alternately in the carriage and on horſeback. Some phyſicians, however, are of opinion, that exerciſe on horſeback is rather pernicious, than otherwiſe, in phthiſis. (See Dr. Dickſon's paper, before quoted.) *Sailing* ſeems to be conſidered at preſent as the moſt efficacious mode of geſtation, eſpecially if a long voyage is taken, which is a double recommendation of the removal to a warmer climate. As a ſort of ſubſtitute for this kind of gentle motion, *ſwinging* has been recommended as a remedy for phthiſis, and Dr. Carmichael Smith has written a treatiſe in its favour. In the uſe of any, or all theſe modes of gentle exerciſe, however, the ſame precept muſt be purſued; they muſt be reſorted to *early* in the diſeaſe.

If the plan, now detailed, has not been adopted in ſuch time and mode, as to have checked the diſeaſe; if it has, therefore, advanced to the confirmed ſtate, with purulent expectoration, hectic fever, and profuſe night ſweats; the principal object of medicine becomes merely palliative, and confined to the alleviation of urgent ſymptoms. If the cough is exceedingly urgent, opiates may be adminiſtered more liberally than in the early ſtage. At this period, ſome of the more ſtimulating expectorants are employed by ſome practitioners, with a view to facilitate the diſcharge of the matter which loads the lungs; ſuch as the oxymel, or other preparation of ſquills, the various balſams, and ſome of the gum-reſins. But the experience of the moſt obſerving phyſicians has decided againſt the utility of theſe heating drugs. (See Dr. Fothergill, loc. cit. Dr. Cullen, loc. cit.) There may be occaſional circumſtances in particular conſtitutions, where the objections may not exiſt, as in a cold phlegmatic habit, or where there is conſiderable debility of circulation, with little inflammatory tendency; but theſe are not common. The colliquative ſweats and diarrhœa frequently alternate with each other, and medicines which relieve the one, are liable to increaſe the other. The diluted ſulphuric acid has a conſiderable influence over the night ſweats, and opium is an efficacious medicine againſt the colliquative diarrhœa. But the opium ſeems to favour the occurrence of the perſpirations, and the acid tends to excite the action of the bowels. Theſe medicines, therefore, muſt be combined, or uſed ſingly and alternately, according to the circumſtances of the caſe. Opium may be alſo given by way of enema, when the diarrhœa is obſtinate.

Some practitioners, preſuming that the hectic fever, and the whole ſeries of phthiſical ſymptoms, were dependent on debility alone, have recommended the uſe of tonic medicines, and a generous diet, in the ſtate of confirmed phthiſis; and ſeveral caſes are on record, in which this plan appears to have been attended with ſucceſs. (See Dr. May's Papers, Lond. Med. Journ. vol. ix. and xi.) But we have already obſerved, ſupported by the authority of Dr. Willan, that catarrhal affections occaſionally put on the ſymptoms of phthiſis, and recover under the ordinary means. There are alſo caſes of this ſort, in which there is, we believe, no ulceration, but only a purulent ſecretion from the membranes, which nevertheleſs terminate fatally, with the worſt ſymptoms of phthiſis; and perhaps it is in ſuch caſes, that a tonic treatment is actually ſucceſsful. But we have no

no means of diftinguifhing thefe cafes from the more general inftances, in which abundant experience has taught us, that all ftimulating or corroborant medicines and food tend to augment the cough and expectoration, to increafe the hectic fever, and therefore to accelerate the deftruction of the conftitution, even in the laft ftages.

Emetics, repeated daily, have alfo been recommended, as a remedy for phthifis. They afford, we believe, a temporary relief to the refpiration and cough, but nothing more. On the contrary, the continued repetition of fuch an irritation, and fuch a derangement of the natural action of the ftomach, neceffarily tends to debilitate and impair the functions of this vifcus, and to weaken the conftitution at large.

Before we conclude, we cannot omit mentioning an illufion, which was foftered in the minds of fome enthufiaftic phyficians, after the difcovery of the compofition of atmofpheric air by the chemifts. It was found that oxygen was the great ftimulus of life, and the fource of the falutary change of the blood, which is marked by its florid colour. From the general florid colour of the blood of the phthifical, it was fuppofed that confumption was occafioned by a general hyper-oxygenation of the fyftem; and hence, by an eafy inference, the breathing of an air, in which the proportion of oxygen was diminifhed, by the addition of fome azotic air, fuch as carbonic acid gas, or carbonated hydrogen, was fuggefted as a probable remedy for confumption. Cafes were even publifhed, illuftrative of the extraordinary efficacy of this new medicine. But the light of experience has opened the eyes of the vifionary, and the phantom has difappeared. It has even been fhewn by the experiments of the French chemifts, that the abforption of oxygen, or, at leaft, its difappearance in the lungs, is influenced principally by the ftate of the body, and not by the proportion exifting in the air which is infpired.

CONSUMPTION, *mefenteric.* See TABES *mefenterica.*

CONSUMPTION, in *Farriery*, is alfo a difeafe incident to horfes, confifting in wafte of mufcular flefh, attended with a flow fever. In this diforder bleeding in fmall quantities is recommended: mercurial purges, and a powder of native cinnabar, gum guaiacum and nitre, of each one pound, in the quantity of an ounce twice a day; fpring grafs, and falt marfhes, are alfo of great fervice, when there is any profpect of a recovery. See CONDITION.

CONSUS. See CONSUALIA.

CONTA, in *Geography*, a river of Italy in Genoa, which runs into the fea near Albenga.

CONTACT, (from the Latin *contactus*,) means the meeting, or mutual touching of two things. The word is univerfally ufed in the common affairs of life, as well as in fcientific fubjects.

In geometry a line is faid to touch another line, or a furface, or a folid; and a plane figure, or furface, is faid to touch another furface or a folid, when the former meets the latter; but, being produced, does not cut it. Thus amongft the definitions of the third book of Euclid's "Elements of Geometry," a right line is faid to touch a circle, when meeting with the fame, and being produced, it does not cut it. Alfo two circles are faid to be in mutual contact when they meet, but do not cut each other. Thus the mathematical meaning of the word contact is clear and definite, nor can any doubt arife in the fpeculative mind concerning the nature of it; the abftract ideas of a line, of a furface, or of a folid, being perfect and independent on any phyfical qualities of a doubtful or uncertain nature.

The contact of two fpherical bodies is only in one point; and the fame holds of a tangent and the circumference of a circle. See TANGENT. Hence, becaufe very few furfaces are capable of touching in all points, and the cohefion of bodies is in proportion to their contacts; thofe bodies will ftick fafteft together, which are capable of the greateft contact. The contact of curve lines or furfaces, with either ftraight or curved ones, is only in points; and yet thefe points have different proportions to one another, as Mr. Robartes has fhewn in the Philof. Tranf. vol. xxvii. p. 470, or Abr. vol. iv. p. 1.

In mechanics and in philofophy the contact between two bodies is faid to take place, when one body, being brought near another body, cannot be approached nearer to it without, in fome meafure, affecting its ftate, be it of motion or of reft. Thus a ftone, being gradually moved towards another ftone, is faid to come in contact with it, when its progrefs is either abfolutely, or partially, obftructed by that other ftone. Or, if they be both at reft, and contiguous to each other, they are faid to be in contact, when one ftone cannot be moved towards the other, without either urging the other forward, or being ftopped by it, or laftly without making an impreffion upon its furface. The fame thing muft be underftood of the contact between any two other bodies. But the great queftion in philofophy is, to determine whether the bodies which thus hinder, or affect, each other's ftate of reft or motion, do actually come in contact with each other's furface in the ftrict mathematical fenfe, or they exert that hindrance, oppofition, refiftance, &c. in virtue of a repulfive power, which acts at a certain indefinite fmall diftance from their furfaces. This queftion feems, at firft fight, to be eafily determined; but, when duly confidered, it will be found to involve certain properties of matter in general, and certain effects, which, in the prefent ftate of knowledge, are far from being thoroughly underftood, or fufficiently examined.—The reafons which fuggefted the above-mentioned doubts, concerning the contact of bodies, and the anfwers which may be offered in elucidation of the fubject, being fully deferving of notice, we fhall now endeavour to ftate them in a regular and compendious manner.

Sir I. Newton, having placed a glafs lens of a figure flightly convex, upon the flat furface of another glafs, and having preffed the one againft the other, obferved certain coloured rings formed between the two glaffes, and concentric with the point of contact in the middle of the glaffes, which point was marked by a colourlefs dark fpot. He farther obferved, that thofe rings of prifmatic colours, and the dark central fpot, became larger when the glaffes were preffed harder againft each other, and became diminifhed in fize when the preffure was diminifhed.—From the known figure of the glaffes employed in this experiment, it is evident that a certain fpace or a film of air muft remain between their contiguous furfaces; that this fpace, or film of air, became thinner when the glaffes were preffed hard againft each other, and *vice verfâ*; laftly, that at the centre, where the glaffes may be prefumed to have been in real contact, the want of fpace, or of air, rendered that fpot colourlefs. In this experiment it is fuppofed, that the colours are owing to the fpace or film of air between the glaffes; hence the central fpot exhibits no fuch colours; and therefore, that when any prifmatic colours appear between the contiguous furfaces of two glaffes, their contact cannot be perfect. Nearly the fame thing is obferved when two flat pieces of glafs are preffed againft each other; prifmatic colours being likewife feen between them, though not in rings, but in rows, which affume various directions, according as the preffure may happen to alter the furfaces of the glaffes. And thofe colours cannot be made to difappear without the application of

of an enormous degree of preſſure; hence it is inferred, that, though of two bodies one may ſupport the other, or puſh it forward, yet their contact may not be perfect. Profeſſor Robiſon reckons the force with which two pieces of glaſs muſt be preſſed againſt each other, in order to produce a perfect contact, as equivalent to the preſſure of 1000 pounds for every ſquare inch of ſurface; ſo that if two pieces of glaſs ſtrike againſt each other, without exerting a preſſure equal to 1000 pounds per ſquare inch of ſurface, they may affect each other's motion, and yet not come actually in contact. In conſequence of the above facts and obſervations it is ſuppoſed, that a repulſive power exiſts on the ſurfaces of bodies, and that this power is extended to a very ſmall and inappreciable diſtance beyond the ſurface.

Another argument to prove the exiſtence of the above-mentioned reſiſting power on the ſurfaces of bodies, is derived from the phenomena exhibited in an electrical experiment.—When an electric jar is diſcharged through a metallic chain in a darkened room, ſparks of electric light are viſible between the contiguous ſurfaces of the links. Dr. Prieſtley, conſidering this effect as ariſing from the want of perfect contact between the links, endeavoured to render it perfect by ſtretching the chain, until on making the diſcharge no ſuch ſparks ſhould be ſeen. This he accompliſhed by making one end of the chain faſt on a firm body, and appending weights to the other end. Thus proceeding, he found that a very conſiderable weight was neceſſary to be applied, before the ſparks could be made to diſappear between the links, when the jar was diſcharged through the chain. This induced Dr. Prieſtley to conclude, that the links of the chain could not be brought into actual contact without the application of a great force; ſince the electric ſparks are viſible only when the electric fluid in paſſing through a body or a ſeries of contiguous bodies, meets with ſome obſtruction, or interruption of continuity.

Beſides the exiſtence of the above-mentioned reſiſting or repulſive power on the ſurfaces of ſuch groſs bodies as come under the cognizance of our ſenſes; it is farther ſuppoſed, that each component particle of ſuch bodies is indued with the ſame repulſive power; in conſequence of which they are not actually in contact with each other, though they form the ſame firm and impenetrable compound. And the exiſtence of this power has been inferred from the phenomena of contraction and expanſion. "Whatever opinion," ſays Dr. Young, "we may entertain, with reſpect to the ultimate impenetrability of matter in this ſenſe, it is probable that the particles of matter are abſolutely impenetrable to each other. This impenetrability is not however commonly called into effect, in caſes of apparent contact. If the particles of matter conſtituting water, and ſteam, or any other gas, are of the ſame nature, thoſe of the gas cannot be in perfect contact; and when water is contracted by the effect of cold, or when two fluids have their joint bulk diminiſhed by mixture, as in the caſe of alcohol, or ſulphuric acid, and water, the particles cannot have been in abſolute contact before, although they would have reſiſted with great force any attempt to compreſs them. Metals too, of all kinds, which have been melted, become permanently more denſe when they are hammered and laminated."

Whoever wiſhes to form a proper eſtimate of the merits of the above-mentioned arguments, and of the validity of the propoſition which they are intended to eſtabliſh, muſt neceſſarily take into the account all the other properties of matter, which have been diſcovered and confirmed by repeated and univerſal experience; for, ſhould it appear impracticable to reconcile the former with the latter, then ſuch other explanation of the phenomena ought to be ſubſtituted as may be attended with leſs contradiction and greater ſimplicity.—That there is a mutual and univerſal attraction amongſt all the particles of matter, is now no longer to be doubted; that this attraction is extended to all diſtances under certain determinate laws, has been ſufficiently eſtabliſhed by ſtrict mathematical reaſoning upon the grandeſt phenomena of the world; that the ſurfaces of ſeveral bodies, like thoſe of poliſhed glaſs or metallic bodies, when placed contiguous to each other, manifeſt a conſiderable degree of attraction, is well known; and, laſtly, that the component parts of ſolids cannot be ſeparated without a conſiderable force, is ſhewn by daily and common experience. Yet, notwithſtanding all theſe evidences of attraction between the bodies of the univerſe at all diſtances, we are told that a conſiderable repulſive power exiſts on the ſurfaces of bodies, and even that every individual particle of matter is endowed with a ſimilar power; ſo that in the hardeſt bodies, ſuch as a diamond, a flint, a piece of metal, &c. which cannot be divided without an immenſe force, the component particles are not actually in contact with each other. But let us endeavour to explain the phenomena, upon which the above theory is eſtabliſhed, in a ſimpler and more ſatisfactory manner.

In the experiments with the glaſſes, it is ſaid that their actual contact is prevented by a power of repulſion on their ſurfaces, which cannot be overcome without a very extraordinary preſſure. Would it not be more natural to ſuppoſe, that the contact cannot be eaſily effected on account of the inequalities of the ſurfaces, and of the hardneſs of glaſs? The ſurfaces of the glaſſes may be ſaid to be ſlightly convex or perfectly flat, and ſuch they may appear to be for common purpoſes. But if a perſon examines how thoſe ſurfaces are formed and poliſhed; if he conſiders the alterations of figure which are unavoidably occaſioned by the partial dilatations or contractions ariſing from heat and cold, alſo from the interpoſition of the leaſt particle of duſt, or even of the air itſelf; he will be eaſily perſuaded, that thoſe ſurfaces are by no means really flat or uniformly convex in the ſtrict meaning of thoſe words. It is true that the action of thoſe cauſes, *viz.* the inequalities that are produced by them, are exceedingly ſmall; but it is of ſmall effects that we are ſpeaking. Upon the whole, therefore, it ſeems, that when the flat and convex glaſſes in the Newtonian experiment, or the two flat glaſſes, are placed the one upon the other, they do actually touch each other, but in a few points only, *viz.* with their more prominent parts, and that the other more depreſſed parts of their ſurfaces cannot come into actual contact, unleſs the former are depreſſed to the level of the latter, by the application of an external force; ſo that the application of this force is not required by the exiſtence of a repulſive power, but by the neceſſity of depreſſing the more elevated parts, in order that the lower or hollow parts may come ſufficiently near to each other. This idea ſeems to derive additional confirmation from the degree of preſſure which muſt be applied, &c. being, at leaſt apparently, proportional to the hardneſs of the bodies employed. Thus, in glaſs, which has a great degree of hardneſs and rigidity, a conſiderable preſſure muſt be applied for the purpoſe. Bring two pieces of cold wax cloſe to each other, and the one will puſh the other forward without adhering to it, becauſe in that cold ſtate the contact can take place in a very few points only; but if thoſe pieces of wax be ſoftened by heat, it will be found, that one of them cannot be cauſed to puſh the other without adhering to it, becauſe in that ſoft ſtate their ſurfaces are eaſily adapted to each other, and inſtantly increaſe the number of points of contact.

The appearance of ſparks between the links of a metallic chain, when an electric jar is diſcharged through it, may be explained

explained in a fimilar manner, without having recourfe to a power of repulfion, &c. for, in confequence of their figure, and of the inequalities of furface, the links cannot touch each other in more than a very few points, through which the electric fluid muft pafs; and though in thofe points the contact be perfect, yet the electric fluid either melts them or renders them red-hot, and of courfe affords the appearance of luminous fparks, in the fame manner, and for the fame reafon, which renders a very fine metallic wire red-hot, or fufes it, when an electric jar is difcharged through it; namely, becaufe it is not large enough to afford a free paffage to the electric fluid. So that if in the flender wire, where there is no interruption of continuity, the paffage of the electric power is rendered manifeft to our eyes, it may be evidently prefumed that the fparks may appear between the links of the chain, though thofe links may be in actual contact. That the light difappears when, by ftretching the chain, the points of contact are multiplied, needs no farther explanation. But the circumftance which contributes to the production of the fparks, is the adhefion of dirt or duft, or the partial oxydation of the furface of the links; confidering that chains for electrical purpofes are generally made of brafs or iron, which are very liable to a fuperficial oxydation.

With refpect to the laft argument, derived from the contraction and dilatation of bodies, we may obferve, with profeffor Prevoft, that the diminution of bulk does by no means prove that the component particles of bodies are not in immediate contact; for a perfon may eafily conceive an infinite variety of arrangements or difpofitions of the elementary particles, which will admit of contraction and dilatation, without the leaft interruption of contact. Thofe particles, for inftance, may be difpofed in the form of rings, which, by becoming more extended ovals, or more circular, will occafion an enlargement, or a contraction of the aggregate. The particles may be fuppofed to be arranged in rows, and thefe rows may be difpofed at certain angles with each other; fo that the bulk of the aggregate may become expanded or contracted according as thofe angles are enlarged or diminifhed; and fo forth. That fome fuch arrangement is not only probable, but does actually take place in moft bodies (whence it may be inferred to take place in all bodies) is clearly indicated by the cryftallization of feveral bodies; *viz.* a regular arrangement of their particles; as in zinc, bifmuth, frozen water, falts, &c.

Contact, *angle of,* is the angle HLM (*Plate* III. *Geometry*, *fig.* 51.) formed by the arc of a circle ML, with the tangent HL, at the point of the contact.

Euclid demonftrates, that the right line HL, ftanding perpendicular on the radius CL, touches the circle only in one point: nor can there be any other right line drawn between the tangent and the circle.

Hence, the angle of contact is lefs than any rectilinear one; and the angle of the femicircle between the radius CL, and the arc ML, is greater than any rectilinear acute angle.

This feeming paradox of Euclid has exercifed the wits of mathematicians: it was the fubject of a long controverfy between Peletarius and Clavius; the firft of whom maintained the angle of contact heterogeneous to a rectilinear one; as a line is heterogeneous to a furface: the latter maintained the contrary.

Dr. Wallis has a formal treatife on the angle of contact, and of the femicircle; where with other great mathematicians, he approves of the opinion of Peletarius. See Angle *of Contact.*

CONTAGION, frequently ufed as fynonymous with *infection*, the matter or medium by which certain difeafes are communicated from one individual to another.

Some writers confine the term *contagion*, in confequence of its derivation from *con* and *tango*, *I touch*, to the communication of thofe difeafes, which can only be transferred by actual contact of the fick, or of the palpable matter from their bodies; and apply the word *infection* to the communication of thofe other difeafes, which fpread by means of invifible effluvia, conveyed through the air, or adhering to articles of clothes, &c., conftituting what are called *fomites*. The diftinction is not important, nor is it philofophically accurate; fince there is an actual contact of a morbid matter, in all cafes of infection, whether vifible or not; and fome difeafes, as the fmall pox, are communicated both by palpable matter, and by imperceptible effluvia. Other writers have confined the two terms to more arbitrary fignifications. We are difpofed with Dr. Wilfon and others, to confider the word contagion as expreffing the morbid poifon, or the means of transferring a difeafe; and infection, as expreffing the operation of the poifon, or the act of communication of the difeafe. Treatife on Febrile Difeafes, vol. i. p. 433.

No mention is made of contagion in the writings of Hippocrates, and it is hence maintained by fome authors, that the ancients were altogether ignorant of its exiftence. It cannot be doubted, indeed, that many of the moft formidable difeafes, which are propagated by contagion, in modern times, were altogether unknown to the ancients: fuch are the fmall-pox, meafles, and fcarlet fever, among the acute; and the venereal difeafe, among the chronic contagions. Of the exiftence of contagion, therefore, the evidence which they poffeffed was comparatively fmall. From the number of the laws in the Mofaic code, however, forbidding all communication with perfons labouring under difeafes, which were deemed unclean, and from the caution with which intercourfe with foreign nations was precluded, it would appear that a general notion of that fpecies of contagion, which infects by actual contact of bodies, prevailed among the Jewifh people, at a very early period. (See Numbers, chap. xxxi.) And whatever might be the knowledge of profane writers on this point, they were certainly well acquainted with epidemic difeafes. But this does not imply a knowledge of the exiftence of contagion, fince even with the moft confirmed proofs of the exiftence of febrile contagions before them, phyficians have generally difputed, in the worft modern epidemics, whether contagion actually exifted or not. Livy, however, in defcribing the progrefs of an endemic fever, exprefsly mentions that contact of the fick excited the difeafe. "Et primo temporis ac loci vitio, et ægri erant, et moriebantur; poftea curatio ipfa et contactus ægrorum vulgabat morbos." Lib. xxv. cap. 26. But, although it be admitted that the exiftence of contagion was occafionally noticed by ancient writers, and was by more modern authors yet more generally known, its nature and mode of propagation were very imperfectly underftood, until the latter half of the eighteenth century; when the method of induction was applied to the inveftigation by fome medical philofophers, and more particularly by Dr. Haygarth.

Of that fpecies of contagion by which certain chronic difeafes are propagated by actual contact, little need be faid. Its exiftence is obvious in a palpable fecretion from the morbid part, and therefore the prevention of it, by avoiding contact with the difeafed, is clear and eafy. The difeafes in which fuch contagious matter is produced, are the venereal difeafe, the itch, the tinea capitis, or fcald head, the yaws, fivvens, &c. The hydrophobia would be incorrectly claffed with

with thefe difeafes, although it agrees with them in being propagated by contact of a poifonous fecretion.

In fome acute difeafes, which may be confidered as an intermediate clafs, being propagated both by contact and effluvia, there is not lefs evidence of the exiftence of contagion, as in the fmall-pox, chicken-pox, and meafles; becaufe by the conveyance of a portion of the fluid contained in the puftules of the former, and in the miliary veficles of the laft, (See Willan on Cutaneous Dif. p. 219.) the fame train of fymptoms has been excited in the perfons receiving it, as occurred in the perfons by whom the contagious matter was produced. But thefe difeafes have been ftill more frequently obferved to attack perfons, who have approached within a fhort diftance of the fick, where no contact took place; implying that the contagious matter, in an imperceptible form, was conveyed through the air, from the one body to the other.

The origin of the contagions, which produce thefe two claffes of difeafe, is a fubject of confiderable difficulty; and inquiries in regard to it have generally proved fruitlefs, or led the inquirer into abfurdities. By what concurrence of circumftances, or by what particular idiofyncrafy in any individual, a new animal poifon can be generated, which fhall excite a new and formidable difeafe, and propagate itfelf, and fpread fatality for centuries through the world, we are altogether unable to difcover. Yet in the hiftory of medicine we find new and unknown contagious difeafes fpringing up, and old ones, which had long prevailed, fuddenly difappearing. The fmall-pox, and the meafles, were firft defcribed by the Arabian phyficians, and the fcarlet fever firft fhewed itfelf in Italy in the fifth century. (See Willan on Cutaneous Dif. Order iii. p. 289.) The venereal difeafe was alike unknown to the ancients. The Plica Polonica feems to have made its appearence only in the laft century. And on the other hand the leprofy of the Jews, and other fpecies of leprofy, which raged in Europe in the 12th and 13th centuries, are fcarcely now to be met with: and we have a remarkable inftance both of the production and difappearence of a contagious difeafe in the Ephemera Britannica, Sudor Anglicus, or fweating ficknefs, as it was termed, defcribed by Caius and others. In fuch inftances, if it fhould happen at any time that no perfon labours under the difeafe, the contagion might be loft, and the difeafe for ever difappear, unlefs the caufes, which firft gave rife to it, fhould again concur to reproduce it.

The cafe is altogether different in refpect to moft of the fevers of that clafs, which are propagated by effluvia only, and in which no palpable poifon is generated. Such is the typhus, or fever with debility, which prevails, under different denominations, in the temperate climates. According to the circumftances of its origin, it has been termed jail-fever, camp, hofpital, and fhip-fever: and from the variety of its appearances, putrid, malignant, petechial fever, &c. and it is occafionally combined with other difeafes, along with which it is propagated, as with inflammation of the lungs, conftituting the peripneumonia typhodes of authors, and with a dyfenteric affection of the bowels, as in the camp-dyfentery. In thefe inftances the origin of the contagion has been obvioufly traced to circumftances of common occurrence; hence peftilential fevers of this clafs frequently arife fpontaneoufly, that is, independently of the propagation of an exifting poifon, which has been perpetuated either by fomites or infected perfons from its firft origin. It is probable that the plague itfelf belongs to this clafs, and is the common fever, rendered peculiarly malignant by climate, feafon, or other circumftances.

The contagion, by which thefe fevers are propagated, is generated in three ways;—by the confinement of the healthy animal exhalations or effluvia in a crowded, and ill ventilated place;—ftill more readily by the confinement of morbid effluvia, although the difeafe be not originally contagious; and 3dly, by the exhalations from putrifying dead animal matter.

1. Many facts have been recorded, which fhew that the natural effluvia of the living body, become the fource of contagious fevers, when accumulated and concentrated in clofe apartments. Mr. Howel and others, who efcaped from the black hole of Calcutta, were feized with typhus fever. Dr. Lind informs us, that in a frigate, which failed from North America, with a healthy crew, a malignant fever broke out before her arrival in England, during very bad weather, which affected a confiderable number of the men, and of which the furgeon's mate, boatfwain, and fome others died. "Thus," he remarks, "a feafoned found crew became infected, as it would appear, from the clofenefs or damp below, occafioned by the hatchway being kept fhut." (On Fevers and Infections, chap. i. § 2.) Sir John Pringle has obferved that the hofpitals of an army, not only when crowded with fick, but at any time when the air is confined, and efpecially in hot weather, produce a fever of a particular kind, and often mortal. "I have obferved the fame fort to arife," he adds, "in full and crowded barracks, and in tranfport-fhips when filled beyond a due number, and detained long by contrary winds; or when the men have been long kept at fea under clofe hatches in ftormy weather. Hofpital-fhips, for diftant expeditions, have for this reafon been generally deftructive both to the fick and their attendants. (Obf. on the Dif. of the Army, part iii. chap. 7.) But contagious fevers are much more readily produced, under circumftances of confinement, where uncleanlinefs alfo confpired: hence fuch fevers originate moft frequently among the poor, and even the moft fevere peftilence, when not imported, is generally to be traced to fome quarter chiefly inhabited by the poor.

2. Where people, labouring under any difeafes, are crowded together, more efpecially if the apartments are imperfectly ventilated, contagion is readily generated. Sir John Pringle remarks, that contagious fever "is incidental to every place, ill aired and kept dirty, that is filled with animal fteams from foul and difeafed bodies; and on this account, jails and military hofpitals are moft expofed to this kind of peftilential infection; as the firft are in a conftant ftate of impurity, and the latter are fo much filled with the poifonous effluvia of fores, mortifications, dyfenteric and other putrid excrements: nay, there is reafon to apprehend that when a fingle perfon is taken ill of any putrid difeafe, fuch as the fmall-pox, dyfentery, or the like, and lies in a fmall clofe apartment, he may fall into this malignant fever." Loc. Citat. It is very common, indeed, to obferve mild febrile attacks among the poor, which, though originating from cold or other caufes, become contagious in their courfe, in confequence of the confined and dirty fituations in which the patients lie.

3. Contagion occafionally originates from the putrifying effluvia of animal and vegetable matters. Thus it often happens that typhus fever fpreads itfelf over the adjacent country, when the dead are left unburied on the field of battle. Foreftus mentions a contagious fever, which raged at Egmont, in North Holland, occafioned by the putrefaction of a whale, which had been left on the fhore. And Senac gives an account of a malignant fever, excited by the offal of a city being accumulated without the walls. It was received

received into a ditch filled with water, and, while it was covered with the water, was not attended with any bad consequence: but when the quantity increafed, fo that it rofe above the furface, a dreadful fever fpread through the city, and its neighbourhood; fo that, where four hundred ufed to die yearly, the deaths were increafed to two thoufand. Willfon on Febrile Difeafes, loc. cit.

The moft important part of our inquiry refpecting contagion, relates to the mode and circumftances of its communication from individual to individual, and of its general fpreading, with a view to difcover the means of fuppreffing it, or preventing its extenfion. This inquiry is, of courfe, limited to the contagions which are foluble or diffufible in atmofpheric air; fince it is obvious that the indiffufible contagions may be avoided, by fhunning the contact of the difeafed. And it muft be premifed, that all the febrile contagions, whether of a fpecific origin, as that of fmall-pox, meafles, fcarlet fever, or malignant fore throat, or arifing from the cafual change of the animal effluvia, as that of typhus, jail and hofpital fever, and perhaps the plague, have been found, by experiments, to be propagated according to the fame laws, and to be fuppreffed by fimilar means.

Whenever a contagious epidemic difeafe prevails, a great general alarm is excited, in confequence of a notion, that the feeds of an evil fo generally deftructive muft be diffufed through the atmofphere at large; and that, if we ftir abroad, we breathe contagion at every ftep. This opinion has been promulgated by phyficians of high rank and authority; but recent obfervations have fhewn that it is erroneous: thus at once removing all grounds for this unneceffary alarm, and directing our attention to thofe means of precaution and prevention, which can alone effectually contribute to our fecurity. Dr. Lind long ago affirmed, after an extenfive experience in the great naval hofpital at Haflar, that the infection of malignant fever, in common with that of the plague, "extends to no great diftance from its fource."—"In the open free air, this infection does not appear to diffufe itfelf above fifty or fixty feet from its *nidus*." Chap. iv. fect. 2. With refpect to the plague, it has been well afcertained by phyficians, that its contagion does not contaminate the atmofphere in general, nor indeed to any great diftance from the fource of the poifon. Dr. Patrick Ruffell, who was in extenfive practice at Aleppo for many years, particularly during the plague of 1760, 1761, and 1762, ufed to adminifter medicines to great numbers ill of the plague, every day, out of a ftreet window, about 15 feet above the ground, even in June and July; and, being fhort-fighted, he examined the fores within four feet: yet neither his family, nor any inhabitant of the fquare where he lived, were infected by the contagion of fuch a number of peftilential patients: and he affirms that it never fpread in a large houfe, if communication were prevented. A numerous body of Franks live in Conftantinople, and are uniformly preferved from the plague, by obferving a few rules of cleanlinefs and *feparation*, while the Turks die of it in multitudes around them. De Mærtens, author of a hiftory of the plague at Mofcow, anno 1771, has fhewn that the contagion was diffeminated to a very fhort diftance through the air: a fact, which was demonftrated by the fuccefsful conduct of the committee of phyficians, appointed by the emprefs to attend the fick on that occafion. The juft inference from thefe obfervations is, that the plague is principally propagated by actual contact or clofe communication with the difeafed, or their clothes, furniture, &c. "Solo ægrorum et rerum infectarum, contactu communicabatur," fays Dr. De Mærtens, "atque atmofphæra contagium non fpargebat; fed faniffima femper fuit. Vifitando tam prope adftabamus illis, ut fola pedis diftantia inter nos et eos fæpe vix remaneret, et abfque alia quacunque cautela, quàm quod nec corpus neque veftes aut lectum tangeremus, a pefte immunes permanferimus. Linguam propius obfervando folebam linteum aceto communi imbutum naribus et ori admovere." Hift. Peft. Mofcueus.

In addition to fuch facts, which are ftated by phyficians of high refpectability, we have the fupport of direct experiments, made refpecting a contagion not lefs virulent and fatal than the plague itfelf, *viz.* that of the fmall-pox; by which the fhort diftance, to which the poifon is communicated through the air, is demonftrably proved.

Dr. O'Ryan, profeffor of phyfic in the college at Lyons, inftituted the following experiments, which we fhall relate in the words of Dr. Haygarth's tranflation: "I placed a large doffil of cotton, foaked in variolous matter, on the middle of an oval table, whofe leaft diameter was three feet. I feated fix children around it, three on each fide of the table, in fuch a manner that all were fituated within half a yard of the infectious cotton. This experiment was fometimes made in the open air, fometimes in the houfe. I took care to renew, every fecond day, both the variolous matter, and the fubftance which contained it. I alternately ufed the poifon taken from the inoculated and from the cafual fmall-pox; and I copioufly impregnated with it balls of cotton, wool, and filk. This operation, repeated during a whole week, morning, noon, and night, for an hour at each fitting, produced no effect.

"I then fent away the children, defiring the parents to acquaint me, in cafe any indifpofition appeared, and to bring them to me a fortnight afterwards, although no alteration fhould have taken place in their health. I declare that not only for that term, but for many fucceeding months, during which I took care frequently to vifit them, they all enjoyed perfect health. It was not till nine months after this time, that four of thefe children had a mild kind of fmall-pox.

"Having concluded from thefe experiments, that the children could not have efcaped infection; but becaufe the variolous matter might have loft that fpring and that degree of energy, which perhaps it may poffefs on arifing immediately from the human body, I placed a perfon, in the eruptive fever of the fmall-pox by inoculation, at the diftance of about half a yard from four children properly prepared: each expofure continued one hour, and was repeated daily for a fortnight, reckoning from the commencement of the fever till the puftules were become perfectly dry. Not one of the four received the infection. Two months afterwards, I inoculated three of thefe children: they had the diftemper in a very mild manner, and recovered without difficulty." Diff. fur les Fievres Infectieufes et Contagieufes. See Dr. Haygarth's Sketch of a Plan to exterminate Small Pox, vol. i. p. 79.

Again, proofs that the fphere of activity of febrile contagion is extremely limited in the air, have been greatly multiplied fince the inftitution of fever-wards and houfes of recovery, which were fuggefted by Dr. Haygarth, from the contemplation of fuch facts as we have juft detailed. The fever-wards, in the Chefter Infirmary, are fituated within thirteen yards of fome other wards of the building; yet, during a fpace of above twelve years, the contagion of fever was never known to extend itfelf from thence. And Dr. Currie relates, in a letter to Dr. Clark of Newcaftle, that contagious fever had not, during ten years, extended itfelf, in any one inftance, from the fever-wards, either in the Liverpool Infirmary or in the workhoufe, although the latter of thefe buildings has fometimes contained 1,400 perfons.

In

In like manner, the houfe of recovery, in Gray's Inn Lane, London, which ftands in a row, in contact with dwelling houfes on both fides, and which has had a conftant fucceffion of contagious fevers in its wards, has now (Dec. 1807) been open nearly fix years, and no fever has occurred in its neighbourhood during the whole period. Nay, it has been farther afcertained, in thefe wards and houfes, as well as in the habitations of the rich, that, in a clean well-aired room of a moderate fize, the contagious poifon is fo completely difarmed of its virulence, by dilution with frefh air, as rarely to excite the diftemper, even in nurfes, expofed to all the putrid miafms of the breath, perfpiration, and other difcharges. See Dr. Haygarth's Letter to Dr. Percival, on the Prevention of Infectious Fevers, 1801. Dr. Clark's Collection of Papers refpecting Fever-wards, Newcaftle, 1802. Reports of the Inftitutions for the Suppreffion of Contagious Fever, in Dublin, London, Manchefter, &c.

A fufficient number of facts, we truft, has been cited, to fhew that the popular opinion and apprehenfion are groundlefs, and that the moft malignant contagions are never conveyed to any great diftance through the atmofphere; but that they are, in fact, rendered inert and harmlefs, by diffufion in the open air, and even in the air of a well ventilated apartment. The neceffary inference is, that all peftilence is propagated by *near approach* to, or *actual contact* of, the difeafed, or by the *conveyance of the contagious poifon in articles impregnated with it.*

Dr. Lind remarks, in the effay before quoted, "by a fixed attention to this fubject for fome years paft, I am convinced, that the *body* of the difeafed, kept exactly neat and clean, is not fo liable to imprefs the *taint*, as his late wearing apparel, dirty linen, and uncleanlinefs of any fort about him, long retained in that impure ftate:—I fay, thefe laft contain a more certain, a more concentrated, and contagious poifon, than the newly emitted *effluvia* or excretions from the fick." There is no doubt that fuch *fomites* fpread and perpetuate many contagious difeafes among us. It is afcertained that cotton, hair, and wool, are the fubftances moft readily imbued with contagion, which becomes more virulent, when the air is prevented from having free accefs to them. If infected clothing, made of thefe materials, remain for fome weeks in a full clofe room, or locked up in chefts, and be then fold out during an unhealthy feafon, not only the wearers of it, but all who have intercourfe with them, are prefently affected, and contribute to fpread the difeafe. Thus the Europeans, fays Dr. Lind, have carried the fmall-pox to almoft all parts of the world, where their fhips have opened a trade; though the feamen in thofe fhips might not have been afflicted with it in their voyage. This poifon has been conveyed, in an old blanket, to nations of Indians, fome of whom it has almoft extirpated. In the year 1746, while the French fquadron, under the command of the duc D'Anville, paffed the fummer at Chebucto, now Halifax, an infectious fever prevailed among them, and cut off a great number of their men. On the return of the fquadron to Europe, feveral blankets and old clothes, which had been ufed in their tents and hofpitals, were unfortunately left behind. Thefe fatal receptacles of difeafe were foon after eagerly picked up by a party of Mimack Indians, who accidentally came to vifit the place, and who clothed themfelves with fome of them; others they carried home, and diftributed among their tribe. The unhappy confequence of which was the almoft total extinction of the Mimack nation; fcarce any of them furvived. The Englifh, upon traverfing the country next fummer from Annapolis Royal, were furprifed with finding the dead bodies and fkeletons of whole families lying unburied in their huts, until the neutrals, who alfo inhabited that country, and the neighbouring Indians informed them, that the Mimacks had been cut off by the French blankets. In feveral of their huts, thefe blankets were found, where not one of the family remained. (Lind, chap. iv. fect. 2.)

Dr. Willan remarks, on the fubject of fomites, that the houfes of the poor in London are often fo little taken care of, that in the apartments where contagious fevers have exifted, enough of the contagion remains, to infect all the inmates who fucceffively occupy the fame premifes; and he mentions fome particular houfes, in which the fomites of fever were thus preferved for a feries of years. (Reports on Dif. of London, p. 256.) The fame accurate obferver ftates, that the fcarlet fever, which, when epidemic, has often commenced in the eaftern extremity of London, and fpread weftward, though it may have been fometimes imported with infected goods brought from abroad, will be more frequently found to have originated from the large repofitories of old clothes, near the Tower, Eaft Smithfield, and Ratcliffe Highway. "During the laft year of my attendance at the Public Difpenfary," Dr. Willan adds, "I had reafon to think that a family in Wild-ftreet, Lincoln's-inn-fields, was infected with fcarlatina maligna by clothes bought in Monmouth-ftreet. More than fifty perfons in the adjoining houfes were foon affected with the difeafe, which afterwards traverfed Drury-lane, and fpread by Long Acre, and the ftreets connected with it, through feveral parifhes in Weftminfter." (On Cutan. Difeafes, p. 391.) Thus alfo, and not by the impregnation of the atmofphere, the fmall-pox, meafles, typhus, whooping-cough, itch, tinea capitis, &c. are perpetuated among us; and the febrile contagions are from time to time widely diffufed.

A great number of facts are on record, which ferve to fhew the extreme virulency of contagious poifons, which have been pent up and accumulated in clofe places, and have contaminated articles of clothing under fuch circumftances. In thofe periods of our hiftory, when a lefs enlightened humanity was carelefs of the health of criminals, and prifoners in general, the occurrence of what were called *black affizes* was frequent in different parts of the country. The criminals, brought out of filthy and infected cells, with their clothes fully imbued with *fomites*, often fpread a mortal contagion through the court, affembled for the purpofes of juftice. "The moft pernicious infection next to the plague," fays lord Bacon, "is the fmell of the jail, where the prifoners have been long, and clofe, and naftily kept, whereof we had in our time experience, twice or thrice, when both the judges, who fat upon the jail, and numbers of thofe who attended the bufinefs, fickened upon it and died." One of the inftances, to which lord Bacon alludes, was doubtlefs at the fatal affizes, held at Oxford, in the year 1577; of which Stow gives the following account in his Chronicle. "On the 4th, 5th, and 6th days of July, were the affizes held at Oxon, where was arrainged and condemned Rowland Jenkins for a feditious tongue; at which time, there arofe amidft the people fuch a damp," (an expreffion in the language of thofe days, fignifying bad air) "that almoft all were fmothered, very few efcaped that were not taken, here died in Oxon 300 perfons, and fickened there, but died in other places, 200 and odd." Similar infections took place at the black affizes at Taunton, and alfo at thofe of Exeter, in 1586; at which laft fome Portuguefe failors fpread the contagion, having been confined, without change of clothes, "in a deep pit and ftinking dungeon." The laft black affizes at the Old Bailey were held fo late as the year 1750. On the 11th of May the prifoners, who were brought into court, fome of them labouring under jail-fever, had been kept nearly

nearly a whole day in fmall, clofe, and crowded apartments. All the individuals, who were feated in the courfe of a draught of air, paffing from the prifoners to an open window, were feized with the diftemper: the reft efcaped. The lord mayor and thofe of the bench who fat on his left hand were infected; while the lord chief juftice, and the recorder, who fat on his right, efcaped. Many of the Middlefex jury, on the left fide of the court, died of it, while the London jury, who fat oppofite to them, received no injury. On the 13th of May died alderman Lambert; on the 14th R. Cox, under-fheriff; on the 17th baron Clark; on the 19th fir T. Abney, juftice of Common Pleas; T. Otway, barrifter; W. Baird, ditto; W. Sharplop, and four others; on the 20th, the mayor and eight of the Middlefex jury. See Gentleman's Magazine.

Thefe facts, while they evince the active virulence of contagion, accumulated in fomites in unventilated and crowded rooms, afford, at the fame time, evidence, that, except where it is carried at once by a direct draught of air, its tendency to diffufe itfelf, and its power when diffufed, through the atmofphere in general, is very limited. It is only under fuch circumftances of concentration, that the virulence of contagion is ever fo great, as to be infectious at more than a few feet diftance. It has already been fhewn, that when arifing from the *body* of the fick, either in the open air, or in well ventilated rooms, its influence is confined to a very fmall diftance.

Before we point out the means of prevention from contagious difeafes, which thefe facts and obfervations fuggeft, it will be neceffary to attend more particularly to the circumftances of individual infection.

All individuals are not equally liable to be infected by contagion; and fome, though the number is extremely fmall, efcape altogether. Thus, there are perfons who have gone through a long life without taking the fmall-pox. The conftitution, however, appears occafionally to undergo fuch a change, in the courfe of life, that thofe who, in earlier years, had refifted the action of this contagion, have received it on fome future expofure to its influence. There is a confiderable difference, too, in the infectious degree of different contagions: thus, that of the whooping-cough affects a much fmaller proportion of mankind, than that of the meafles, or fmall-pox; and that of the fcarlet fever excites the difeafe in children much more frequently than in adult perfons. Again, the contagion, in fome inftances of peftilence, and, we believe, in the plague in general, is more fatal to the vigorous and middle-aged, than to the old on the one hand, or to children on the other. We were informed by a gentleman, who refided at Malaga, during the late peftilence at that place, that the appearance of the town, after the ceffation of the fever, was remarkable, in confequence of the fmall number of ftrong, active, and well-looking people, who were to be feen; old people and children conftituting almoft the whole of the remaining population. In the typhus, or contagious malignant fever of this country, Dr. Haygarth infers, from accurate deduction, that about eight in 168 efcape infection, though fully expofed to the contagion; which is lefs than *one* in *twenty-three*. (See Letter to Dr. Percival, p. 31.) It has been calculated that nearly the fame number, or one in 20, is naturally exempted from the contagion of the fmall-pox. Upon this datum it was alfo calculated, that if two perfons together have efcaped the difeafe, the probability, that they were never both expofed to an *infectious quantity* of the poifon, is above 400 to one; if three in a family have efcaped, above 8000 to one. (Haygarth's Inquiry how to prevent the Small-pox, p. 24.) This mode of reafoning is equally applicable to typhous infection.

Now, as great numbers of people, vifitors, nurfes, &c. breathe the air of the chambers of patients, ill of contagious fever, and yet efcape infection, it is obvious that in almoft all thefe cafes, (at leaft in 22 out of 23) a fufficient *dofe* of the poifon had not been received. This leads us to an important inquiry, into the dofe of typhous contagion requifite to produce infection. The quantity will vary, no doubt, according to different circumftances, but the obfervations of Dr. Haygarth, and of the phyficians of fever-wards, and houfes of recovery, have enabled us to judge with fome accuracy of the limits of this variation. There appears to be a ftrict analogy between contagious miafms and other poifons. The larger the dofe of a poifon or drug, the greater in general is the effect which it produces. Many of the moft powerful and falutary medicines, when taken in too large a quantity, are poifons, as opium, antimony, mercury, foxglove, hemlock, &c. And, on the other hand, even arfenic itfelf, the moft virulent and unmanageable of all poifons, has, by the fkill and attention of phyficians, been reclaimed from the clafs of mifchievous fubftances, and by a diminution of the dofe is juftly held to be a fafe and ufeful remedy. Farther, in different conftitutions, and in different maladies, there is a certain degree of variety in the operation of any drug. Thus four or fix times the dofe, *e. g.* of antimony or mercury, may be required for one patient more than for another, or for the fame perfon in different difeafes. In the fame way the mifchievous quantity of infectious miafms admits of fome variation.

It is clear, from the collected obfervations of Dr. Haygarth, and of thofe active and experienced phyficians whofe correfpondence he has publifhed, not to mention the experience which fever-wards have lately afforded, that in a large, airy, and clean apartment, few or none even of the moft intimate attendants catch the difeafe, where the patient labours under infectious fever. The nurfes themfelves, expofed to the effluvia of the excrements, and perpetually near, and often in contact with the fick, neverthelefs hardly ever receive infection. The atmofphere of a room where contagion is generated, if cleanlinefs and ventilation are employed, may therefore be breathed for a long time with impunity. And it is not lefs clear, that an atmofphere ftrongly impregnated with contagion, may be breathed, for a fhort time, with the fame impunity. If we compare the numbers who efcape infection after being expofed to breathe a contagious atmofphere, with the fmall number who are naturally not fubject to receive contagion, this propofition muft be obvious. But to ftate facts. "During four years attendance in the hofpitals of Edinburgh and London, and afterwards during thirty-one years in private practice in Chefter, and fourteen years and a half in the Chefter Infirmary, and three years at Bath, I have been," fays Dr. Haygarth, "in the habit of breathing air ftrongly impregnated with the infectious miafms of fever. In many, very many, inftances, I have vifited patients ill of infectious fevers, in fmall, clofe, and dirty rooms: yet never but once, above thirty years ago, had a fever. The phyficians of the Manchefter Infirmary for many years, and particularly during the late widely-fpreading epidemics in that large and populous town, have, with great fortitude and humanity, conftantly vifited the home patients; that is, they have, in innumerable inftances, breathed the moft peftilential air, in the moft concentrated ftate. Their and my fafety manifeftly proceeded from this circumftance; we remained but a fhort time in the patients' room. We did not refpire an infectious dofe of the poifon." (Let. to Dr. Percival, p. 40.) We could multiply evidence

upon

upon this point to an indefinite extent, but the general fafety of medical men under fuch circumftances is fufficient to prove, that air ftrongly impregnated with infectious miafms may be breathed for a fhort time, and air weakly impregnated for a long time, without any injury. We might hence be almoft led to believe, that the poifonous miafms do not generate a fever, till they have been refpired without interruption, for feveral days together: and it is not improbable that, in fome perfons, fuch an accumulated quantity of the poifon may be required.

There are, however, other facts which prove that this is by no means always the cafe. Infection is occafioned fuddenly, in fome inftances, and from a very fhort expofure to a peftilential air. Whether this is owing to peculiar fufceptibility of the individual, or to the particular mode of receiving the contagious effluvia, is doubtful. The writer of this article, about fix years ago, vifited a poor family, of four perfons, lying in the fame bed, in an exceedingly clofe and dirty apartment, ill of contagious fever. He always had the precaution to throw open the window on entering the room, to ftation himfelf between the window and the bed, whilft he examined the fick, and to remain but a fhort time with them. He had repeated his daily vifits during a week, and with impunity, when he was at length accompanied by another phyfician, who defigned to admit the patients into the Houfe of Recovery, juft then opened in Gray's-inn-lane. The latter took no precaution, but examined the fkin of the fick minutely and clofely, ftanding on that fide of the bed towards which the air from the window impelled the contagious effluvia, and fo near as to receive thefe effluvia and the breath in the moft concentrated ftate. He took the infection, and his fever proved fatal. Here the infection of this excellent phyfician was attributable only to the full dofe of the poifon, which his incautious zeal induced him to inhale. In moft cafes, as in this, where a fudden infection takes place, a difagreeable fenfation is excited at the moment of expofure, which different perfons have defcribed differently. Some have felt a fharp tafte in the mouth, as if blue vitriol were diffolving in it, but which no wafhing or gargling could remove. Others have compared the firft impreffion to that of an earthy exhalation from a newly-opened grave, the fenfation extending down to the ftomach, fometimes exciting inftantaneous ficknefs and fhivering. Dr. Haygarth mentions that two of his patients, who were phyficians, were infected fuddenly by a fhort expofure. One of them thought that he caught the fever by creeping behind, in order to affift, his patient; the other by infpecting morbid fæces. In both thefe cafes, the expofure was fuch as might probably afford a full dofe of the contagion. Dr. Lind is of opinion, that, in thefe difeafes, the ftools, efpecially if very fœtid, are moft communicative of contagion; next to thefe the breath; and laftly the effluvia from the body.

The activity of contagion is not always proportionate to the appearances of malignancy in the difeafed. Sometimes only one man in a fhip may be feized with the *petechial* or with the *yellow* fever, fays Dr. Lind, while all the reft continue unaffected. And the moft malignant cafe of fever, that we ever witneffed, did not infect any of the family, though in a clofe and fmall houfe. And on the contrary, we have feen fevers, of the mildeft defcription, which fpread extenfively: fo that we fully coincide with Dr. Lind in his obfervation, that "fevers have often no peculiar characteriftic fymptom, by which they are known to be infectious:" and again, when he fays, "in fome this fever will be more fevere, in others more mild, and often moft of the fick will be able to fit up through great part of the day, which cannot be urged as an argument againft the infection, but only as a proof of its mildnefs." (Loc. cit. § v.) It is obvious, therefore, that great caution fhould be ufed in pronouncing fevers *not* infectious.

The period at which different fevers begin and ceafe to generate contagious effluvia is not abfolutely afcertained. It feems moft probable that in eruptive fevers there is no contagion till the eruption appears; and that contagion remains fo long as any fcab remains on the fkin. This is clearly the cafe in fmall-pox.

The latent period of contagion, as Dr. Haygarth terms it, or the period which elapfes between the expofure to contagion and the firft appearance of the difeafe which enfues, is afcertained with tolerable accuracy in refpect to the fmall-pox; but in typhous cafes it appears to be extremely irregular. The fmall-pox from inoculation ufually commences on the eighth or ninth day after the operation. Thus, of 810 inoculated cafes, in 519 fever commenced before the ninth, and 291 on or after the ninth day. But from the teftimony of Drs. Woodville, Clark, and Currie, the eruptive fever fometimes commences fo early as the fifth day after inoculation; and three cafes are related by Dr. Clark where it commenced fo late as the 16th, 17th, and 23d day. The latent period in the cafual fmall-pox is fomewhat longer than in the inoculated; moft commonly from 10 to 16 days. (See Haygarth, Sketch, &c. before quoted.) The latent period of the contagion of meafles is from 10 to 14 days. (Willan on Cutan. Dif.) But the latent period of typhous infection is much more irregular, and often much longer. Of a large number of cafes ftated by Dr. Haygarth, more than half commenced between the 17th and 33d day after expofure, a great proportion after the 27th, and almoft all between the 20th and 60th. (See Letter to Dr. Percival, p. 20. *et feq.*) The fever occurred in only five inftances before the 10th day. So that on the whole, it appears, that the latent period of typhous infection varies from a few days to two months. (Ibid. p. 68.)

This latent infection is probably often allowed to lie long dormant, or is excited into action at an earlier period, according to the occurrence or non-occurrence of circumftances which may render the conftitution lefs capable of refifting its action. Thus perfons who had fome time previoufly been expofed to the influence of contagion, have been immediately taken ill upon being wet with rain, or on expofure to a cold and damp air, or after a debauch, or other fuch debilitating caufes. During the prevalence of a peftilence, it has been obferved that expofure to the damps of evening, efpecially in warm countries, is extremely dangerous. And Dr. Chifholm remarks, that thofe who were addicted to the abufe of intoxicating liquors, were moft fubject to the fever of Grenada. From the great length of time, indeed, which the contagion of fever often lies dormant, we may infer, with Dr. Lind, that it is probable, that, without the influence of thefe cafual exciting caufes, the contagion might never, in fuch inftances, have affected the conftitution.

Prevention of infection. The circumftances under which contagion is generated, and the modes in which it is conveyed and propagated, being underftood, the means of preventing its production, and of avoiding its pernicious influence, when it exifts, will readily fuggeft themfelves. Inftead of omitting all attempts at avoiding the contagion of a peftilence, as altogether fruitlefs, where the very pabulum of life, the common air, is charged with poifon; or of adopting the dangerous expedient of clofing up every avenue of ventilation in our houfes (Wilfon on Fevers, p. 458. vol. i.), or of employing ufelefs and abfurd meafures of precaution, we fhall

ſhall proceed upon rational grounds to the uſe of effectual preventives. All thoſe who contend that the ſpreading of contagion depends upon ſome peculiar ſtate of the atmoſphere, admit that it is ſome *occult* quality in the air; that it is neither the heat nor the cold, the moiſture nor the dryneſs, nor any other ſenſible condition of it, with which peſtilence is connected. The great Sydenham, after having noted attentively the ſtate of the atmoſphere and the weather, in different years, during which epidemics of different kinds prevailed, was obliged to confeſs that he could perceive no difference in ſeaſons in which different contagious diſeaſes occurred. He, therefore, had recourſe to a ſuppoſition equally gratuitous, that ſome unwholeſome exhalations from the earth were the ſource of peſtilential diſeaſes.

But when it is conſidered, that contagion *originates* in accumulated and confined animal effluvia, and is *communicated* either to thoſe who approach, or come in contact with the ſick, or by means of ſubſtances impregnated with contagious matter, and in theſe ways only, the means of prevention are obvious.

With reſpect to the caſual origin of contagion, it is ſcarcely neceſſary to ſay, that cleanlineſs and ventilation, as they preclude the confinement and accumulation of the animal effluvia and ſecretions, will infallibly prevent the generation of the poiſon.

Where contagion exiſts, its farther communication may be prevented by avoiding contact or approach to the ſick, and by confining the patient to a ſeparate room, in which, if it be kept clean, and well ventilated, it has already been ſhewn, that the contagion will be inert, at a ſhort diſtance from the ſick; and therefore that the neceſſary attendants, and medical viſitors, will receive no injury from reſpiring the air within it. In this way contagion has been prevented from ſpreading in large ſchools, and other places, where a number of people live together, as in workhouſes and hoſpitals, of which ſome examples have been already given. Dr. Haygarth's rules for the prevention of infection, ſeem to compriſe all the requiſite means to be adopted in houſes where contagious fever exiſts; they are the following.

Rules to prevent infection.

"1. As ſafety from danger entirely depends on cleanlineſs and free air, the chamber-door of a patient, ill of an infectious fever, eſpecially in the habitations of the poor, ſhould never be ſhut; a window in it ought to be generally open during the day, and frequently in the night. Such regulations would be highly uſeful both to the patient and nurſes; but are particularly important previous to the arrival of any viſitor.

"2. The bed curtains ſhould never be drawn cloſe round the patient; but only on the ſide next the light, ſo as to ſhade the face.

"3. Dirty clothes, utenſils, &c. ſhould be frequently changed, immediately immerſed in cold water, and waſhed clean when taken out of it.

"4. All diſcharges from the patient ſhould be inſtantly removed. The floor near the patient's bed ſhould be rubbed clean every day with a wet mop or cloth.

"5. The air in a ſick room has, at the ſame time, a more infectious quality in ſome parts of it, than in others. Viſitors and attendants ſhould avoid the current of the patient's breath,—the air which aſcends from his body, eſpecially if the curtains be cloſe,—and the vapour ariſing from all evacuations. When medical or other duties require a viſitor or nurſe to be placed in theſe ſituations of danger, infection may be frequently prevented by a temporary ſuſpenſion of reſpiration.

"6. Viſitors ſhould not go into an infected chamber with an empty ſtomach; and, in doubtful circumſtances, on coming out, they ſhould blow from the noſe, and ſpit from the mouth, any infectious poiſon which may have been drawn in by the breath, and may adhere to thoſe paſſages." (See Letter to Dr. Percival, p. 73. *et ſeq.*)

By obſerving theſe rules, not only numerous viſitors, but the medical attendants, and the nurſes themſelves, who frequently move and otherwiſe aſſiſt the ſick, in fever-wards, and the wards of houſes of recovery, entirely eſcape infection. This is proved, with ſcarcely any exception, in all the inſtitutions of this ſort throughout England and Ireland. During the laſt four years (the writer ſpeaks from perſonal obſervation) only one inſtance of infection ſeizing a nurſe in the London Houſe of Recovery, occurred, and, in that caſe, ſhe imprudently ſlept in a bed, juſt quitted by a convaleſcent, who had left the houſe, without changing the linen. By the ſame rules, Dr. Haygarth arreſted the progreſs of a ſcarlet fever and ſore throat in a ſchool, containing 37 boarders, at a time when Wincheſter and other great ſchools were diſperſing their ſcholars on account of this moſt contagious diſtemper, which had ſpread alarmingly among them. Not one was infected after the plan of ſeparation in an unviſited room was adopted, although all the boys remained in the ſame houſe. (Let. to Dr. Percival, p. 81.)

Contagion may, however, be extenſively circulated by *fomites*, i. e. attached to clothing, furniture, and other articles, which mode of communication is, perhaps, the moſt to be apprehended, during the prevalence of an epidemic malady. Hence the ſevere laws of quarantine have been enacted, in order to preſerve this country from the contagion of foreign peſtilence, which might be imported with the articles of commerce. And it is not leſs neceſſary, during times of internal peſtilence, to be watchful in regard to this point. It is not, however, by a ſlight and brief expoſure to contagious miaſms, that ſubſtances are ſufficiently imbued with them, to communicate infection. Thus it is, on the whole, well aſcertained that the clothes of viſitors do not acquire a peſtilential quality, ſo as to infect others. Upon this point, the experience of ſeveral obſerving practitioners coincides. Dr. Clark of Newcaſtle affirms, that in eighteen years practice, he never communicated the contagion of ſmall-pox, nor of the ſcarlet fever, with ulcerated ſore throat, to any one, even to children in his own family, although he had frequently, on the ſame day, viſited many patients in thoſe diſeaſes, and in the moſt malignant ſtages of the latter, and afterwards had intercourſe with other children liable to receive them. Mr. Henry adduces his own experience, during nearly forty years, in Mancheſter, in teſtimony of the ſame fact, in regard to the contagion of ſmall-pox. And the teſtimony of ſeveral other practitioners is equally ſtrong, as to the non-conveyance of this contagion by their clothes. Now, whatever is true of the contagion of ſmall-pox, and of ſcarlet fever, is ſtill more deciſive as to typhous infection, which is leſs powerful than either. (See Haygarth, Sketch of a Plan, &c. pp. 369, 386, 404, &c.) Subſtances do not become ſufficiently impregnated with the poiſon, in clean and ventilated places, except by being a conſiderable time in contact with, or very near the ſick, as the bed in which the patient lies, or the linen he wears; theſe *fomites* are chiefly produced in cloſe and dirty places, where the contagion is concentrated by accumulation and confinement, as in the cells of jails, or in the apartments of the poor; in which caſes, the utmoſt virulence of the poiſon is brought forth.

Where contagion of this degree of activity is produced, and is combined with articles of clothing and furniture, &c. the mere act of ventilation, which effectually prevents its

its deleterious action, when arising from the body of the sick, is altogether inadequate to destroy its power in these *fomites*. Hence various means have been devised, in all ages, for annihilating contagion. Among these, fire has been most generally employed, more especially with a view of fumigating, or applying the smoke or vapours from different substances, to the source of the poisonous miasms. Hippocrates and Acron of Agrigentum, believing the air to be the medium of infection, are said to have ordered large piles of wood to be burnt in the streets and infected parts of Athens, by which means they stayed the plague in that city. (Aetii *Tetrab.* Plutarch, de Isid. et Osir.) But however useful the fumigation of *fomites* may be, it does not appear to be of any utility when employed in the atmosphere in general. In the year 1721, the plague raged at Toulon with such violence, that in the space of ten months it destroyed about two-thirds of its inhabitants. Many having insisted upon fires being made in different parts of the city, the public records were consulted, and it was there found that, on a similar occasion, the same means had been tried without success. The experiment, however, was repeated. Wood was laid before every house, and at the sound of a bell, all the fires were lighted, by which the city was involved in a thick smoke for nearly a whole day. The plague, however, suffered no abatement. The same measure was resorted to both at Marseilles and London, when the plague raged in these cities, with no better success. Nay, after the fires had been kept burning for three days in London, on the night which succeeded, no less than 4000 died, although not more than 12,000 had been destroyed during the preceding three or four weeks. (Wilson on Feb. Dis. vol. i. p. 464.)

There is no doubt, however, that contagion, adhering to clothes and furniture, may be effectually destroyed by the vapours from various combustible and volatile substances. Dr. Lind recommends the fumes of tobacco to be dispersed through the cells and infected apartments, in prisons and ships, as well as for the purification of infected articles; he also advises the exposure of fomites, to the fumes of sulphur, from a charcoal fire, as an efficacious mode of purification. But he is perfectly convinced, he says, from long experience, that even the simple heat of a *close confined* fire, or the heat of an oven, is a destroying power which "no infection whatever can resist." The efficacy of gun-powder was ascertained by an accident, and Dr. Lind afterwards used it in wards where fevers were received, every morning. In a ship of war, a contagious fever prevailed, which had destroyed sixty men; when, in an engagement with the French, twenty-five barrels of gun-powder were fired on board of her during the action; and, to the surprise of her officers, none of her men were afterwards attacked with fevers.

Some strong smelling substances, as camphor, the vapours of juniper, and of Cascarilla bark, &c. have been occasionally resorted to as preventatives from contagion; but the power of these substances is very questionable, and they may be, perhaps, negatively prejudicial, as their aromatic odour may conceal the smell of bad air in the room of the sick, and thus prevent effectual measures of safety from being employed.

The most efficacious of the means which we possess of destroying contagion in fomites, seem to be the fumes of the mineral acids. The vapours of vinegar, and those of the sulphureous acid, have been long used with some degree of success; but those of the muriatic, and still more, perhaps, those of the nitrous acid, appear to be complete antidotes to accumulated contagion. The evidence of the efficacy of the nitrous acid fume, in purifying infected places and substances, which was a few years ago laid before the House of Commons by Dr. Carmichael Smyth, was such as to induce that house to vote a national donation of five thousand pounds to him for the discovery. This vapour is easily obtained, by mixing with powdered nitre a little of the strong acid of vitriol or sulphuric acid; the latter combines with the potash, the base of the nitre, expelling at the same time the nitrous acid in fumes. (See Dr. C. Smyth's treatise on the subject.) The vapour of the muriatic acid may be obtained in a similar manner, by using common sea or rock-salt, instead of nitre.

Where contagion has been long pent up in close cells or rooms, it is apt even to adhere to the walls. In such cases, white-washing with hot or newly slaked lime, is an efficacious aid of the acid fumigations.

It is a curious fact, and perhaps wholly unaccountable upon any theory of the propagation of contagion, that pestilential diseases, after running an indefinite course, notwithstanding all the measures adopted to restrain their progress, frequently cease spontaneously, at a time when the walls of the houses, furniture, &c. must still be supposed to be highly impregnated with the contagion. The fact is authenticated by Dr. Russell, Dr. Lind, and several other physicians of equal respectability. The cessation is not connected with any sensible changes in the atmosphere. Warm weather is perhaps, on the whole, but not without many exceptions, more favourable to the production of contagious diseases, than cold weather. But the worst fevers have often raged in the coldest seasons, as did the plague in London; and there have been instances of the plague suffering a check as the weather grew warmer. (Wilson on Feb. Dis. p. 448.)

During the prevalence of a contagious epidemic, temperance and regularity, and care in avoiding all causes of debility, (such as cold damp air, &c.) the use of the cold bath, and the preservation of an equal state of mind, are great personal preservatives. The general alarm which prevails during those periods of public calamity, is not among the least of the causes which contribute to extend the evil. It would be, therefore, injudicious to condemn the use of camphor, rosemary, and other aromatic substances, or carrying a quill filled with quicksilver, or other amulets, about the person, since whatever tends to inspire confidence in the mind, contributes to the security of the body.

CONTARII, in *Antiquity*, a kind of horsemen, whose chief armour was the *contus*, a kind of long spear.

CONTARINI, Gaspard, in *Biography*, a cardinal of the church of Rome, was not more celebrated as a divine than as a politician. He flourished in the Venetian territories, and was nominated from that republic as ambassador to the emperor Charles V., after which he was raised to a considerable station in the government of his country. He was ambassador also to Rome; and when pope Clement VII. surrendered to the imperial army, a commission was given to Contarini to negociate for the liberty of the pontiff. In 1535, he was created cardinal by pope Paul III.; and in 1541, he was appointed legate to Germany, and with the other legates was appointed to preside at the general council, which was afterwards held at Trent; he was, however, sent legate to Bologna, before that assembly met, where he died at the age of 59, in the year 1542. He was author of many works, and on various topics, in which he displays considerable talent, and a mind superior to the times in which he lived. The principal pieces are "De Immortalitate Animæ," "De Septem Ecclesiæ Sacramentis," "De Potestate Papæ," "De Prædestinatione," "De Libero Arbitrio," and "Confutatio Articulorum Lutheri."

Contarini, Vincent, a confiderable fcholar in claffical literature and antiquities, was born at Venice, in 1577, and attained the profefforfhip of the Greek and Latin languages at Padua, which he held with great reputation till the year 1614, when he retired to Rome. From whence, taking a journey into Iftria, he fell ill, and died at Venice in the prime of life, in 1617. The works by which he is chiefly known are "De Frumentaria Romanorum Largitione," and "De Militari Romanorum Stipendio." Moreri.

CONTARINO, Cav. Giovanni, an hiftorical and portrait painter, who was born at Venice in the year 1549, and who ftedfaftly purfued the folid and pure ftyle of Titian, notwithftanding the pernicious example of almoft all his rival compatriots, who, lofing the remembrance of thefe glowing and rich tints which had fo long been the boaft of the Venetian fchool, had adopted a manner in which the lights were fo extravagantly contrafted by the moft obfcure and cutting fhadows, as to give to their pictures the appearance and gloom of midnight reprefentations. The principal works of Contarino are at Venice, and evince, independent of the beauties of colouring, a very competent knowledge of fore-fhortening and the *fotto in fu*, with an excellent tafte of compofition. One of his beft and greateft performances is the ceiling of the church of St. Francifco di Paola, where, in the centre, he painted the Refurrection of Chrift, and on each fide the Annunciation and Nativity, together with the Evangelifts and the four Doctors of the Church. He executed feveral confiderable works for the court of the emperor Ridolfus II., who conferred on him the honour of knighthood. His portraits bore fo ftrong a refemblance to nature, that one of them, reprefenting Marco Dolce, is faid to have deceived his dogs and other domeftic animals, who leaped up to the picture, fuppofing it their mafter himfelf. This artift died in the 56th year of his age, 1605. Lanzi, Storia Pittorica.

CONTAY, in *Geography*. See Conty.

CONTCHOUDSONG, a town of Afia, in the country of Thibet; 380 miles E.N.E. of Laffa. N. lat. 30° 20′. E. long. 97° 29′.

CONTE, del, Jacopino, in *Biography*, was born at Florence in 1510, and is faid in his youth to have received fome inftructions in painting, in the fchool of Andrea del Sarto. Having completed his ftudies, he foon gave proofs of fuperior talents, both in hiftorical and portrait painting. Rome, whither he was invited under pope Paul III., was the theatre of his labours, and he was employed to paint the portraits of that pontiff and of his fucceffor Clement VIII., as well as thofe of the cardinals, the ambaffadors, and other nobles of the court. In hiftorical painting, he had no lefs fuccefs; and the frefcoes, which he executed in the church of St. Giovanni Decollato, rank him amongft the leaft affected or extravagant of the imitators of Michelangelo. An altar-piece in the fame church, reprefenting the taking down from the crofs, a compofition of many figures, is confidered his *chef-d'ouvre*. He died at Rome in 1598. Baglione.

Conte, del, or Faspi, Guido, an artift who was born at Carpi, in the ftate of Modena, in the year 1584, and was the firft inventor of the *fcagliola*, a fpecies of compofition, or pafte, with which the fineft marbles are with facility imitated, and which acquires fufficient hardnefs to bear a polifh. Some of the works of Guido, particularly two altars, are ftill exifting at Carpi, where he died in the year 1649.

This art has fince been brought to fuch a degree of perfection in feveral parts of Italy, that not only the fineft marbles have been counterfeited, fo as occafionally to deceive the beft judges; but likewife bas-relievos, vafes, medals, and even pictures of great beauty, have been produced; info-much that it is become an article of commerce. (See Scagliola.) Lanzi, Storia Pittorica.

CONTEMPLATION, an act of the mind, whereby it applies itfelf to confider, reflect on, and admire, the wonderful works of God, nature, &c.

Contemplation is the height of perfection of the myftic divines. See Mystic.

CONTEMPORARY, or Cotemporary, a perfon, or thing, of the fame time, or that exifted in the fame age, with another. Socrates, Plato, and Ariftophanes, were contemporaries: the beft hiftories are thofe of contemporary authors.

CONTEMPT, in the *Doctrine of the Paffions*, is a fpecies of hatred, expreffing in its general fenfe difapprobation or averfion, which arifes from the mere confideration of a worthlefs object, efpecially if it be propofed to us under a pretence of its poffeffing excellence, or from mifconduct in things not of themfelves vicious; as, where a perfon either acts below his ftation and character, or affects to do that for which he is not qualified. It is oppofed to efteem or to emulation. This is one of thofe paffions which in oratory belongs to demonftrative difcourfes. Thus Cicero (De Orat. lib. ii. c. 12.) endeavours to expofe Cæcilius, and bring him into contempt of the court, for pretending to rival him in the accufation of Verres, for which he was altogether unfit.

Contempt, in *Law*, is difobedience to the rules, orders, or procefs of a court, which hath power to punifh fuch offence; and a man may be imprifoned for a contempt done in court, but not for a contempt out of court, or for private abufe. But for contempt out of court, an attachment may be granted. Cro. Eliz. 689.

Attachment alfo lies for contempt to the court, to bring in the offender to anfwer on interrogatories, &c. and if he cannot acquit himfelf, he fhall be fined. 1 Lill. 305. If a fheriff, being required to return a writ directed to him, doth not return the writ, it is a contempt: and this word is ufed for a kind of mifdemefnor, by doing fomething that is forbidden, or not doing what is commanded. 12 Rep. 36. As the degrees of this crime vary, the punifhment is lefs or greater; fometimes a mere fine, and fometimes imprifonment.

If a defendant in chancery, on fervice of a fubpœna, does not appear within the time limited, by the rules of the court, and plead, demur, or anfwer to the bill againft him, he is then faid to be in contempt; and the refpective proceffes of contempt are in fucceffive order awarded againft him: thefe are attachment; attachment with proclamation; a commiffion of rebellion; and, finally, a fequeftration. It is a contempt to inftitute a fuit fictitioufly, though the demand is real, either to hurt any perfon, or to get the opinion of the court.

The moft remarkable inftances of contempts may be reduced to the following heads, *viz.* contempts of the king's writs; contempts in the face of a court; contemptuous words or writings concerning the court; contempts of the rules or awards of the court; abufe of the procefs of the courts; and forgeries of writs and other deceits tending to impofe on the court. 2 Hawk. P. C. c. 22. § 3. For an account of the contempts that are punifhed by attachment; fee Attachment.

Contempts or mifprifions (fee Misprision) are offences againft the king and government: fuch is the mal-adminiftration of high officers, in public truft and employment, ufually punifhable by the method of parliamentary impeachment, and fubject to the penalties of banifhment, imprifonment, fines, or perpetual difability: fuch is alfo the offence of embezzling the public money; and fuch are thofe con-tempts

tempts of the executive magiftrate, which demonftrate themfelves by fome arrogant and undutiful behaviour towards the king and government. Contempts againft the king's prerogative are a refufal to affift him by advice in his councils, and by perfonal fervice in his wars, againft a rebellion or invafion. To this clafs may be referred the neglect of joining the "poffe comitatus," or power of the county, when required by the fheriff or juftices, according to the ftatute 2 Hen. V. c. 8; which is a duty incumbent upon all that are 15 years of age, under the degree of nobility, and able to travel. Contempts againft the prerogative are alfo a preference of the interefts of a foreign potentate to thofe of our own, and doing or receiving any thing that may create an undue influence in favour of fuch extrinfic power; as by taking a penfion from any foreign prince, without the king's confent; alfo, a difobedience to the king's lawful commands, iffuing by writs out of his courts of juftice, or by fummons to attend his privy council, or by letters from the king commanding a fubject to return from beyond the feas: and likewife difobedience to any act of parliament; all which contempts are punifhable by fine and imprifonment, at the difcretion of the king's courts of juftice. Contempts and mifprifions againft the king's perfon and government may be by fpeaking or writing againft them, curfing or wifhing him ill, giving out fcandalous ftories concerning him, or doing any thing that may tend to degrade him in the efteem of his fubjects, weaken his government, or excite jealoufies between him and his people. Contempts againft the king's title, not amounting to treafon or præmunire, are the denial of his right to the crown, in common and unadvifed difcourfe; punifhable by our law with fine and imprifonment. If any perfon affirm or maintain, that the common laws of this realm, not altered by parliament, ought not to direct the right of the crown of England; this is a mifdemefnor, by ftat. 13 Eliz. c. 1, and punifhable with forfeiture of goods and chattels. A contempt may alfo arife from refufing or neglecting to take the oaths, appointed by ftatute for the better fecuring of the government; and yet acting in a public office, place of truft, or other capacity, requiring the faid oaths to be taken, *viz.* thofe of allegiance, fupremacy, and abjuration; which fhould be taken within fix calendar months after admiffion. The penalties inflicted by ftatute 1 Geo. I. ftat. 2. c. 13, are little fhort of thofe of a præmunire; being an incapacity to hold the faid offices, or any other; to profecute any fuit; to be guardian or executor; to take any legacy or deed of gift; and to vote at any election for member of parliament: and after conviction the offender fhall alfo forfeit 500*l.* to thofe who will fue for it. Contempts againft the king's palaces or courts of juftice have always been regarded as high mifprifions; and by the ancient law, before the conqueft, fighting in the king's palace, or before the king's judges, was punifhed with death. And at prefent with us, by ftat. 33 Hen. VIII. c. 12, malicious ftriking in the king's palace, where he refides, whereby blood is drawn, is punifhable by perpetual imprifonment and fine at the king's pleafure; and alfo with lofs of the offender's right hand. But ftriking in the king's fuperior courts of juftice, in Weftminfter-hall, or at the affifes, is made ftill more penal. By the ancient common law, before the conqueft, it was a capital felony; and our modern law fubftitutes for the lofs of life that of the offending limb; the crime, and even drawing a weapon, being punifhable with the lofs of the right hand, imprifonment for life, and forfeiture of goods and chattels, and of the profits of the offender's lands during life. (See Assault, &c.) A refcue of a prifoner from any of the faid courts, without a blow, is punifhed with perpetual imprifonment, and forfeiture of goods, and of the profits of lands during life. Even in the inferior courts of the king, an affray, or contemptuous behaviour, is punifhable with a fine by the judges there fitting; as by the fteward in a court-leet, or the like. Thofe alfo who are guilty of any injurious treatment to fuch as are immediately under the protection of a court of juftice, are punifhable by fine and imprifonment. Laftly, to endeavour to diffuade a witnefs from giving evidence; to difclofe an examination before the privy-council; or to advife a prifoner to ftand mute, are high mifprifions and contempts of the king's courts, and punifhable by fine and imprifonment. If one of the grand jury difclofes to any perfon indicted the evidence that appeared againft him, he is guilty of a high mifprifion, and liable to be fined and imprifoned. Blackft. Comm. vol. iv.

CONTENEBRA, in *Ancient Geography*, a town of Italy, in Etruria, mentioned by Livy.

CONTENEMENT, a word, in our *Ancient Law-books*, about whofe fignification authors are not rightly agreed. According to fome, it fhould fignify the countenance, credit, or reputation, a perfon has, from and by reafon of his freehold. In which fenfe it is ufed in the ftat. 1 Edw. III. &c. where it ftands as fynonymous with *countenance.*

Others will have it fignify what is neceffary for the fupport and maintenance of men, according to their feveral qualities, conditions, or ftates of life. Thus, Spelman, *Contenementum eft æftimatio, & conditionis forma, qua quis in republica fubfiftit.* And in this fenfe it occurs in Magna Charta, cap. 14.

CONTENSON, Vincent, in *Biography*, a French Dominican monk, was born at Condom, in 1640, and celebrated in his time for confiderable pulpit talents. He left behind him a work of reputation, entitled, "Theologia mentis et cordis," which has paffed through feveral editions in folio and in octavo.

CONTENT, in *Mathematics*, a term frequently ufed for the capacity of a veffel, or the area of fpace; or the quantity of any matter, or fpace, included in certain bounds. The content of a tun of round timber is 43 folid feet. A load of hewn timber contains 50 cubic feet: in a foot of timber are contained 1728 cubic or fquare inches, and as often as 1728 inches are contained in a piece of timber, be it round, or fquare; fo many feet of timber are contained in the piece.

In gauging, the gallon for beer and ale is allowed to contain 282 cubic inches, and the wine gallon 231; the gallon of dry meafure 272.

Hence, as oft as 282 cubic inches are contained in any veffel, round or fquare; fo many gallons of ale or beer it holds; and the like may be obferved of the other meafures.

Multiply, therefore, one fide of a fquare, or oblong, into the other; and divide by one of thofe numbers, according to the quality of the liquor; the quotient gives the area in gallons, upon an inch deep.

Though the work may be confiderably fhortened by only multiplying the fides of fquares, or the diameters of rounds, into themfelves; the product is the number of gallons, and parts, the veffel contains, upon an inch in depth: and when that receives an augmentation, by being two, three, or four inches deep, it then commences a folid body, and contains as many gallons, and parts, as it has inches and parts deep.

A cubic foot contains fix gallons and almoft a pint of ale and beer; and feven gallons two quarts of wine. A cubic foot of dry meafure contains fix gallons and a half, and

 fomething

fomething more. A bufhel of falt contains 56 pounds avoirdupoife. See GAUGING.

CONTENTIOUS JURISDICTION, in *Law*, denotes a court, or affembly, which has a power to judge and determine differences between contending parties.

The lords chief juftices, judges, &c. have a *contentious jurifdiction*; but the lords of the treafury, the commiffioners of cuftoms, &c. have none; being merely judges of accompts and tranfactions.

CONTENTMENT, in *Pathology* and *Ethics*, expreffes the acquiefcence of the mind in the poffeffion of the good that is affigned to us. It implies a perception that our lot might have been better, or that it is inferior to what others enjoy, or that it does not fully anfwer the expectations we had formed. An effort of reafon, or of prudence, or of religious principles, is neceffary to produce it. We compare our prefent with our former fituation, or with the inferior lot of others; and thus learn to acquiefce in the degree of advantage which we have obtained. A regard to the difpofals of Providence, wife, righteous, and benevolent, will very much contribute to the acquifition and exercife of the virtue of contentment.

CONTESSA, in *Geography*, a fmall town of European Turkey, in the province of Macedonia, fituated in the bay of the fame name, with a good harbour, on the coafts of the Archipelago; 54 miles N.E. of Salonica. Long. 41° 35′. At the entrance of the gulf of Conteffa is fituated the ifland of *Taffo*. The French navigators alfo call this bight "Golfe de Rhondine," from the corrupted name of the ancient town of *Rhedine*; but the Greeks defignate it under the name of *Orfano*. It is the *Sinus Strymonicus* of the ancients.

CONTESTANI, in *Ancient Geography*, a people of Hifpania Citerior, to the fouth of the Edetani. Their territory extended fouthwards as far as Betica, or at leaft to the extremity of the Tarragonenfis, where are found fome places dependent on the Baftitani, who inhabited part of the eaftern Betica.

CONTESTANIA, a country of Spain, in the Tarragonenfis, mentioned both by Pliny and Ptolemy. The former fays, that this country was firft called "Mavitania," afterwards "Deitania," and then *Conteftania*. Here thefe authors place the river Tader, the colony of Illici, Lacentum, Dianium, the river Sacro, &c.

CONTESTATIO LITIS, among *Civilians*, denotes a general affertion that the plaintiff hath no ground of action, which affertion is afterwards extended and maintained in his plea.

CONTEXT, among *Divines* and *Critics*, that part of Scripture, or other writing, which lies about the text, before or after it, or both. To take the full and genuine fenfe of the text, the context fhould be regarded.

CONTEXTURE, a word frequently ufed in fpeaking both of the works of nature and art; and denoting the difpofition and union of the conftituent parts with refpect to one another.

CONTHIL, in *Geography*, a town of France, in the department of the Meurthe, and diftrict of Chateau-Salins; 2 leagues N.N.W. of Dieuze.

CONTHILA, in *Ancient Geography*, a borough of Greece, in Attica; placed by fome in the Ptolemaide tribe, and by others in the Pandionide.

CONTI, GIUSTO DE, in *Biography*, an Italian poet and lawyer. His verfes are chiefly amatory; and they appeared under the title of "Bella Mano," on account of the beautiful hand of his miftrefs, which is the fubject of frequent adulation. He died in 1409, and his poems have been publifhed at Venice, Paris, Verona, and Florence. He has been compared to Petrarch; but the beft judges have regarded him as much inferior to that writer. Moreri.

CONTI, CESARE and VINCENZIO, two brothers, the former, a native of Ancona, was celebrated as an expeditious painter of grotefques; the latter, born at Rome, was a painter of hiftory.

Baglione enumerates many confiderable works, in which both thefe artifts were employed at Rome, under the pontificate of Sixtus V. and Gregory XIII. Vincenzio ultimately fettled in Turin, where he was taken into the fervice of the duke of Savoy. They both died during the pontificate of Paul V. Baglione.

CONTI, DOMENICO, of Florence, was the beloved difciple of Andrea del Sarto, and heir to his defigns and ftudies. In gratitude and veneration to the memory of his great mafter, Conti, at his own expence, erected the monument ftill remaining in the cloifter of the Nunziata, where the buft of Andrea is finely fculptured by the hand of Raffaello di Monte Lupo. Of Domenico's works in painting little is now known. Orlandi.

CONTI, CARLO, an engraver, native of Lorraine, in 1742. He eftablifhed himfelf at Vienna, where he was reputed a good artift. He was living in 1790. Heinecken.

CONTI, FRANCESCO, an hiftorical painter, born at Florence, in the year 1681. He travelled to Rome, where he became the difciple of Carlo Maratti. On his return, he acquired fufficient reputation to merit a place in the celebrated collection of portraits in the Florentine gallery. He died in the year 1760. Lanzi, Storia Pitt.

CONTI, LUCA, an engraver and architect, who was born in 1749, and became the difciple of Cleriffeau. He eftablifhed himfelf at Paris, where he continued to follow his profeffion in 1790. Heinecken.

CONTI, GIOACHINO. See GIZZIELLO.

CONTIGLIANO, in *Geography*, a town of Italy, in the duchy of Spoleto, near a lake to which it gives name; 3 leagues W. from Rieti.

CONTIGNE, a town of France, in the department of the Maine and Loire, and diftrict of Segré; 3 miles N. of Chateauneuf.

CONTIGUITY, the relation of bodies touching one another. See CONTINUITY.

CONTIGUOUS, a relative term, underftood of things difpofed fo near each other, that they join their furfaces, or touch.

The houfes in ancient Rome were not contiguous as ours are, but all infulated.

CONTIGUOUS *angles*, in *Geometry*, are fuch as have one leg common to each angle; otherwife called *adjoining angles*, in contradiftinction to thofe produced by continuing their legs through the point of contact, which are called *oppofite* or *vertical angles*.

CONTINENCE, in *Ethics*, a moral virtue, by which we refift concupifcence. It fhould feem that there is this diftinction between *chaftity* and *continence*, in that it requires no effort to be chafte, which refults from conftitution; whereas *continence* appears to be the confequence of victory gained over ourfelves. The verb *continere*, in Latin, fignifies *to reftrain*.

CONTINENT, in *Geography*, a terra firma, main land, or a large extent of country, not interrupted by feas: fo called, in oppofition to *ifland*, *peninfula*, &c. See EARTH, OCEAN, &c.

Sicily is faid to have been anciently torn from the conti-

nent of Italy; and it is an old tradition, which fome of our antiquaries have ftill a regard to, that Britain was formerly a part of the continent of France.

Mr. Kirwan fuppofes (fee Irifh Tranf. vol. vi. p. 298.) that, when by the rupture of the Thracian Bofphorus, or ifthmus which connected the Cafpian, the lake of Aral, and the Black Sea, on the one fide, and of the African ifthmus, which joined Ceuta with Gibraltar on the other, the waters of the Ocean and of the Euxine were forced in upon the Mediterranean, an immenfe preffure took place upon its bed, under which it funk or fell into the interior cavity of the globe; during this tremendous tumult the iflands of Sicily, Sardinia, Corfica, and thofe of the Archipelago, were torn off from the Continent, and Italy was lengthened to its prefent fhape. The feparation of Sicily from Italy is vouched by ancient traditions, as may be feen in Pliny, Ovid, and Claudian.

"Zancle quoque juncta fuiffe
Dicitur Italiæ, donec confinia pontus
Abftulit, et media tellurem repulit unda."
Ovid. Met. l. xv. v. 290.

"Trinacria quondam
Italiæ pars una fuit, fed pontus et ceftus
Mutavere fitum, rupit confinia Nereus,
Victor, et abfciffo interluit æquore montes."
Claud. de Rep. Prof. l. 1.

The entire feparation of Great Britain from the Continent muft have happened long after the deluge, and that of Ireland from Great Britain at a ftill later period; for wolves and bears were anciently found in both, and thefe muft have paffed from the Continent into Britain, and hence into Ireland, as it cannot reafonably be fuppofed that they were imported thither. The divulfive force, fays Kirwan (*ubi fupra*), that feparated Britain from Germany, feems to have been directed from North to South, but gradually weakened in its progrefs. Hence that ifland is fharpened northwards; but the impreffion muft have been confiderably weakened by the oppofition of the granitic mountains that form the Shetland and Orkney ifles. The rupture of the ifthmus that joined Calais and Dover was probably effected by an earthquake at a later period, and gradually widened by tides and currents. Ireland was protected by Scotland from the violence of the northern fhock; and therefore its feparation from Scotland appears to have been late and gradual. That from England was probably diluvial, and effected by a fouthern fhock. All thefe changes happened 3600 years ago; and there is no reafon for thinking that the general level of the ocean has been fince altered; but that of the continents feems to have varied confiderably, being in fome places higher and in fome lower than it was in ancient times.

The world is ordinarily divided into two grand continents; the Old and the New; the Old comprehends Europe, Afia, and Africa; the New the two Americas, North and South.

The feparation of the two continents Kirwan (*ubi fupra*) fuppofes to have probably been the effect of excavation by volcanos; at leaft, he fays, this caufe is adequate to fuch an effect, and it ftill exifts in the moft northern parts; the fuperior fertility of the weftern coaft of America may arife from the lavas ejected on that coaft. But however this feparation was effected, we have no traditional account of it, and the period in which it happened is no lefs difficult to be afcertained than the caufes which produced it.

M. Buffon affirms, that they were not feparated when the elephants lived equally in the north of Europe, Afia, and America, the bones of which have been found in Ruffia, Siberia, and Canada. Hence he concludes, that the feparation of the two Continents muft have happened after the abode of thefe animals in the northern regions. But it has been doubted whether the remains of elephants and of the rhinoceros that have been lately found in Siberia, even allowing that the temperature of this country was ever fo fuited to the conftitution of thefe animals as to admit of their living in it, belonged to animals which ever lived in it. As to the mode of their formation, we have different conjectures and theories, of which an account will be given under the articles DELUGE and EARTH.

M. Buffon obferves (See Smellie's Tranflation, vol. i.) that the furface of the earth is divided, from one pole to the other, into two belts of land, and two of fea. The firft and principal belt is the ancient Continent, the greateft length of which is a line commencing at the moft eaftern point of the north of Tartary, and extending from thence to the neighbourhood of the gulf of Linchidolin, where the Ruffians fifh for whales; from thence to Tobolfki; from Tobolfki to the Cafpian fea; from the Cafpian fea to Mecca: from Mecca to the weftern part of the country inhabited by the Galli in Africa; from thence to Monoemuci, or Monomotapa; and, laftly, to the Cape of Good Hope. This line is about 3600 leagues in length (each league being about 2000 or 2100 fathoms long, and about 27 of them making a degree), and is never interrupted but by the Cafpian and the Red Seas, which are of inconfiderable breadth. This greateft length of the Old Continent forms a diagonal line; for, if meafured by a meridian, it will appear, that from the northernmoft point of Lapland to the Cape of Good Hope, exceeds not 2500 leagues; and that this line, though fhorter, meets with greater interruption from the Baltic and Mediterranean. With regard to all other lines which could be drawn under the fame meridians in the Old Continent, they muft ftill be fhorter than thofe above-mentioned. *E. G.* From the moft fouthern point of the ifland of Ceylon to the northernmoft coaft of Nova Zembla, the diftance is 1800 leagues. Thus alfo, if the Continent be meafured by lines parallel to the equator, its greateft length, without much interruption by feas, will ftretch from Trefana, on the weft coaft of Africa, to Ninpo, on the eaft coaft of China, which is about 2800 leagues. Another line may begin near Breft, and extend to the coaft of Chinefe Tartary, which will be nearly 2300 leagues. From Bergen in Norway to the coaft of Kamtfchatka the diftance is only 1800 leagues. All thefe lines are much fhorter than the firft. Hence the greateft length of the Old Continent extends from the eaftern point of Tartary to the Cape of Good Hope, and is about 3600 leagues. This line may be confidered as the middle of the ancient Continent; for in meafuring the furface on each fide of it, M. Buffon found, that, on the left there are 2,471,092$\frac{3}{4}$ fquare leagues; and on the right, 2,469,687, which two lines differ only by 1405$\frac{3}{4}$ leagues, or barely 1$\frac{1}{2}$ degree fquare. Hence the Old Continent contains about 4,940,780 fquare leagues, which is not one fifth part of the earth's furface, and may be regarded as a large belt of earth, with an inclination to the equator fomewhat more than 30 degrees.

The New Continent is another belt of earth, the greateft length of which may be taken from the mouth of the river Plata to the lake of the Affiniboils. This line paffes from the mouth of the river Plata to lake Caracara; from thence to Mataguais, Pocona, Zongo, Mariana, Morna, St. Fé, and Carthagena; then it paffes through the gulf of Mexico

Mexico to Jamaica and Cuba; from thence along the peninfula of Florida, through Apalache, Chicachas; and from thence to St. Louis, Fort le Sueur; and terminates in the country bordering on lake Affiniboils, the extent of which is unknown. This line is interrupted only by the gulf of Mexico, is about 2500 leagues in length, and divides the New Continent nearly into two equal parts; that on the left containing 1,069,286$\frac{1}{6}$ fquare leagues, and that on the right 1,070,926$\frac{1}{12}$; the difference of which is 1639$\frac{3}{4}$, or fcarcely 1$\frac{1}{5}$ degree fquare. This line is the middle of a belt of land, called the New Continent, and is inclined to the equator fomewhat lefs than 30°, but in an oppofite direction to the former; for that of the Old Continent extends from the N. E. to the S. W.; but that of the New Continent from N.W. to S. E. The fuperficial contents of the Old and New Continents are about 7,080,993 fquare leagues, *i. e.* not near a third part of the furface of the globe, which contains 25,000,000 fquare leagues. Of thefe lines which divide the Continents into equal parts, it may be remarked, that they both terminate at the fame degrees of N. and S. latitude; and that the two Continents make mutual advances, or projections, exactly oppofite to each other; *viz.* thofe on the African coaft, from the Canary ifles to Guinea; and thofe of America, from Guiana to the mouth of the Rio-Janeiro. It appears, therefore, that the moft ancient lands on the globe are thofe which extend from 200 to 250 leagues on each fide of the two lines above defcribed.

Agreeably to this idea, it is found that, in the Old Continent, the moft ancient countries of Africa are thofe which ftretch from the Cape of Good Hope to the Red Sea and Upper Egypt, and are about 500 leagues broad; and, confequently, that the whole weftern coaft of Africa, from Guinea to the ftraits of Gibraltar, are new lands. In the fame manner, if we trace this line through Afia, and include an equal breadth, we fhall find, that the moft ancient countries are, the two Arabias, Perfia, Georgia, Turcomania, a part of independent Tartary, Circaffia, part of Mufcovy, &c.; and, of courfe, that Europe, and perhaps alfo China, and the eaftern part of Tartary, are comparatively new countries.

In the New Continent, we fhall likewife find, that Terra Magellanica, the eaftern part of Brazil, of the country of the Amazons, of Guiana, and of Canada, are new lands, when compared with Tucuman, Peru, Terra Firma, the iflands in the gulf of Mexico, Florida, the Miffifippi, and Mexico. Moreover it may be obferved, that the Old and New Continents are nearly oppofite to one another. The Old Continent extends farther north of the equator than fouth; but the New, farther fouth than north. The centre of the Old Continent lies in the 16th or 18th degree of N. latitude; and the centre of the New Continent lies in the 16th or 18th degree of S. latitude; as if they were intended to counterbalance each other. Befides, both continents refemble one another in this refpect that they might be divided into two portions, which would be furrounded on all fides by the fea, except the two fmall ifthmufes of Suez and Panama.

It is obfervable that the prodigious chains of mountains in thefe two continents run from W. to E. in the Old Continent, and from N. to S. in the New. In the Old Continent there are about 430 rivers which directly fall either into the Ocean, or into the Mediterranean and Black feas. But in the New Continent we know only of 135 rivers which fall immediately into the fea. Both the Old and New Continents appear to have been encroached upon by the Ocean in the fame latitudes: both are furnifhed with a great Mediterranean and a vaft number of iflands, which likewife lie nearly in the fame latitudes. The only difference is, that the Old Continent, being much larger than the New, has a Mediterranean on its weft coaft, to which the New Continent has nothing analogous. But both feem to have undergone fimilar revolutions. Thefe revolutions are greateft near their middle parts, or between the tropics, where the motion of the fea is moft violent. For other particulars relating to thefe Continents, we refer to the defcription of their refpective countries.

It has been remarked, that a confiderable portion of the elevated and folid matters or ftrata which form our Continents, are oppofite to a large or deep ocean at the anti-podes or oppofite fide of the earth: and this circumftance affords matter for important reflections, when we take into our account that thefe parts, now fo confiderably elevated above the level of the Ocean, once formed part of its bottom, as appears from the nature and difpofition of the ftrata themfelves, but more efpecially from the fhells and other aquatic remains found lodged in them, in a perfect and unbroken ftate, lying in the fame manner and pofitions, as the fhells, &c. of living animals are found to be diftributed, on the bottom of the fea, in places where divers have had opportunities of examining them. The following queftions here naturally prefent themfelves; has the quantity of water on the furface of the earth been fo much diminifhed, as to lay the continents thus bare; or, has the centre of gravity of the earth been fo deranged, as to occafion the waters to accumulate in particular places and leave others uncovered? For a long time there feemed little difficulty in folving the myftery, by anfwering the firft queftion in the affirmative, on the principles of thofe who maintained, that the earth was only a hollow cruft or fhell of matter, and that great part of the waters of the univerfal ocean had retreated into the internal cavities of the globe. But fince the labours of Britifh philofophers have concurred in proving, that the fpecific gravity of the entire or compound mafs of the terraqueous globe is 5 times that of water, while all the water exifting in or upon the earth, (of fp. grav. 1, or little more) and all the earths and ftones (whofe fpecific gravities do not exceed 2$\frac{1}{2}$ or 2$\frac{3}{4}$ on the average) are included; we are forced to conclude, not only that the central parts of the globe are folid, but compofed alfo of much heavier materials, than thofe which conftitute the fuperficial ftrata. Another circumftance alfo concurs to fhew the improbability, of any large caverns now exifting, filled with water in the interior parts of the earth, *viz.* the fiffures, which fo univerfally are found, breaking and dividing even the hardeft rocks and ftrata, into comparatively fmall and irregular fragments, fo as to render them incapable of arching or fupporting themfelves over water without an actual contact or bearing upon each other: and accordingly caverns or grottos of any confiderable fize are rarely met with in mining, and thefe principally, if not entirely, in very hard lime-ftone ftrata, near the furface, and carrying but a comparatively fmall load of fuperincumbent ftrata.

This ruptured and broken ftate of the folid matters of the globe, has probably fitted them for obeying the action of the centrifugal force generated by its diurnal revolution, and for affuming nearly the form of an *ellipfoid* (as the late meafurements of degrees upon the earth's furface in various parts of the world have fhewn;) otherwife, moft probably, the equatorial parts of the earth muft have been occupied by a zone of water inftead of poffeffing Iflands and parts of Continents in common with other parts of the world, as they now do. Let the reader but confider the immenfe weight of folid matter which exifts above the level of the fea, or general ellipfoidal lines of equilibrium, in one of our Continents; and fuppofe a cylindrical perforation to be made under fuch Continent, quite through the earth to the oppofite ocean, fo

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as to feparate, for the fake of argument, this cylindrical column of the earth and water from the reft of the earth, (as the broken ftate of the ftrata and the actual hardnefs of their fragments entitles us to fuppofe poffible) and it will appear, as a neceffary confequence of equilibrium, that the continent and ftrata under it to the centre of the earth muft be equal in weight to the fame fpace of Ocean at the antipodes, and the ftrata under its bottom extending to the fame centre; for if thefe were different, and we fuppofe the Continent to preponderate, it is plain from the waters of the Ocean covering the other end of the cylinder being at liberty to recede, that they would do fo, and the Continent would fink and the bottom of the oppofite Ocean would rife, until the equilibrium was reftored: and in like manner if the ftrata under the ocean be fuppofed the heavieft, a further protrufion and confequent elevation of the Continent, compared with its furrounding feas, would enfue. This view of the fubject leads, in the opinion of the writer of this part of our article, to the conclufion, that a very large mafs, or perhaps feveral maffes of matter of a high fpecific gravity, now occupy the bottom of the Ocean oppofite to the Continents and large iflands, which were not there at the time that thefe Continents occupied a lower place in refpect to the centre of the earth, and were covered by the univerfal Ocean: and he thinks, that he has difcovered the fource whence thefe very heavy and difturbing maffes of matter were derived, in the difappearance of fome immenfe fatellitic body which apparently for a long period revolved round this earth, very near to its furface, and occafioned tides fo rapid and enormous, as to heave up the land and break the ftrata into innumerable fragments, permanently denudating fome parts, when elevated above the point of equilibrium between the earth and fatellite's attraction, and pouring down upon other parts of the furface, fuch torrents of the ruins of abraded ftrata, as entirely to hide the ftrata of thefe diftricts under alluvial coverings; forming, in numerous inftances, hills of great height and extent, containing large and irregular fragments of rocks, and different known ftrata, thrown together throughout their whole thicknefs and extent, in the greateft apparent confufion. For other obfervations and conjectures, relating to this fubject; fee EARTH.

The difcovery of a fouthern Continent has been an object of curious and diligent inveftigation; but hitherto without fuccefs. Captain Cook's fecond voyage commenced in the year 1772, was undertaken with a particular view to the decifion of the queftion, concerning the exiftence of a fouthern Continent. In the profecution of this voyage, and while he was proceeding fouthward in queft of a Continent, he fell in with ice iflands, in S. lat. 50° 40′ and 2° of longitude from the Cape of Good Hope; in his farther progrefs, he was ftopped by other fields of ice, which led him to imagine, from a notion that thefe are formed in bays and rivers, that he could not be at a great diftance from land. But having failed in S. lat. 55° 40′ for more than 30 leagues along the edge of the ice without finding any opening, he found that this ice did not join the land; and therefore he thus difcovered the fallacy of the general opinion, that ice is always formed in the vicinity of land. The obfervations of captain Cook confirmed thofe of other navigators, that the cold of the fouthern feas is much more intenfe than that of equal latitudes in the northern hemifphere; and he alfo afcertained that this cold was not owing to the vicinity of a Continent, as had formerly been imagined. On the contrary, it was now determined beyond difpute, that if any fuch Continent exifted in the eaftern part of the fouthern Ocean, it muft be confined within the latitude of 60°. Having advanced as far as S. lat. 62° 10′ and W. long. 172°, he found the farther he proceeded that the number of ice iflands very much increafed; and in lat. 67° 31′, and W. long. 142° 54′, he got into fuch a clufter of thefe iflands, that it was both difficult and dangerous to efcape them. Finding it impoffible to get any farther to the fouthward, he determined to explore a confiderable tract of fea to the north of his prefent fituation, and then again to ftand to the fouth. But in this he was unfuccefsful; no land being difcovered either in failing northward, eaftward, weftward, or fouthward; though he proceeded in the laft direction as far as 71° 10′ S. lat. and 106° 54′. W. long. It was now impoffible to advance; and it was the opinion of the captain himfelf, as well as of moft of the gentlemen on board, that the ice by which they were now ftopped extended as far as the pole. The moft foutherly land difcovered by this perfevering navigator was that on which he beftowed the name of "Southern Thule," and which is fituated in S. lat 59° 13′ 30″. W. long. 27° 45′. Here not a fingle herb of any kind was feen, but very high and barren mountains, the tops of fome of which reached above the clouds; and we may obferve, that this feems to be the only part of the world hitherto difcovered, altogether unfit for the fupport of animal life. This country was difcovered on the 31ft of January 1775. Upon the whole, it may be concluded, that the greateft part of the fouthern Continent, if it has any exiftence, muft be within the polar circle, where the fea is fo encumbered with ice, that the land muft be inacceffible. So great is the danger in navigating thefe fouthern feas, that captain Cook afferts on the moft probable grounds, that fuch lands as lie to the fouthward of his difcoveries could not be explored; and that even no man could venture farther than he had done. Thick fogs, fnow-ftorms, intenfe cold, and every attendant circumftance that can render navigation difficult and dangerous, muft be encountered; and all thefe difficulties and dangers are heightened to a very great degree by the inexpreffibly horrid afpect of the country itfelf. It is a part of the world deemed by nature never to feel the warmth of the fun's rays, but to be buried in everlafting fnow and ice. Whatever ports there may be in the coaft, they are almoft entirely covered with frozen fnow of a vaft thicknefs. If however any of them fhould be fo far open as to invite a fhip into it, fhe would run the rifk of being fixed there for ever, or of coming out on an ice ifland. Befides, the iflands and floats on the coaft, the great falls from the ice-cliffs in the port, or a fudden fnow-ftorm, might be attended with equally fatal effects. For thefe reafons captain Cook determined to abandon the purfuit of a land, whofe exiftence was fo equivocal, but whofe inutility, if it could be difcovered, was certain.

After captain Cook's perfevering and fruitlefs traverfes through every corner of the fouthern hemifphere, who, for the future, fays the editor of Cook's third voyage (vol. i. Int. p. 56.), will pay any attention to the ingenious reveries of Campbell, de Broffes, and de Buffon? or hope to eftablifh an intercourfe with fuch a continent as Maupertuis's fruitful imagination had pictured? A Continent equal, at leaft, in extent, to all the civilized countries in the known northern hemifphere, where new men, new animals, new productions of every kind, might be brought forward to our view, and difcoveries be made, which would open inexhauftible treafures of commerce. (See Maupertuis's Letter to the King of Pruffia.) The author of the Preliminary Difcourfe to Bougainville's "Voyage aux Ifles Malvaines" computes, that the fouthern Continent (for the exiftence of which, he owns, we muft depend more on the conjectures of philofophers, than on the teftimony of voyagers) contains

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8 or 10 millions of ſquare leagues! We can now boldly take it upon us to diſcourage all expeditions formed on ſuch reaſonings of ſpeculative philoſophers, into a quarter of the globe, where our perſevering Engliſh navigator, inſtead of this promiſed fairy land, found nothing but barren rocks, hardly affording ſhelter to penguins and ſeals; and dreary ſeas and mountains of ice, occupying the immenſe ſpace allotted to imaginary paradiſes, and the only treaſures there to be diſcovered, to reward the toil, and to compenſate the dangers of the unavailing ſearch.

CONTINGENCY, in *Metaphyſics*, denotes the mere poſſible exiſtence or non-exiſtence of an object in any future time; and is oppoſed to *neceſſity;* which ſee. See alſo CHANCE and PROBABILITY.

CONTINGENCY *of blood*, in the writers of the laws of Scotland, is uſed for proximity of blood. Bayne, Crim. Law. p. 48.

CONTINGENT, literally ſignifies what may or may not happen, what is caſual or uncertain, and depending upon chance. See CHANCE. But in military acceptation, it denotes the quota or proportion of troops, money, and ammunition, which each of a body of leagued or confederated ſovereigns, or princes, furniſhes on emergencies, when required or called on, in virtue of and in ſupport of the confederation. In the wars of the German empire, each prince and ſtate, and all the members of the Germanic body, were obliged to furniſh their contingent. In like manner the princes forming the *confederation of the Rhine*, are, at preſent, obliged to furniſh their reſpective contingents.

CONTINGENT *bill*, of a regiment, is an account of the extra charges, which a regiment, in the due courſe of ſervice, is from circumſtances unavoidably and accidentally under the neceſſity of incurring.

CONTINGENT *line*, or tangent-line, in *Dialling*, denotes the interſection of the planes of the dial and equinoctial, and it interſects the ſubſtile or ſubſtilar line at right angles.

CONTINGENT *legacy*, is a legacy depending on the life of the legatee; if it be left to any perſon, *when* or *if* he attains the age of twenty-one, and if he dies before that time, it is a lapſed legacy; but if it is left *to be paid* when he attains that age, it is a veſted legacy; and if the legatee dies, his repreſentatives ſhall receive it out of the teſtator's eſtate at the time, when it would have become payable, if the legatee had lived.

CONTINGENT, or *Executory remainder*, in *Law*, is where an eſtate is limited to take effect, either to a dubious and uncertain *perſon*, or upon a dubious and uncertain *event;* ſo that a particular eſtate, which doth ſupport a remainder, may or may not determine before the remainder may commence. This kind of remainder is oppoſed to *veſted* or *executed* remainders. 3 Rep. 20. See REMAINDER.

CONTINGENT *uſe*, in *Law*, is an uſe limited in a conveyance of land, which may, or may not, happen, to veſt, according to the *contingency* expreſſed in the limitation of ſuch uſe. An uſe in contingency is ſuch which by poſſibility may happen in poſſeſſion, reverſion, or remainder. 1 Rep. 121. See USE.

CONTINGENTS are ſometimes alſo uſed by mathematicians in the ſame ſenſe as tangents.

CONTINI, GIAMBATISTA, in *Biography*, an architect who enjoyed conſiderable reputation at Rome in the latter part of the 17th and the beginning of the 18th century. He was born in the year 1641, and after having acquired at the ſchools a competent knowledge of languages, the Belles Lettres, and geometry, was placed by his father, who was likewiſe an architect, under the tuition of the celebrated Bernini. The inſtructions of his maſter were not thrown away, and Giambatiſta became employed by ſeveral of the firſt families of Rome. He conſtructed many of thoſe magnificent altars and chapels with which the churches of Rome abound, and built the duomo of Vetralla as well as that of Vignarello. His works are enumerated by his biographer Lione Paſcoli, who informs us that he lived highly reſpected, and died in 1723. Paſcoli.

CONTINUAL CLAIM. See CLAIM *continual*.

CONTINUAL *proportionals*. When in a ſeries of quantities the firſt is to the ſecond as the ſecond to the third, and the third to the fourth, and the fourth to the fifth, &c. they are called *continual proportionals:* ſuch are 1, 2, 4, 8, 16, &c. where the terms increaſe in a two-fold ratio; and 36, 12, 4, $\frac{4}{3}$, &c. where they decreaſe in a triple ratio. Such a ſeries is otherwiſe called a *progreſſion*.

CONTINUANCE, in *Law*, is much the ſame as *prorogation* among the civilians. It denotes the continuing of a cauſe in court, by an entry upon the records there for that purpoſe. After iſſue or demurrer joined, as well as in ſome of the previous ſtages of proceeding, a day is continually given and entered upon the record, on which the parties are to appear, from time to time, as the exigency of the caſe may require. The giving of this day is called the "continuance," becauſe thereby the proceedings are continued without interruption from one adjournment to another. If theſe continuances are omitted, the cauſe is thereby diſcontinued, and the defendant is diſcharged *ſine die*, without a day, for this term: for by his appearance in court, he has obeyed the command of the king's writ; and, unleſs he be adjourned over to a day certain, he is no longer bound to attend upon that ſummons; but he muſt be warned afreſh; and the whole muſt begin *de novo*. It may ſometimes happen, that after the defendant has pleaded, nay, even after iſſue or demurrer joined, there may have ariſen ſome new matter, which it is proper for the defendant to plead; as, that the plaintiff, being a feme-ſole, is ſince married, or that ſhe has given the defendant a releaſe, and the like: here, if the defendant takes advantage of this new matter, as early as he poſſibly can, *viz.* at the day for his next appearance, he is permitted to plead it in what is called a plea *puis darrein continuance*, or ſince the laſt adjournment. For it would be unjuſt to exclude him from the benefit of this new defence, which it was not in his power to make when he pleaded the former. But it is dangerous to rely on ſuch a plea, without due conſideration; for it confeſſes the matter which was before in diſpute between the parties (Cro. Eliz. 49.) And it is not allowed to be put in, if any continuance has intervened between the ariſing of this freſh matter and the pleading of it; for then the defendant is guilty of neglect, or *laches*, and is ſuppoſed to rely on the merits of his former plea. Alſo it is not allowed after a demurrer is determined, or verdict given; becauſe then relief may be had in another way, namely, by writ of *audita querela*. And theſe pleas *puis darrein continuance*, when brought to a demurrer in law or iſſue of fact, ſhall be determined in the ſame manner with other pleas. Blackſt. Comm. vol. iii.

Continuances and eſſoins are amendable upon the roll, at any time before judgment:—they are the acts of the court, and at common law they may amend their own acts before judgment; though in another term; but their judgments are only amendable in the ſame term in which they are given. (3 Lev. 431.) Upon an Original, one term, or two, or three terms may be meſne between the teſte and the return; and this ſhall be a good continuance; for the defendant is not prejudiced by it, and the plaintiff may give a day to the defendant beyond the common day, if he will. But a continuance by *capias* ought to be made from term to term, and there

there cannot be any mesne term, because the defendant ought not to stay so long in prison. (2 Danv. Abr. 150.) If a man recover upon demurrer, or by default, &c. and a writ of inquiry of damages is awarded, there ought to be continuance between the first and second judgment, otherwise it will be a discontinuance; for the first is but an award, and not compleat, till the second judgment, upon the return of the writ of inquiry of damages. (Ibid. 153). If the plaintiff be non-suited, by which the defendant is to recover costs; if the plaintiff will not enter his continuances, on purpose to save the costs, the defendant shall be suffered to enter them. (Cro. Jac. 316, 317.) The course of the court of King's Bench is to enter no continuance upon the roll, till after issue or demurrer, and then to enter the continuance of all upon the back, before judgment; and if it is not entered, it is error. (Trin. 16 Jac. B. R.) See DISCONTINUANCE.

CONTINUANCE *of a writ*, or *action*, is its holding in force from one term to another, in a case where the sheriff has not returned, or executed, a former writ issued out in the same action.

CONTINUANCE *of assise*. If a record in the treasury be alleged by one party, and denied by the other, certiorari shall be sued to the treasury and chamberlain of the exchequer; who, if they certify not that the said record is there, or likely to be in the Tower; the king shall then send to the justices, repeating the certificate, and will them to *continue the assise*.

CONTINUANDA *assisa*. See ASSISA.

CONTINUANDO, in *Law*, a term used in a declaration of trespass, where a plaintiff would recover damages for several trespasses in the same action. To avoid multiplicity of suits, a man may in one action of trespass recover damages for many trespasses; laying the first to be done with a *continuance* to the whole time in which the rest of the trespasses were done; which is done in this form: *continuando transgressionem prædictam, &c. à prædicto die, &c. usque, &c.* Terms de Ley. 2 Roll. Abr. 545. Lord Raym. 240. 7 Mod. 152.) This declaration of trespass may be alleged, where the inquiry is continually renewed, as by spoiling or consuming the herbage with the defendant's cattle; in which case the *continuando* is good. (1 Lill. Abr. 307.) Thus also trespass for breaking a house with *continuando* is good; and until a re-entry is made, the continuation of the possession is a continuing of the trespass. (Lutw. 1312.) But where the trespass is by one or several acts, each of which terminates in itself, and being once done cannot be done again, it cannot be laid with a *continuando*; yet if there be repeated acts of trespass committed, (as cutting down a certain number of trees,) they may be laid to be done, not continually, but at divers times and days within a given period. Salk. 638, 639. Lord Raym. 823.

CONTINUANDO *Processum*. See PROCESSUM and CONTINUANCE.

CONTINUANS PUNCTUM. See PUNCTUM.

CONTINUATION *of* MOTION. See MOTION and PROJECTILE.

CONTINUATIVE CONJUNCTIVES, in *Grammar*, are those conjunctions, uniting both sentences and their meaning, which join those sentences only, which have a natural connection; in contradistinction to copulative, which join all sentences, however incongruous in signification. The latter merely couple sentences, and are applicable to all subjects, whose natures are not incongruous. The former, on the contrary, by more intimate connection, consolidate sentences into one continuous whole, and are therefore applicable only to subjects which have no essential coincidence. The principal copulative in English, is, *and*; the continuatives are, *if*, *because*, *therefore*, *that*, &c. *E. G.* "Lysippus was a statuary, *and* Priscian was a grammarian."—"The sun shineth, *because* the sky is clear." Continuatives, according to the distribution of Mr. Harris (Hermes, p. 244.) are either suppositive, as, *if*; or positive, as, *because*, *therefore*, &c. *E. G.* "You will live happily, *if* you live honestly."—"You will live happily, *because* you live honestly." The difference between these continuatives is this; the suppositives denote connection, without asserting actual existence; and the positives imply both the one and the other. Moreover, positives are either casual, as, *because*, *since*, *as*, &c.; or collective, as *therefore*, *then*, &c.; and they differ in this respect, that the causals subjoin causes to effects, thus; "the sun is eclipsed, *because* the moon intervenes;" but the collectives subjoin effects to causes, thus; "the moon intervenes, *therefore* the sun is eclipsed." All these continuatives may be resolved into copulatives. Instead of "*because* it is day, it is light," we may say, "it is day, *and* it is light."

CONTINUATO, in the *Italian Music*, is used to direct a singer, or player, to continue or hold on a sound, in equal strength or manner; or to continue a movement in an equal degree of time all the way.

CONTINUED FEVER. A fever without remissions or intermissions. See FEVER.

CONTINUED *Quantity*. } See CONTINUUM, CONTINUITY,
CONTINUED *Body*, &c. } and QUANTITY.

CONTINUED, or *thorough bass*, in *Music*, is that which continues to play constantly, both during the recitatives, and to sustain the choir, or chorus.

CONTINUED *proportion*, in *Arithmetic*, is that in which the consequent of the first ratio is the same with the antecedent of the second: as, 3 : 6 :: 6 : 12. See PROPORTION.

On the contrary, if the consequent of the first ratio be different from the antecedent of the second, the proportion is said to be *discrete*: as, 3 : 6 :: 4 : 8. See DISCRETE.

CONTINUED *zocle*, or *socle*, in *Architecture*. See SOCLE.

CONTINUED *Attic*, *Community*, *Pedestal*. See the substantives.

CONTINUI SOLUTIO. See SOLUTIO.

CONTINUITY is usually defined among *Schoolmen*, the immediate cohesion of parts in the same *quantum*. Others define it, a mode of body, whereby its extremes become one: and others, a state of body resulting from the mutual implication of its parts.

Continuation relates to *duration*, and continuity to *extension*. We say, the *continuation* of a work, or an action; and the *continuity* of space or size; *continuation* of the same conduct; and *continuity* of the same building.

There are two kinds of continuity, *mathematical* and *physical*. The first is merely imaginary and fictitious; since it supposes real or physical parts where there are none. *Physical* continuity is, strictly, that state of two or more parts, or particles, wherein they appear to adhere, or constitute one uninterrupted quantity, or *continuum*; or between which we perceive no intermediate space.

The schoolmen distinguish two other sorts of continuity; viz. *homogeneous*, and *heterogeneous*. The first, where our senses do not perceive the bounds, or extremes, of the parts; and this agrees even to air, water, &c. The second, where our senses indeed perceive the extremes of certain parts, yet at the same time observe the same parts closely linked to each other; either in virtue of their situation or figure, &c.

and

and this is chiefly attributed to the bodies of animals and plants.

The continuity of bodies is a ftate merely relative to our fight and touch: *e. gr.* if the diftance of two feparate objects be fuch, as that the vifual angle they fubtend is infenfible to the eye, which it will be if lefs than fixteen feconds, the two feparate bodies will then appear *contiguous.* Now, the refult of feveral *contiguous* objects, is a *continuity:* fo that any number of vifible objects, being placed fo as that the diftances fubtend angles of lefs than fixteen feconds, they will appear to form one *continuum.*

And hence, as we can determine the diftance at which any given magnitude becomes invifible; it is eafy to find at what diftance any two bodies, however remote from each other, will appear as contiguous; and feveral, as forming one *continuum.* For the phyfical caufe of continuity, fee COHESION.

Leibnitz, an eminent mathematician, has fuppofed what he calls a law of continuity to obtain in the univerfe, by which law every thing that is executed or done in nature, is done by infinitely fmall degrees. He urges, that good fenfe dictates this truth, *natura non operatur per faltum,* or that nothing can pafs from one extreme to another, without paffing through all the intermediate degrees. Bernouilli Opera, tom. iii. p. 9. *feq.*

This law feems fubject to difficulties: rigoroufly taken, it fuppofes actual, and yet infinitely fmall changes, which fome philofophers cannot relifh; and if we fuppofe changes only imperceptible to our fenfes, but finite, the law of continuity is no lefs violated, than if the univerfe were to be fuddenly deftroyed, as M. Maupertuis juftly obferves. Mem. de l'Acad. de Berlin. tom. ii. p. 284.

This law of continuity led Mr. Bernouilli to reject all hard bodies as chimeras, and naturally impoffible.

CONTINUO, in the *Italian Mufic,* is fometimes applied to *baffo,* to fignify the thorough-bafs. That *baffo continuo,* is the continual, or thorough-bafs. It is fometimes marked in mufic books by the letters B, C.

CONTINUO is alfo ufed for a fpecies of harmony mentioned by Julius Pollux, and which, fays Zarlino, anfwers to the perpetual burden of our bag-pipes, which now and then muft be harmonious.

CONTINUOUS FEVERS. See CONTINUED *fever.*

CONTINUUM, or CONTINUED *quantity,* in *Phyfics,* denotes a quantity, or co-extenfion, whofe parts are not divided, but joined and connected together, fo as to leave no room to determine where one begins, and another ends.

It is controverted, among philofophers, whether a *continuum* be infinitely divifible, *i. e.* divifible into infinite proportionable parts?

The ancients attributed the rife of water, in pumps, to the love of continuity, and the abhorrence of a vacuum; becaufe the weight and preffure of the air were not then known.

Mathematicians divide quantity into *continued* and *difcrete.* The former being that which is expreffed by lines, and makes the fubject of geometry; and the latter comprehending thofe that are expreffed by numbers, which make the fubject of arithmetic.

In medicine and chirurgery, wounds, ulcers, fractures, &c. are expreffed by the phrafe *folutio continui,* or *folution of continuity.*

In a critical fenfe, we fay, there ought to be a continuity, *i. e.* a connexion between the parts of a difcourfe.

In the epic poem, particularly, the action fhould have a continuity in the narration, though the events, or incidents, be not continued. As foon as ever the poet has opened his fubject, and brought his perfons on the ftage, the action is to be continued to the end; every character muft be at work, and no fuch thing as an idle perfon to be feen.

F. Boffu obferves, that, by retrenching dull languifhing incidents, and intervals void of action, which break the continuity, the poem acquires a continued force, which makes it run equally throughout.

CONTOBABDITES, a fect in the fixth century. Their firft leader was Severus of Antioch, who was fucceeded by John the grammarian, furnamed Philoponus, and one Theodofius; whofe followers were alfo called Theodofians.

Some of them who were willing to receive a book compofed by Theodofius on the Trinity, made a feparate body, and were called *Contobabdites,* from a place not known, which Nicephorus does not mention, but which muft apparently have been the place where they held their affemblies.

The Contobabdites allowed of no bifhops; which is the only circumftance tranfmitted to us concerning them.

CONTOOCOOK, in *Geography,* a river of the United States of America, in New Hampfhire, which runs into the Merrimack, four miles N. of Concord.

CONTOPÆCTÆ, of κοντος, *pole,* and πηκτος, *compact,* in *Antiquity,* a fort of artifts who fupported a pole on their foreheads fo firmly, that boys could play, dance, and wreftle together on it.

CONTOR, or CUNTORE, in *Ornithology.* See CONDORE.

CONTORSION, in *Surgery,* a twifting or deformity of fome part of the body; arifing generally from a difeafed ftructure of the bones, or an irregular action of the mufcles. Thus a contorfion of the back may be occafioned by a caries, or a rickety difpofition in the vertebræ; and a contorfion, or twifting of the head, fo that the chin fhall be turned towards one fhoulder, may arife from a paralyfis, or a fpafmodic ftate of the fterno-maftoid mufcle. But the nature of this difeafe is more particularly defcribed under the article DISTORTION, to which the reader is referred.

CONTORTÆ, or CONTORTI, in *Botany,* the twenty-ninth natural order in the Philofophia Botanica of Linnæus, and the thirtieth of the Prelections. In the Philofophia Botanica, it confifts of the following genera: rauwolfia, tevetia, cerbera, plumiera, tabernæmontana, cameraria, periploca, nerium, vinca, apocynum, cynanchum, ceropegia, afclepias, ftapelia. In the fynoptic table, annexed to the Prelections, they ftand thus: I. Pericarp a follicle; tabernæmontana; cameraria; plumeria; echites; nerium; ceropegia; vinca; apocynum; afclepias; cynanchum; periploca; *pergularia;* ftapelia; *embothrium, *Forft.* *rhopala, *Aubl.*; *plectronia? allamanda.* II. Pericarp a capfule; macrocnemum; *manettia;* cinchona, removed from cymofæ; *portlandia; rondeletia; hillia; genipa.* III. Pericarp a berry; *gardenia*; *muffænda; randia*; * fagræa, *Thunb.; cariffa; pæderia; arduina;* lycium and ceftrum, both removed from vepoeculæ; *gynopogon, *Forft.*: *willughbeja. *Schreb.*; melodinus, *Linn. jun.* IV. Pericarp a drupe; rauwolfia; cerbera. Thofe printed in italics were added by Linnæus himfelf; thofe marked with an afterifk, by Gifeke from other authors. The order was named by Linnæus, from the form of the corolla, which is twifted in a direction contrary to the fun: its border, when open, refembles a wheel, each fegment having generally unequal fides, with the fhorter fide placed under the longer fide of the preceding one. Only three of the genera are natives of Europe, afclepias, vinca, and cynanchum: moft of them are lactefcent and poifonous;

fome highly deleterious. *Root* perennial. *Leaves* undivided, generally oppofite, fometimes three or four together, rarely alternate. *Inflorefcence* of ten fingular, the peduncle arifing from the fide of the ftem betwixt the pairs of leaves, not from their axils. *Calyx* one-leafed, five-cleft. *Corolla* regular, monopetalous, five-cleft; ftructure of the nectaries in moft genera very fingular. *Stamens* five. *Piftils* two, or one with a double ftigma. Germ generally fuperior.

CONTOUR, in *Painting* or *Drawing*, a French word, fynonymous with contorno in the Italian, and outline in the Englifh language. Perfection of outline conftitutes, perhaps, the greateft difficulty in painting; although it is, properly fpeaking, only *one* of the requifites of defign; yet the knowledge of it feems neceffarily to pre-fuppofe a thorough acquaintance with all the remainder; and hence the adage of Annibale Caracci, not very delicately expreffed in the Italian, "Give me but a correct outline, and fill it up as you pleafe!" See Design.

Contour, alfo denotes the compafs, limits, or enceinte of a country, place, camp, plan, defign, &c. It is the ground work of each of thefe things.

CONTOURNE', a French term applied to any animal that is ftanding or paffing with its face towards the finifter fide of the efcutcheon. In Englifh heraldry it is termed *counter-paffant*.

CONTOURNIATED, or Contorniated, a term applied among *Antiquaries* to a fpecies of medals, fo called from the Italian *contorniato*, encircled, on account of the hollow circle which commonly runs round them. They are diftinguifhed from medallions, as they are fometimes denominated, not by their fize, but by their thinnefs; faint relief; reverfes fometimes in *intaglio*, hollowed, not raifed; and, in general, by their peculiar and inferior workmanfhip. Medallic writers have formed various opinions concerning thefe fingular pieces of coinage. Some fuppofe that they were ftruck by Gallienus, to the memory of illuftrious men, and celebrated athletæ, at the time when he caufed all the confecration-coins of his predeceffors to be reftored. This fentiment feems nearly to have been adopted by M. Mahudel, who fays, (Hift. de l'Acad. des Belles Lettres, tom. v. p. 284.) that the contorniati were ftruck originally at Rome, about the clofe of the third century. F. Hardouin conjectures, that they were not earlier than the 13th century; other antiquaries refer them to the fifth century; and others find inftances of them as ancient as the time of Nero; others again afcribe the invention of them to Greece, in her days of glory, and they fuppofe that they were appropriated to the purpofe of honouring the memories of great men, and principally of thofe who had borne away the prize at the folemn games; fuch are thofe which bear the names or images of Homer, Solon, Euclid, Pythagoras, Socrates, Apollonius Tyanæus, and feveral Athletæ, whofe victories are expreffed upon them by palms, and chariots, either bigæ or quadrigæ. Havercamp, in an exprefs work on thefe pieces, thinks they were ftruck from the times of Conftantine I. to thofe of Valentinian III. on account of the public games. Mr. Pinkerton (Eff. on Medals, vol. i. p. 232.) fuggefts, that they were tickets for different places in the public games. The dye, appearance, device, infcription of the reverfe—every thing—confirmed this opinion; which he has found perfectly confonant to that of two or three of the firft medallifts in this country. This opinion is fo far conformable to that of Havercamp, and others, as it fuppofes that thefe pieces were ftruck upon occafion of the games. But it differs in reprefenting thefe medals, as mere tickets for places at the games; and ftill more in fuppofing them ftruck in all ages of the empire, from Auguftus, downwards. Thofe who fuppofe them ftruck in the lower empire, are reduced to the deplorable dilemma of imagining, that Chriftian princes thought Nero's head an honour to their games; and that they preferved the portrait of Apollonius Tyanæus, the enemy of their faith, and thofe of other Pagan philofophers. Joubert indeed afcribes them to the upper empire, without determining whether they were ftruck under one prince, or all who gave games. Mr. Pinkerton is convinced, that they were ftruck under the various emperors whofe names they bear; and that when Conftantine I. introduced Chriftianity, they would almoft vanifh, inftead of beginning, according to the opinion of Havercamp. The difference of workmanfhip, in thefe pieces, if accurately infpected, may fhew this of itfelf, independently of other reafons. Although thefe pieces are of different kinds, they are moftly of a fize between two and three inches in diameter. Some have, upon the obverfe part, the head of the emperor or emprefs, who gave the games; and almoft a feries of them might be formed from Auguftus down to Gallienus. In confirmation of this opinion, it is further alleged, that thofe emperors, who were remarkably diftinguifhed by their attachment to public diverfions, occur very frequently on thefe pieces, which Mr. Pinkerton calls "ticket-medals," whereas others appear more feldom, and thofe who never prefented any games, not at all. Thofe with Nero on their obverfes are fo common as to be of very little value. Other obverfes preferve the portraits of illuftrious authors of antiquity, that are no where elfe to be found. Salluft, Horace, and other Roman writers, were delineated on thefe tickets, when the memory of their perfons was yet frefh to the inhabitants of Rome, and we may therefore depend upon their portraits. This cannot be faid of the Greek portraits of Homer, Solon, Pythagoras, Socrates, and others, all which our author fuppofes to have been ftruck at Rome, when Grecian actors were to perform, or in the Grecian cities, during the Roman empire. A few obverfes prefent athletæ, or actors in the games, and fuch are commonly reprefented holding a horfe by the rein, or in fome other attitude peculiar to their profeffion. On the reverfes there is almoft always a charioteer driving a chariot, or fome fimilar device, peculiar to public games. Thofe ftruck for the theatre are the moft fcarce, and have fometimes on the reverfe an actor at full length, with "Placeas," *mayeft thou pleafe*, or fome fuch legend. One, in particular, has a buft of Salluft on the obverfe; and on the other fide three perfons, one of whom bears an inftrument, refembling the common flute; another an inftrument like the fcenic flute feen in the hands of Pan; while the third is declaiming. The legend is "Petroni placeas," *mayeft thou pleafe, Petronius*. The perfon declaiming is Petronius, who was, perhaps, that day, to make his firft appearance upon the Roman ftage; and the whole defign, in this laft inftance, is fo clear, that Mr. Pinkerton cannot forbear being furprifed, that the intention of thefe tickets fhould fo long have efcaped the medallic authors. The fuppofition that they were tickets for different feats, or places, at the games, is further confirmed by the variety of marks to be found on the obverfes of them. Some have a fprig of laurel; others a P, with an E below it, implying, perhaps, "podium equeftre," or the box of the equeftrian order, which laft is very common; others bear a particular animal, or fome fuch badge. All thefe marks, in tickets perfectly preferved, are cut in the brafs, and then filled up with filver. The pieces of this clafs, with imperial portraits, are of little value; thofe bearing the images of illuftrious men, are eftimable, though not of great price. Apollonius Tyanæus, who flourifhed in the reign of Domitian, and Apuleius, who lived in that of Antoninus the philofopher, are, it is believed, the lateft

lateſt of that deſcription who appear upon theſe ticket-medals.

CONTRA, or Counter, in *Compoſition*. See Counter.

Contra, *Lat.* a prepoſition frequently uſed by the Italians in their *Muſic*: *contrappunto*, counterpoint; *contra baſſo*, double baſe; *contralto*, counter tenor; *contrappunto doppia*, double counterpoint; *contrappunto ſemplia*, ſimple counterpoint; *contrappunto fiorito*, florid counterpoint, &c. This Latin word, which the Italians have adopted, was originally applied to all the ſeveral parts deſtined to make harmony to a plain ſong or melody, as counterpoints or counterparts to the canto fermo. Thus, harmony in four and more parts was formed: as *baſſo*, baſe; *medius*, mean or middle part; *alto tenore*, high tenor, from the ſituation of the clef on the ſtaff; the *diſcantus*, *ſoprano*, *triplum*, or treble. When the alto tenore ſung the part oppoſite or *againſt* the treble, it was called *contralto* or *counter tenor*; and when a lower part was employed than the baſe, it was called *contra baſſo*: the title now given to a double baſe.

Contra, in *Surgery*. See Counter-*fiſſure*, Counter-*extenſion*, Counter-*opening*, Counter-*ſtroke*, &c.

Contra *battuta*, in *Muſic*, againſt, or out of time.

Contra *formam collationis*, in *Law*, a writ that lay where a man had given lands, in perpetual alms, to a religious houſe, hoſpital, ſchool, or the like, and the governor, or managers, had alienated the lands, contrary to the intention of the donor, for the recovery of them. Reg. Orig. 258.

This was founded on the ſtatute of Weſtm. 2. cap. 1.

Contra *formam feoffamenti*, a writ that lay for the heir of a tenant, infeoffed of lands or tenements by the lord's charter, to make certain ſuit and ſervice to his court; who was afterwards diſtrained for more ſervices than were contained in the charter. Reg. Orig. 176. Old Nat. B. ii. 162.

Contra *formam ſtatuti*, is the uſual concluſion of every indictment, &c. laid on an offence created by ſtatute.

If one ſtatute be relative to another, as where the former makes the offence, and the latter adds a penalty, the indictment ought to conclude *contra formam ſtatutorum*. 2 Hale's Pl. C. 173. c. 24. Where there are ſeveral ſtatutes, and it does not appear on which the information is founded, the concluſion, "contra formam ſtatuti" is ill. Cro. Jac. 142. Pl. 19. Broughton *v.* Moor, &c.

CONTRABAND, in *Commerce*, a prohibited commodity; or a merchandize bought or ſold, imported or exported, in prejudice, and contrary to the laws and ordinances of a ſtate, or the public prohibitions of the ſovereign.

The word comes from the Italian *contrabando*, of *contra* and *bando*, q. d. contrary to edict, or publication of prohibition.

Contraband goods are not only liable to confiſcation themſelves, but do alſo ſubject all other allowed merchandizes found with them in the ſame box, parcel, or bale, together with the horſes, waggons, &c. which conduct them to the ſame.

In England there are two principal contrabands for exportation, wools and live ſheep, which all ſtrangers are prohibited from carrying out, on pain of having the right hand cut off; the other, that of ſheep-ſkins and calf-ſkins, which all foreigners are in like manner prohibited from exporting, on pain alſo of having the right hand cut off; yet the ſubjects of England are allowed to tranſport the ſame from France to England. See Wool and Sheep.

Since the year 1662, when liſts were formed of contraband goods, as to the import, and which included more than fifty different ſorts, many regulations and ſtatutes have been enacted; and theſe are ſo numerous and various, and ſo liable to change in the fluctuating ſtate of commerce, that in a work of this kind it would be of little permanent utility to recite them.

In 1719 and 1720, an attempt was made in parliament to paſs a bill for putting gold and ſilver, whether in coined ſpecies, or otherwiſe, among the number of contraband goods for exportation; but in vain, by reaſon of the ſtrong oppoſition made by thoſe who enrich themſelves by the export of theſe metals; which, by the laws of the kingdom, are allowed to be ſent away, upon entering them, paying the duty of the export, and making oath of their being foreign, *i. e.* of their not being the coin or plate of the kingdom, melted down. See Customs.

CONTRACT, a mutual conſent of two or more parties, who promiſe and oblige themſelves voluntarily, to do ſomething, pay a certain ſum, or the like.

As a contract is a mutual promiſe, the obligation of contracts, the ſenſe in which they are to be interpreted, and the caſes where they are not binding, will be the ſame as of promiſes. See Promise. From the principle on which the obligation of promiſes is founded, *viz.* "that this obligation is to be meaſured by the expectation which the promiſer any how voluntarily and knowingly excites," reſults a rule, which governs the conſtruction of all contracts, and is capable, from its ſimplicity, of being applied with great eaſe and certainty: the rule is, that "whatever is expected by one ſide, and known to be ſo expected by the other, is to be deemed a part or condition of the contract." The ſeveral kinds of contracts may be comprehended under thoſe of ſale, hazard, loan of inconſumable property and of money, and labour, including ſervice, commiſſions, partnerſhip, and offices. With regard to contracts of ſale, the rule of juſtice, which ought principally to be inculcated in the making of bargains, is, that the ſeller is bound in conſcience to diſcloſe the faults of what he offers to ſale. If it be deemed diſhoneſt to magnify beyond the truth the good qualities of the commodity which we have to ſell, is it leſs unjuſt to conceal its faults? The buyer in many caſes has no ſecurity from impoſition, but in the ingenuouſneſs and integrity of the ſeller. This rule, however, admits of one exception, namely, where the ſilence of the ſeller implies ſome fault in the thing to be ſold, and where the buyer has a compenſation in the price for the riſk which he runs: as where a horſe, in a London repoſitory, is ſold by public auction, without warranty; the want of warranty is notice of ſome unſoundneſs, and produces a proportionable abatement in the price. (See Warranty.) To this head of concealing the faults of the article which we want to diſpoſe of may be referred the practice of paſſing bad money. This practice has been ſometimes defended by a vulgar excuſe, that we have taken the money for good, and muſt therefore get rid of it: that is, in other words, we have been deceived or impoſed upon, and therefore we may deceive or impoſe upon others. This excuſe is much the ſame, as if one, who had been robbed upon the highway, ſhould allege that he had a right to re-imburſe himſelf out of the pocket of the firſt traveller he met: the juſtice of which reaſoning the traveller poſſibly may not comprehend. (See Uttering *of falſe money*.) Where no monopoly or combination exiſts, the market price is always a fair price; becauſe it will always be proportionable to the uſe and ſcarcity of the article. Innumerable queſtions relating to this kind of contract are determined ſolely by *cuſtom*; not, indeed, that cuſtom poſſeſſes any proper authority to alter or aſcertain the nature of right and wrong; but becauſe the contracting parties are

 preſumed

presumed to include, in their stipulation, all the conditions which custom has annexed to contracts of the same sort: and when the usage is notorious, and no exception made to it, this presumption is generally agreeable to the fact. Thus, in justice as well as in law, what is called "the custom of merchants" regulates the construction of mercantile concerns.

By contracts of hazard are meant *gaming* and *insurance*. See these articles.

Contracts of loan comprehend those pertaining to inconsumable property, and to money. When the identical loan is to be returned, as a book, a horse, &c. it is called "inconsumable," in opposition to corn, wine, money, and those things which perish, or are parted with in the use, and can therefore only be restored in kind. The questions pertaining to this class of contracts are few and simple, and admit of an easy and obvious solution. If the thing lent be lost, or damaged by the use, or by accident in the use for which it was lent, the lender ought to bear the loss or damage. With regard to the loan of money, there exists no reason in the law of nature, why a man should not be paid for the use of his money lent, as well as of any other property into which the money might be converted. (See INTEREST and USURY.) For contracts of labour, see SERVANT, COMMISSION, AGENT, FACTOR, STEWARD, ATTORNEY, and ADVOCATE. See also PARTNERSHIP. Under this head it may be observed, that in many offices, as schools, fellowships of colleges, professorships of the universities, and the like, there is a two-fold contract; one with the founder, and the other with the electors. The contract with the founder obliges the incumbent of the office to discharge every duty appointed by the charter, statutes, deed of gift, or will of the founder; because the endowment was given, and consequently accepted, for that purpose, and upon those conditions. The contract with the electors extends this obligation to all duties that have been *customarily* connected with, and reckoned a part of, the office, though not prescribed by the founder; for the electors expect from the person they chuse all the duties which his predecessors have discharged; and as the person elected cannot be ignorant of their expectation, if he mean to refuse this condition, he ought to apprise them of his objection. Here it should be observed, that the electors can excuse the conscience of the person elected from this class of duties only; because this class results from a contract, to which the electors and the person elected are the only parties. The other class of duties results from a different contract; and with respect to these a question arises of delicate investigation, and of difficult solution, *viz.* how far the incumbent of an office may be allowed to deviate from the will of the founder, and to suppose him placed in circumstances similar to his own, and, in this new state of things, capable of forming a different judgment, and equally disposed to adapt his regulations and injunctions to the change of circumstances, which, in the course of ages, has occurred?—The best mode of easing the consciences of incumbents, in cases of this kind, is to introduce a reformation in many antiquated establishments, and in the laws, already obsolete, and, as it were, quiescent, by which they were designed by their unenlightened, but liberally disposed, founders to be regulated. Few of these contracts, to which we now refer, have, we conceive, been liberally and punctually fulfilled in modern times; and it would be unquestionably more conducive to the honour and usefulness of ancient institutions, and of official incumbents, to abolish regulations, which it is not thought proper to observe. It has been a question of some magnitude and difficulty, what offices may be conscientiously supplied by a deputy. A deputy, according to archdeacon Paley, may be allowed in all cases, to which the following objections do not apply: 1. Where a particular confidence is reposed in the judgment and contract of the person appointed to it; as the office of a steward, guardian, judge, commander in chief by land or sea. 2. Where the custom hinders; as in the case of schoolmasters, tutors, and of commissioners in the army or navy. 3. Where the duty cannot, from its nature, be so well performed by a deputy; as the deputy-governor of a province may not possess the legal authority, or the actual influence of his principal. 4. When some inconvenience would result to the service in general from the permission of deputies in such cases; *e. g.* it is probable that military merit would be much discouraged, if the duties belonging to commissions in the army were generally allowed to be executed by substitutes. In this connection, the non-residence of the parochial clergy, who supply the duty of their benefices by curates, presents itself to consideration; but as it will require a more distinct discussion, we refer to the article NON-RESIDENCE. On the subject of this article, see Paley's Principles of Moral and Political Philosophy, vol. i. p. 142—163.

CONTRACT is particularly used in *Common Law*, for an agreement or covenant between two or more persons, with a lawful consideration or cause. As, if I sell my horse for money; or covenant in consideration of 20*l.* to make you a lease of a farm; these are good contracts, because there is *quid pro quo*, or one thing for another. Or, a contract, which usually conveys an interest merely in action, may be thus defined: "An agreement upon sufficient consideration, to do or not to do a particular thing." In all contracts, therefore, our attention is directed to three points, *viz.* the agreement, the consideration, and the thing to be done or omitted, or the different species of contracts. In a contract, considered as an agreement, a mutual bargain, or convention, there must be at least two contracting parties, of sufficient abilities to make a contract, as where A. contracts with B. to pay him 100*l.*, and thereby transfers a property in such sum to B. This property, however, is not in possession, but in action merely, and recoverable by suit at law; so that it could not be transferred to another person by the strict rules of the ancient common law, for no chose in action could be assigned or granted over. See CHOSE *in action*.

This contract or agreement may be either *express* or *implied*. *Express* contracts are where the terms of the agreement are openly uttered and avowed at the time of the making, as to deliver an ox, or ten load of timber, or to pay a stated price for certain goods. *Implied* are such as reason and justice dictate, and which, therefore, the law presumes that every man undertakes to perform. There is one species of implied contract, which runs through and is annexed to all other contracts, conditions, and covenants, *viz.* that if I fail in my part of the agreement, I shall pay the other party such damages as he has sustained by such my neglect or refusal. In short, almost all the rights of personal property (when not in actual possession), do in great measure depend upon contracts of one kind or other, or at least might be reduced under some of them; and this is the method taken by the civil law, which has referred the greatest part of the duties and rights, of which it treats, to the head of obligations *ex contractu*, and *quasi ex contractu*. (Inst. 3. 14. 2.) See ASSUMPSIT.

A contract may also be either *executed*, as if A. agree to change horses with B., and they do it immediately; in which case the possession and the right are transferred together:—or it may be *executory*, as if they agree to change next.

next week; in which cafe the right only vefts, and their reciprocal property in each other's horfe is not in poffeffion but in action:—for a contract *executed* (which differs nothing from a grant) conveys a *chofe in poffeffion*; a contract *executory* conveys only a *chofe in action*. For an account of the *confideration*, upon which a contract is founded, fee CONSIDERATION.

A confideration of fome fort or other is fo abfolutely neceffary to the forming of a contract, that a *nudum pactum*, or agreement to do or pay any thing on one fide, without any compenfation on the other, is totally void in law, and a man cannot be compelled to perform it. However a man may or may not be bound to perform fuch a contract, in honour or confcience, which the municipal laws do not decide, it is certain that thefe laws will not compel the execution of what he has no vifible inducement to engage for:—and, therefore, our law has adopted the maxim of the civil law, that *ex nudo pacto non oritur actio*. (Cod. 2. 3. 10. & 5. 14. 1. Br. & St. d. 2. c. 24. Bro. Abr. tit. dette, 79. Salk. 129.) But any degree of reciprocity will prevent the pact from being nude; nay, even if the thing be founded in a prior moral obligation, (as a promife to pay a juft debt, though barred by the ftatute of limitations,) it is no longer *nudum pactum*. And as this rule was principally eftablifhed to avoid the inconvenience that would arife from fetting up mere verbal promifes, for which no good reafon could be affigned (Plowd. 308, 309.), it therefore does not hold in fome cafes, where fuch promife is authentically proved by written documents. For if a man enters into a voluntary bond, or gives a promiffory note, he fhall not be allowed to aver the want of a confideration in order to evade the payment; for every bond, from the folemnity of the inftrument (Hardr. 200. 1. Ch. Rep. 157.), and every note from the fubfcription of the drawer (Lord Raym. 760.), carries with it an internal evidence of a good confideration. Courts of juftice will, therefore, fupport them both, as againft the contractor himfelf; but not to the prejudice of creditors, or ftrangers to the contract.

The moft ufual contracts, by which the rights of chattels perfonal may be acquired by the laws of England, are thofe of *fale* or *exchange*, of *bailment*, of *hiring* and *borrowing*, and of *debt*. See thefe articles refpectively. See alfo INTEREST and USURY, BOTTOMRY and RESPONDENTIA, INSURANCE, and ANNUITY.

Every contract, whatever be its nature, implies in itfelf an *affumpfit* in law, for the performance of it; for a contract would be to no purpofe, if there were no means to enforce its performance. See ASSUMPSIT.

A diverfity occurs where a day of payment is limited in a contract, and where it is not fo limited. In the former cafe, the contract is good prefently, and an action lies upon it, without payment; but in the latter, it is otherwife. Thus, if a man buy any commodity, the contract is void, if he do not pay the money prefently; but if a day of payment be ftipulated, there the one may have an action for the money, and the other trover for the commodity. (Dyer, 30. 293.) Where a feller fays to a buyer, he will fell his horfe for a fpecified fum, and the buyer fays he will give it; if he prefently tell out the money, it is a contract; but if he do not, it is no contract. (Noy's Max. 87. Hob. 41.) The property of any thing fold is immediately in the buyer by the contract; though regularly it muft be delivered to the buyer, before the feller can bring his action for the money. (Noy, 88.) If a perfon contract to buy a horfe, or any thing elfe, of another, and no money is paid, or earneft given, nor day fet for payment, nor the thing delivered,; in thefe cafes, no action will lie for the money, or the thing fold, but it may be fold to another. (Plowd. 128. 309.) All contracts are to be certain and complete. For an agreement to give fo much for a thing as it fhould be reafonably worth, is void on account of its uncertainty: fo is alfo a promife to pay money in a fhort time, &c. or to give fo much, if a perfon likes the thing when he fees it. (Dyer, 91. 1 Bulft. 92.) But if I contract to give another 10*l*. for fuch a thing, if I like it on feeing the fame; this bargain is faid to be perfect at my pleafure, though I may not take the thing before I have paid the money:—if I do, the feller may have trefpafs againft me: and if he fell it to another, I may bring an action on the cafe againft him. (Noy, 104.) If a contract be to have for cattle fold 10*l*., if the buyer do a certain thing, or elfe to have 20*l*. it is a good, and fufficiently certain contract. Alfo, if I agree with a perfon to give him fo much for his horfe, as A. B. fhall judge him to be worth, when he hath judged it, the contract is complete, and an action will lie on it: and the buyer fhall have a reafonable time to demand the judgment of A. B. But if he die before the judgment is given, the contract is determined. (Perk. fect. 112, 114. Shep. Abr. 294.) In contracts, the time is to be regarded, in and from which the contract is made; the words fhall be taken in the common and ufual fenfe; and the law doth not fo much regard the form of words, as the fubftance, and the mind of the contracting parties. (5 Rep. 83. 1 Bulft. 175.) A contract for goods may as well be made by word of mouth, as by deed in writing; and where it is merely written, but not fealed and delivered, it is the fame as if it were verbal. But if the contract be by writing fealed and delivered, and fo converted into a deed, it is of another nature; and in this cafe generally the action on the verbal contract is gone, and fome other action lies for the breach of it. (Plowd. 130, 309. Dyer, 90.) Contracts, not to be performed in a year, are to be in writing, figned by the party, &c., or no action may be brought on them; but if no day is fet, or the time is uncertain, they may be good without it. (Stat. 29 Car. II. c. 3.) And by the fame ftatute, no contract for the fale of goods for 10*l*. or upwards, fhall be good, unlefs the buyer receive part of the goods fold, or give fomething in earneft to bind the contract; or fome note thereof be made in writing, figned by the perfon charged with the contract. See SALE.

CONTRACT, *nude* and *quafi*. See the adjectives, and CONTRACT *fupra*.

CONTRACT, *Simple*. See SIMPLE and DEBT.

CONTRACT, *Special*. See SPECIALTY and DEBT.

CONTRACT, *ufurious*, is a contract to pay more intereft for money than the laws allow.

It is a devaftavit in executors to pay a debt upon an ufurious contract. See USURY.

CONTRACT *of Marriage*. The Romanifts diftinguifh the civil contract, which is the confent of the parties, from the *facrament*, which is the benediction of the prieft.

Thofe contracts are faid to be *null*, which the law prohibits: fuch are all contracts between perfons incapable of contracting, as minors, religious, lunatics, wives without confent of their hufbands, &c.

In order to a good civil marriage, the parties muft not only be willing and able to contract, but actually muft contract themfelves in due form of law. Any contract made, *per verba de præfenti*, or in words of the prefent tenfe, and in cafe of cohabitation *per verba de futuro* alfo, between perfons able to contract, was before the act (26 Geo. II. c. 33.) deemed a valid marriage to many purpofes; and the parties might be compelled in the fpiritual courts to celebrate it *in facie ecclefiæ*. But thefe verbal contracts are now of no force, to compel a future marriage. See MARRIAGE.

CONTRACT,

Contract, *Original*, in *Englifh Hiftory*, denotes that reciprocity of protection and fubjection, which fubfifts between the king of Great Britain and his fubjects. The duties refulting from hence are what, according to judge Blackftone, (Comm. vol. i.) were meant by the convention in 1688, when they declared that king James had broken the "original contract" between king and people. But however, as the terms of that original contract were in fome meafure difputed, being alleged to exift principally in theory, and to be only deducible by reafon and the rules of natural law; in which deduction different underftandings might very confiderably differ; it was, after the revolution, judged proper to declare thefe duties exprefsly, and to reduce that contract to a plain certainty. So that, whatever doubts might be formerly raifed by weak and fcrupulous minds about the exiftence of fuch an original contract, they muft now entirely ceafe, efpecially with regard to every prince, who hath reigned fince the year 1688. As to the terms of the original contract between king and people, thefe the learned judge apprehends to be now couched in the *coronation oath*; which fee. See alfo Constitution and King.

Contract is alfo ufed for the inftrument in writing, which ferves as a proof of the confent granted, and the obligation paffed between the parties.

Among the ancient Romans, contracts, and all voluntary acts, were written, either by the parties themfelves, or by one of the witneffes, or by a domeftic fecretary of one of the parties, whom they call a *notary*; but who was no public perfon, as among us.

The contract, when finifhed, was carried to a magiftrate, who gave it a public authority by receiving it *inter acta*, into the number of the acts under his jurifdiction; giving each of the parties a copy thereof, and fealed with his feal. Which practice paffed into France, where it obtained a long time. The confcientious performance of private contracts between man and man is frequently recommended in the Koran. For the prevention of difputes, all contracts are directed to be made before witneffes, and in cafe fuch contracts are not immediately executed, the fame ought to be reduced into writing in the prefence of at leaft two witneffes, (which feems to have been alfo required by the Jewifh law, even in cafes where life was not concerned,) who ought to be Moslems and of the male fex; but if two men cannot be conveniently had, then one man and two women may fuffice. The fame method is alfo directed to be taken for the fecurity of debts to be paid at a future day; and where a writer is not to be found, pledges are to be taken. Hence, if people truft one another without writing, witneffes, or pledge, the party on whom the demand is made is always acquitted if he denies the charge on oath, and fwears that he owes the plaintiff nothing, unlefs the contrary be proved by very convincing circumftances. Sale's Koran, Introd. p. 139.

Contracts, in *Rhetoric*, furnifh one head or clafs of external arguments. (See Argument and Topics.) In this view of them, they are either public or private. Public contracts denote tranfactions between different ftates, as leagues, alliances, and the like; which depend on the laws of nations. Thofe are called private, which relate to leffer bodies, or focieties of men, and fingle perfons, and they may be either written or verbal. With refpect to the force and obligation of contracts, the Roman law declares, that "nothing can be more agreeable to human faith, than that perfons fhould ftand to their agreements." Therefore in controverfies relating to this kind of human teftimony, the party, whofe intereft it is, that the contract fhould be maintained, will plead, that fuch covenants have the force of private laws, and ought religioufly to be obferved, fince the common affairs of mankind are tranfacted in that manner; and therefore to violate them is to deftroy all commerce and fociety among men. On the other fide it may be faid, that juftice and equity are chiefly to be regarded, which are immutable; and befides, that the public laws are the common rule to determine fuch differences, which are defigned to redrefs thofe, who are aggrieved. Indeed, where a compact has been obtained by force or fraud, it is in itfelf void, and has no effect either in law or reafon. But on the other hand, the Roman lawyers feem to have very rightly determined, that all fuch obligations, as are founded in natural equity, though not binding by national laws, and are therefore called "nuda pacta," ought however in confcience and honour to be performed.

CONTRACTED vein, in *Hydraulics*, (*Vena contracta* of Newton,) is a name given to the contraction which has been obferved in a ftream of fluid iffuing out of an aperture. When water, or other fluid analogous to water, iffues out of an aperture in the thin fide or bottom of a veffel containing that fluid, as at A, *fig.* 1 and 2; *Plate* I. *Hydraulics*, the fize of the aperture being very fmall in proportion to the fide or bottom of the veffel, the ftream AB is not of the fame fhape throughout its whole length, nor is it of an uniform fize. When the aperture is circular, the diftance of the narroweft part of the ftream, from the infide furface of the veffel, is about equal to the radius of the aperture This narroweft part of the ftream has been called *the contracted vein*; the whole ftream itfelf having been ufually denominated *the vein of fluid*, by writers on the fubject. From the place of the contracted vein forwards, the ftream enlarges its dimenfions, and fometimes divides itfelf into different fmaller ftreams. The diameter of the contracted vein, or narroweft part of the ftream, is fubject to a little variation, arifing from the fize of the veffel in proportion to the aperture, and partly from the *charge* of the veffel, (*viz.* from the height of fluid in the veffel above the level of the aperture); hence the diameter of the contracted vein, as meafured by different authors, has not turned out exactly of one invariable dimenfion; the difference, however, is not very material; as appears from the following table, which contains the different meafurements of the contracted vein; calling the diameter of the circular aperture *one*.

Authors of the experiments.	*Diameter of the contracted vein.*
Poleni (de Caftellis, § 35.) - - -	0.790
Michelotti; Sperim. Idraul. tom. II. Exp. 4.	0.800
Boffut (Hydrodyn. art. 437. Exp. 5.) -	0.818
Venturi, with 35 inches charge, and an horizontal circular orifice of 18 lines in diameter - - - -	0.798

From a mean of the above meafurements, it may be concluded, that the diameter of the contracted vein is little more than eight-tenths of the diameter of the aperture. That fhort part of the ftream which ftands between the aperture and the greateft contraction, is not uniformly conical, but it approaches to the figure of an hyperbolic conoid.

This contraction of the ftream is undoubtedly owing to the different directions, and different velocities, with which the various parts (or, as they are called, *filaments*) of the fluid run towards the aperture, as is indicated by the *figs.* 1 and 2. Hence it has been obferved, that when the aperture is very large in proportion to the fize of the veffel, the contraction of the ftream is lefs evident. And fuch, alfo, is in great meafure the cafe, when the fide of the veffel in which the aperture is made, is not very thin.

The

The various filaments of the fluid, which run from every part of the veffel in oblique directions towards the aperture, partly crofs each other at the contracted vein; and this croffing, or tendency to crofs, is one of the caufes which enlarge the ftream beyond that place. It is evident, that with apertures of different fhapes, the form of the contracted vein, that is of the ftream of that place, muft vary confiderably. But profeffor Venturi, defirous of determining the effects of fome of thofe variations from the circular fhape, made the following experiments with orifices of peculiar fhapes.

"In the orifice A B C D, (*fig.* 3.) the two fides A, B, are parallel to the horizon; the extremities are rounded; the width of this aperture is lefs than two lines, its length 18 lines, and the charge 32.5 inches. The fection of the ftream which iffues from this orifice, firft affumes the form E F, after which, the two extremities E, F, approaching nearer and nearer to enlarge the middle part of the fection of the ftream, at 4.5 inches diftance from the orifice, acquire the quadrangular form G H. The ftream afterwards extends itfelf in the perpendicular direction, in the form of a large fan K L. I have repeated the experiment, by placing the longitudinal axis of the orifice C D vertically. In this cafe the fame phenomena were produced, E F becoming vertical, and K L horizontal, both preferving their form."

"The fluid filaments, which, iffuing out of the orifice, pafs near the two oppofite borders A, B, are very near each other, and becoming convergent, they tend to unite at a very fhort diftance from the orifice itfelf. The filaments C, D, are more remote, and, perhaps, lefs convergent; they cannot unite but at a greater diftance than the two former. In this cafe, therefore, there are movements which tend to form two contractions, the one nearer, and the other more remote from the orifice; thefe two contractions counter-balance each other in part. Their mutual oppofition carries the effect, G H, to a diftance five times greater than that of the contracted vein of a circular orifice, having a diameter of the fame breadth as that of this orifice."

"In this experiment we fee the caufe of a phenomenon, which has been obferved in fome particular cafes by Poleni and others, without giving the explanation. In every orifice of a right-lined figure through a thin plate, the angles of the contracted vein anfwer to the fides of the orifice and the contrary. When the quadrangular orifice has the fituation M N O P, the greateft contraction of the ftream is made at a greater diftance than in a circular aperture; it affumes the form and fituation Q R S T. The reafon is, that the oppofite angles M, P, are more remote from each other, than the fides I, V, whence the fame thing happens as in the long orifice A C B D. In the fame manner, the triangular orifice in the fituation X, produces a contraction of the form, and in the fituation Z, &c."

When the horizontal oblong aperture, C D, (*fig.* 3.) was ufed, the diftance of the contracted vein from that orifice, was found to vary with the height of the fluid; as fhewn in the following table; from which it appears, that the contraction of the ftream takes place at a greater diftance, under ftrong charges, than in thofe which have but little elevation.

Height of the charge above the orifice C D.	Diftance of the greateft contraction G H.
Inches.	*Lines.*
32.5	53.
18.	48.
10.	40.
6.	36.

If a cylindrical tube be fitted to a circular aperture in the fide of the refervoir, or veffel containing the fluid, and part of it be pufhed into the interior part of that veffel, the contraction of the vein will be greater, and the quantity of fluid that runs out in a given time, will be lefs, than without fuch tube. If to the external part of the circular orifice, a fhort tube be adapted exactly of the fhape of the contracted vein, or very nearly fo, as in *fig.* 4, (it being a tube nearly conical, but with its fides a little convex inwardly,) the quantity of fluid that runs out in a given time, will be the fame, or very nearly the fame, as when the fimple aperture is ufed, without fuch tube.

The velocity of the fluid is far from being the fame in every part of the ftream; for fince the fame quantity of fluid muft pafs through every tranfverfe fection of the ftream in a given time, it follows, that the velocity muft be inverfely as the area of each tranfverfe fection. Therefore the velocity at the contracted vein is greater than at the circular aperture; and fince the areas of the fections at thofe two places, are as the fquares of their diameters, and the diameter of the contracted vein is to that of the circular aperture nearly as eight to ten, or as four to five; hence we fay, as 16 is to 25, fo is the velocity at the aperture, which we fhall call *one*, to the velocity at the vena contracta; that is, as one to 1.56.

CONTRACTILE Force, that property, or power, inherent in certain bodies, whereby, when extended, they are enabled to draw themfelves up again to their former dimenfions. For the caufe of this property, which is of the utmoft confequence to a right underftanding of the animal œconomy, fee Fibre.

CONTRACTION, in *Surgery*, from *contraho*, to draw together; a rigid or ftiffened ftate of any part in the body, but efpecially of the joints. This rigidity may arife from a morbid condition, either of the bones, ligaments, or mufcles; and may proceed from a great variety of caufes. Cullen has given four fpecies of contractions; but Sauvages has multiplied them to the number of eleven! The furgeon who knows the caufe and feat of this complaint, will not, however, pay much regard to thofe nofological diftinctions, in his method of cure. If the morbid change arifes from inflammation and thickening of the parts affected, he will ufe difcutient remedies, fomentations, and emollient poultices; or, after the inflammatory ftage has fubfided, he will employ electricity, friction, ftimulant embrocations, and moderate extenfion of the affected mufcles, &c. If the rigidity be very obftinate, and the ligaments yield with great difficulty, the furgeon will ufe mechanical force more freely, and perhaps will enjoin the exercife of alternate bending and ftraightening the limb, by means of pulleys or fteel fprings, befides the occafional adminiftration of the vapour-bath, or hot ablutions. The principles of the art being underftood, and the nature of the cafe which comes before us, it will not be difficult, by fteady perfeverance, to overcome a great number of obftacles which prefent themfelves, in the treatment of contractions.

When the difeafe is occafioned by an union of the bones which form a joint, the mobility of the limb is not to be expected. This fpecies of contraction is named *anchylofis*, and is explained at large in a feparate article of this work. (See Anchylosis,) When one mufcle is found in a ftate of permanent contraction, *e. g.* the fterno-maftoid of the neck, it is fometimes requifite to divide the mufcle in order to effect the cure. (See Distortion *of the neck*). We underftand that Mr. Carpue, furgeon of his majefty's forces, has invented many ingenious mechanical inftruments, which will foon be made public, for the relief of this clafs of difeafes.

Contraction, in *Grammar*, the reduction of two vowels, or syllables, into one; as, *may'nt*, for *may not*; *should'st*, for *shouldest*, &c.

The Greeks abound with contractions, both in their verbs and their nouns.

In this language, two simple vowels concurring in the same word are generally combined into a diphthong; and in this case the concurrent vowels are said to be contracted. Contraction is either *simple* or *compounded*; *simple*, when constituent vowels are retained unchanged; and *compounded*, when a new sound results. *E. G.* The contraction of τειχεϊ into τειχεῖ is simple; that of τειχεος into τειχους is compounded. The first sort of contractions is called *synæresis*, the second *crasis*. When two succeeding vowels have dots above them, they are separately sounded; but when contracted, they have over them the circumflex accent; hence τειχεϊ has three syllables, but τειχεῖ only two. Every contraction, whether simple or compounded, is the coalition of two short vowels; and it takes place in nouns of every declension, in adjectives, in verbs, and in the combination of the article and prepositions with the succeeding words. Simple contractions are all reducible to the following rule.—Let the concurring vowels, instead of being sounded separately, be expressed by a single impulse of the voice; αι ᾶι, αυ ᾶυ, ει, εῖ, &c. The difficulty lies in the compounded contractions; but all the varieties of these may be comprehended under the four succeeding cases. 1. If the two short vowels to be contracted be the same, they are already represented by one of them lengthened. Thus αα, ιι, εε, are contracted into ᾶ, ῖ, ῆ, respectively. Note, however, that, in the common tongue, the contraction of εε is not into ῆ, but into its equivalent εῖ: and the contraction of οο is not into ω, but into ου. 2. If the concurrent vowels be not the same, that which is predominant in sound prevails over that which is subordinate to it. The predominant vowel must in most instances be the prepositive; since this pre-occupies the organs, and thus demands a fuller enunciation. The subjunctive, therefore, is lost in the contraction; and its only effect is to lengthen the prepositive, when a *doubtful vowel*, but to convert it, if *short* by nature, into its correspondent long one. Hence αε, εα, ου, and οε are contracted into ᾶ, ῆ, ω, and ω respectively. The exceptions to the above principle are the following: verbs in μι of the first class, in order to be distinguished from the third person plural, have in the three singular, αε contracted into η. The diphthongs εα, οα, when succeeded by ς are contracted, the former into ει, and the latter into ου. If a vowel, or ρ, precede εα, they are contracted into α. By attention to the pronunciation of ο, α, ε, it will be perceived that the first, having a fuller sound, predominates over the second and third; and, therefore, αο are contracted, not into ᾶ, but into ῶ. In the concurrent vowels εο, the latter prevails in sound over the former, and consequently, the contraction is into ου, not into ω. Conformably to the second case οε would be contracted into ω; but its contraction, in the common tongue, like that of εο, is generally into ου. 3. The vowels ιυ, being predominant in sound, and from their nature incapable of coalescing with those subjoined to them, cause the subjunctive to be expelled: as ιεραξ, ιραξ, a hawk, οφιας, οφις, a serpent, ιχθυας, ιχθῦς, fishes, &c. 4. As the contraction is the union of two short vowels into one compound sound, it follows, that a short vowel preceding a long one, as having no effect in lengthening a sound which does not admit of different degrees of length, is dropped in the contracted form; as Απελλεης, Απελλῆς, Apelles, Βασιλεων, Βασιλῶν, kings, τιμαω, τιμω, I honour, &c. When a vowel precedes a diphthong, it is either itself rejected, or it causes to be rejected one of the constituents of that diphthong: thus, α preceding ει, ου, expels the subjunctives ι, υ; but preceding οι, α is itself rejected. In like manner, ε is rejected, when preceding ει, οι, or ου. When ο precedes ει, it requires in nouns and adjectives the rejection of the subjunctive: also in the infinitive mood of verbs in οω, ο preceding ει requires ι to be rejected; but in the second and third persons singular indicative, the prepositive is dropped. Before οι and ου, ο is itself rejected. In the adjectives ἁπλοη simple, διπλοη double, ο is expelled;—thus, απλῆ, διπλῆ. See Jones's Grammar of the Greek Tongue, on a new and improved Plan, part ii. chap. 1.

Contraction, in *Logic*, or *Composition*, a species of reduction, wherein the thing that reduces does also abridge, or bring the thing reduced into a lesser compass.

The design of contraction is to bring things, which before were too lax and diffusive, nearer together; that so their mutual relation may appear the more clearly, and they may better strengthen and support each other.

To this head are referred the arguments, as they are called, of poems and orations; the titles and summaries of chapters, &c. See Abridgment.

Contraction, in a general sense, means diminution of the bulk, or extent, of any thing; the nearer approach of its parts to one another. This word is generally used in philosophy, in surgery, in grammar, in the arts, &c. In philosophy the contractions mostly noticed, are those which arise from a diminution of temperature. The shortening of the dimensions of a body is the general effect; but at certain periods of their contraction, bodies change their apparent state of existence; thus the vapour of water is contracted by a diminution of temperature from a higher degree, down to about 212° of Fahrenheit's scale; but below that degree, its contraction is very great, and it is thereby converted into fluid water, in which state it occupies not more than about the 1800th part of the space it took up a little before its conversion into water. Similar phenomena are to be observed with most other bodies, and the particulars which need be remarked concerning them, are the rate, the quantity, and the limits of contraction in different bodies. But those particulars being the reverse of the phenomena which are described under the denomination of *expansion* or *dilatation*, are with more perspicuity stated under those articles, to which the reader is referred. It is, however, necessary in this place briefly to state a few particulars which seem less regular, and some which arise, not from a simple cause, but from the compound effect of pressure, and of diminution of temperature.

"When an elastic fluid is contracted by cold within certain limits, determined by a degree of pressure to which it is exposed, as well as by the nature of the fluid, its particles become subjected to the force of cohesion; they rush still nearer together, and form a liquid. Thus, when steam under the common atmospheric pressure, is cooled below the heat of boiling water, it is instantly condensed, and becomes water; but with a pressure of two atmospheres, it would be condensed at a temperature 36° higher, and with the pressure of half our atmosphere only, it might be cooled without condensation 33° lower than the common temperature of boiling water. And similar effects take place in vapours of other kinds at higher or lower temperatures, a double pressure producing, in all cases, an equal disposition to condensation, with a depression of temperature of between 20 and 40 degrees, and most commonly

of about 35° of Fahrenheit. Thus the vapour of spirit of wine is usually condensed at 175° of Fahrenheit; but with a double pressure it is condensed at a temperature 39° higher; and with the pressure of half an atmosphere, at a temperature 35° lower; and the vapour of either, which is commonly condensed at 102°; requires a temperature 38° higher, with a double pressure, or as much lower with half the usual pressure. If the temperature be below the freezing point of the liquid, the pressure being sufficiently lessened the vapour may still retain its elasticity, but a further reduction of temperature or increase of pressure will convert it immediately into a solid."

Water, and all aqueous fluids, are gradually contracted by a diminution of temperature, until they arrive at a certain point which is about eight degrees above the freezing point; but below that point they begin to expand and continue to do so according as their temperature is lowered. Effects nearly similar have been observed with a few metallic substances.

Speaking of contraction, a remarkable phenomenon, of considerable importance in manufactures, obtrudes itself on our notice. It is the hardness which certain bodies acquire in consequence of a sudden contraction, and this is particularly the case with glass and some of the metals. Thus glass vessels suddenly cooled after having been formed are so very brittle, that they hardly bear to be touched with any hard body. The cause of this effect is thus properly explained by Dr. Young. "When glass in fusion is very suddenly cooled, its external parts become solid first, and determine the magnitude of the whole piece; while it still remains fluid within. The internal part, as it cools, is disposed to contract still further, but its contraction is prevented by the resistance of the external parts, which form an arch or vault round it, so that the whole is left in a state of constraint; and as soon as the equilibrium is disturbed in any one part, the whole aggregate is destroyed. Hence it becomes necessary to anneal all glass, by placing it in an oven, where it is left to cool slowly; for, without this precaution, a very slight cause would destroy it. The Bologna jars, sometimes called proofs, are small thick vessels, made for the purpose of exhibiting this effect; they are usually destroyed by the impulse of a small and sharp body, for instance, a single grain of sand, dropped into them, and a small body appears to be often more effectual than a larger one; perhaps because the larger one is more liable to strike the glass with an obtuse part of its surface." See *Prince* RUPERT's *Drops*.

The hardening of steel is an effect of the same sort. The piece of steel is made red-hot, and, in that state, is suddenly cooled and contracted by immersion in water; in consequence of which it remains so brittle and hard, as not to suffer its being filed or hammered. If, instead of water, the piece of red-hot steel be plunged in oil, its contraction is not so sudden, and of course its hardness will not be so great. If it be plunged in quicksilver, which cools it much quicker than water, its hardness becomes so great as to render it capable of cutting or scratching glass like a silicious body. But, on the other hand, if the piece of steel, after its having been rendered red-hot, be suffered to contract gradually in the air; then its texture will easily yield to the hammer or to the file.

The necessity and importance of attending to the minute variations in the bulk of bodies by heat and cold, was never before, perhaps, so strikingly exemplified, as in the government Trigonometrical Survey, begun under general Roy, in the year 1784, by the measurement of a base of 27404.3 feet in length on Hounslow Heath, near London. This was first measured by long deal rods, which were soon laid aside, on account of their great and variable contraction and expansion, and long glass rods or tubes were next tried wherein the sum of the expansions of the rods, during the operation, reduced to 62° of Fahrenheit's thermometer, amounted to 6 inches very nearly, and of the contractions to 1.8 inch nearly, making an addition of 4.2 inches to the length of the base, as measured by the glass rods, on account of their expansion and contraction during the operation; see Phil. Transf. 1785, p. 477. In 1791, this base was remeasured with a steel chain made for the purpose by Ramsden, with all imaginable attention to accuracy, and the correction necessary to be applied to the length of the base, on account of the excess of the expansions over the contractions of the chain during the operation, was found to be 34.2 inches, but from which 27.11 inches was afterwards deducted, for reducing the base to the length which would have resulted, from a measurement in the temperature of 62°, to which point of the thermometer's scale all lengths in this survey are supposed to be reduced. See Phil. Transf. 1795, p 433.

CONTRACTION *of Strata*, in *Natural History*. That clay and argillites have contracted during their hardening in the strata of the earth, Mr. Bergman infers from having observed, that the petrified shells found in these are commonly compressed and flatted, and that argil hardens by contraction, but those found in lime-stone retain their primitive shape, because these harden chiefly by infiltration.

CONTRACTION is frequently used, by anatomical writers, to express the shrinking up of a fibre, or an assemblage of fibres when extended.

Convulsions and spasms proceed from a preternatural *contraction* of the fibres of the muscles of the part convulsed.

On the contrary, paralytic disorders generally proceed from a too great laxness of the fibres of the parts affected; or from the want of that degree of *contraction* necessary to perform the natural motion or action of the part.

In the first, therefore, the animal spirits are supposed to flow either in too great a quantity, or irregularly; and, in the last, the animal spirits are either denied a free passage into the part affected, or the tension of the fibrillæ is supposed insufficient to promote the circulation.

Contraction evidently appears to be the true natural state of all muscles; for, if a muscle be at any time freed from the power of its antagonist, it is immediately found to *contract*; and is not, by any action of the will, or the spirits, to be reduced to a state of dilatation.

CONTRACTION *of the heart*, *arteries*, *lungs*, &c. See SYSTOLE, HEART, ARTERY, PULSE, &c.

CONTRADICENTE. See NEMINE *contradicente*.

CONTRADICTION, a species of direct opposition, wherein one thing is found diametrically opposite to another.

The schoolmen usually define it, *oppositio inter ens & non-ens medio carens*: where, by *ens*, and *non-ens*, are understood any two extremes, whereof one affirms, and the other denies; and it is said to be *medio carens* to distinguish it from the other species of composition; the extremes, here, neither agreeing in subject, as is the case in privation; nor in essence and kind, as in contrariety.

CONTRADICTION, *freedom of*. See FREEDOM.

CONTRADICTION, *imply a*. See IMPLY.

CONTRADICTOR, in a legal fenfe, a perfon who has a right or title to contradict or gainfay.

An inventory of the effects of a minor ought to be made in prefence of his guardian, or truftee, who is the legal *contradictor*: a decree againft a farmer has no effect on the landlord, the firft not being the legitimate *contradictor*.

CONTRADICTORY PROPOSITIONS, are oppofites, one of which imports a mere, and naked, denial of the other.

Of thefe, therefore, one muft be pofitive, and the other negative; as *fitting*, and *not fitting*: *white*, and *not white*. Contradictory propofitions mutually deftroy each other.

To have two propofitions truly contradictory, they muft be oppofite, both in quantity and quality, *i. e.* one muft be univerfal, and the other particular, which make the oppofition of quantity; and the one affirmative, and the other negative, which make the oppofition in quality. Thus, *v. gr.* "All ufe of wine and filver is evil;" falfe:—"Some ufe of wine and filver is not evil;" true. To this it is neceffary, that the one deny and the other affirm, the fame thing, of the fame fubject, confidered in the fame circumftances: unlefs the queftion be about an effential attribute, in which cafe, no regard is had to circumftances; every thing having always its own effence. This the logicians exprefs by *affirmare & negare idem, de eodem, fecundum idem*.

There may likewife be contradictory propofitions on a particular fubject; *e. gr.* an individual. Thefe are called *fingle* contradictory propofitions; as "Peter is innocent, Peter is not innocent, or is a criminal." Now to have thefe propofitions contradictory, Peter muft be confidered at the fame time, without which they may be both true; fince there may be a time wherein Peter was innocent, and another wherein he was a criminal.

CONTRA-FISSURE. See COUNTER-*fiffure*.

CONTRA-HARMONICAL PROPORTION, that relation of three terms, wherein the difference of the firft and fecond is to the difference of the fecond and third, as the third is to the firft.

Thus, *e. gr.* 3, 5, and 6, are numbers contra-harmonically proportional; for $2 : 1 :: 6 : 3$.

To find a mean contra-harmonically proportional to two given quantities: the rule is, divide the fum of the two fquared numbers by the fum of the roots; the quotient is a *contra-harmonically* mean proportional between the roots.

CONTRA-INDICATION, in *Medicine*, denotes fuch a fymptom, or fet of fymptoms, as indicate the neceffity of remedies, which other fymptoms, or the difeafe in general, forbid us to employ.

Thus, when inflammation of the lungs fupervenes to a low or typhous fever, or *vice verfâ*, the nature of the fever requires cordials and ftrengtheners for its cure, whilft the inflammation indicates, on the contrary, the ufe of blood-letting, and other debilitating expedients. Contra-indications are always perplexing occurrences.

CONTRAINT, Fr. reftrained. This word is fynonymous with *ftretto*, in Ital. (which fee.) It is an adj. which, in *Mufic*, implies, whether in melody or harmony, the *conftraint* of a theme or ground.

CONTRALTO, *Ital.* the *Counter-tenor*. The compafs of this kind of voice is ufually very limited; it feldom goes lower than G, in the 4th fpace of the bafe, or higher than C, in the 3d fpace of the treble. Senefino had no more than fix or feven good notes in his voice; nor had Guadagni, in his younger days, when he was content with the force of his natural compafs, which, like Senefino's, were full, rich, and flexible. This fpecies of voice is an octave above the bafe; and its clef, that of C on the 3d line, the fame as the *alto viola*, or *tenor*, among inftruments.

CONTRAMANDATIO PLACITI, in *Law Books*, fignifies a refpiting, or giving the defendant further time to anfwer; or, an imparlance, or countermanding of what was formerly ordered. Leg. H. I. c. 59. See COUNTERMAND.

CONTRAMANDATUM, a lawful excufe, which the defendant, by his attorney, allegeth for himfelf, to fhew that the plaintiff has no caufe to complain, *fi dies placiti fit contramandatus*. 11 Hen. I. See COUNTERMAND.

CONTRAMURE, in *Civil Architecture*. See COUNTERMURE.

CONTRAMURE, in *Fortification*, is a wall built before another to ftrengthen it, and to prevent its receiving any damage from the adjoining buildings. See RAMPART.

CONTRA-POINTS, in *Mufic*. See COUNTER-POINT.

CONTRA-POSITIO, in *Law*, a plea or anfwer. Leg. H. I. c. 34.

CONTRA-POSITION, in *Logic*. See CONVERSION.

CONTRAPPUNTO. See COUNTER-POINT.

CONTRARIENTUM ROTULUS. See ROTULUS.

CONTRARIETY, that which denominates two things contrary to each other.

Contrariety confifts in this, that one of the terms imports a negation of the other, either mediately or immediately; fo that contrariety may be faid to be the contraft, or oppofition of two things, one of which implies the abfence of the other.

CONTRARIETY, *freedom of*. See FREEDOM.

CONTRARIES, are pofitive oppofites; which being of the fame kind, or fame common nature, and fubfifting by turns in the fame fubject, are as remote from each other as poffible, and mutually expel each other. Such are whitenefs and blacknefs, cold and heat, &c.

Hence, properly fpeaking, only qualities can be contraries: *contrariety*, in effect, only agrees to qualities *per fe*; to other things it agrees *per accidens*, or *in ordine ad qualitatem*.

CONTRARY, however, is often ufed in a more extenfive fignification, *viz.* for any inconfiftence or difference between the nature and qualities of things. It is a popular maxim in philofophy, that *contraria juxta fe pofita magis elucefcunt*; contraries fet off one another. In this fenfe is the word *contrary* ufed in the fchools; and hence an argument *à contrario*.

This method of improving things, *è contrario*, is much ufed, and with good fuccefs, by F. Bourdaloue, in his Sermons.

CONTRARY, in *Rhetoric*. Contraries are things which, under the fame genus, are at the utmoft diftance from each other: fo that what we grant to the one, we utterly deny the other; *e. g.* "Virtue ought to be embraced, therefore vice fhould be avoided." F. de Colonia lays down three kinds of contraries in rhetoric; viz. *adverfatives*, *privatives*, and *contradictories*.

Adverfatives are thofe that differ much in the fame thing, as virtue and vice, war and peace: thus Tully, "Si ftultitiam fugimus, fapientiam fequamur; & bonitatem, fi malitiam,"

tiam." And Quintilian, "Malorum cauſa bellum eſt, erit emendatio pax." Drances argues thus in Virgil:

"Nulla ſalus bello: pacem te poſcimus omnes."

Privatives are habits, and their privations. *Contradictories* are thoſe, one of which affirms, and the other denies, the ſame thing of the ſame ſubject.

Contrary *motion*, in *Muſic*, is when one part aſcends while another deſcends, and *vice verſâ*, oppoſed to *moto retto*, and *moto obliquo*, which ſee.

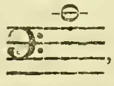
Contrary motion of the parts, in compoſition, and of the hands in thorough-baſe, has a pleaſing effect, and precludes the ſucceſſion of 5ths and 8ths.

Contrary *propoſitions*, in *Logic*, univerſal propoſitions, one of which affirms, and the other denies, the ſame predicate of the ſame ſubject; as "every ſquare is a parallelogram," and "no ſquare is a parallelogram." Theſe propoſitions differ in quality, but not in quantity, and therefore are diſtinguiſhed from contradictory propoſitions, which differ in quantity and quality.

Contrary propoſitions cannot be both true, but may both be falſe: whereas, in contradictory propoſitions, one is neceſſarily true, and the other falſe.

Contrary *point of flexure*. See Point.

CONTRA-SOGGETTO, in *Muſic*, a 2d ſubject in a fugue or canon, or a new ſubject, in contrary motion to the firſt.

CONTRA-TONES, in the *German Muſical Writings*, are ſuch as lie below the great octave of their tablature or literal notation, for the notes of the gamut. All notes on an organ, or other inſtrument which lie, more than two octaves below the tenor cliff note, or , are ſaid to be contra-tones. See Tablature.

CONTRAST, in *Muſic*, is often productive of agreeable effects, when, in the ſame movement, we paſs from loud to ſoft, and ſoft to loud; from quick to ſlow, and ſlow to quick; from a ſimple to an elaborate accompaniment, and *e contra;* from low to high, and high to low; and when the harmony is full and thin alternately.

Contrast, in *Painting* or *Drawing*. The proper introduction and management of contraſts of lines, forms, colours, lights, and ſhadows, form a very principal, and indeed indiſpenſable, branch of the ſtudy of a painter; and there is perhaps nothing in the art which ſo neceſſarily requires a more than ordinary ſhare of judgment and diſcretion. If contraſts are only ſparingly uſed, they ſeldom fail to produce a ſtriking and happy reſult; if they are too frequent, confuſion in the compoſition, and a ſpotty diſagreeable effect is the conſequence; when they are entirely omitted, inſipidity enſues. Contraſts in painting may, therefore, be compared to diſcords in muſic, which, when ſkilfully introduced, give double reliſh to the harmony, by preventing that nauſea naturally attendant on an uninterrupted ſucceſſion of ſweets of any kind ſoever. The ſubject of contraſts is neceſſarily connected with our inquiries reſpecting the great component parts of painting. We therefore beg to refer the reader to thoſe articles. See Invention, Composition, Design, Expression, Clair-obscure, and Colouring.

Contrast, *to*, in *Architecture*, is to avoid the repetition of the ſame thing, in order to pleaſe by variety; as is done in the great gallery of the Louvre, where the pediments are, alternately, arched and angular.

Contrast, or Contrate, *wheel*, in *Horology*, denotes that wheel in watches which is next to the crown, whoſe teeth and hoop lie contrary to thoſe of the other wheels; whence its name. See Watch-*work* and Wheel.

CONTRAVALLATION, or Countervallation, in *Fortification*. See Circumvallation.

CONTRAVENTION, a man's failure of performing or diſcharging his word, obligation, or duty, or the laws and cuſtoms of the place. The penalties impoſed in caſes of contravention, only paſs for comminatory.

In a more limited ſenſe, contravention implies the non-execution of an ordinance, or edict.

Contravention is ſuppoſed to be a degree below prevarication; and to be only the effect of negligence or ignorance.

In the French and other ſervices, every commanding officer, of whatever rank, was reſponſible for the wrongs and treſpaſſes committed by the troops under his command. He was obliged to pay the damages; and if himſelf ſet an example of ſuch things, he was conſidered as doubly culpable, and was not only bound to pay the damages, but was otherwiſe puniſhed.

CONTRAYERVA, in *Botany*. See Dorstenia.

Contrayerva, in the *Materia Medica*, *Dorſtenia Contrayerva*, Linn. This is a perennial plant of South America, the root of which has long been uſed in medicine, and is ſtill retained, though its medicinal powers are but moderate. It is ſaid to have been firſt brought into Europe by ſir Francis Drake, about the year 1581, and from him called *Drakena*. It

It was then efteemed a very great alexiterial, and a fovereign antidote againft poifon.

Its juice is a violent poifon, faid to be ufed by the Peruvians to poifon their arrows. *Contrayerva* fignifies *counter-poifon*, becaufe the root of it is faid to be an antidote againft the poifon of its juice.

The root is knotty, reddifh brown externally, and pale within: its tafte is fub-aftringent, warm, and fomewhat bitter; but its acrimony is much fheathed by the very large quantity of mucilage which it contains. Contrayerva is a gentle ftimulant. Its ufe is almoft entirely confined to the pulvis contrayervæ compofitus, in which it is mixed with crab's claws and chalk. The London Pharmacopeia directs the preparation of it, by mixing 5 ounces, by weight, of powdered contrayerva with $1\frac{1}{2}$ pound of compound powder of crab's claws.

There is another kind of *contrayerva* brought from Virginia, more ordinarily called *ferpentaria*: this is very aromatic; it is but feldom prefcribed fingly, though faid to have the fame fuccefs againft poifons and venoms with the contrayerva of Peru. This is an excellent fubftitute for the contrayerva. See Lewis's Mat. Med. and Newman's Chem. Works.

CONTRE, Fr. in combination with words. See Counter.

Contre-*dance*, Fr. *Country-dance*, taken from the lively and familiar dance of our peafants and villagers in England. Some, however, imagine that, during the Norman line, we had this rural dance from the French *contre-dance*, in which the partners are placed oppofite or againft each other. Of this opinion was the late Mr. Donoyer, dancing-mafter to the royal family.

Contre-*fens*. The French make ufe of this expreffion, in *Mufic*, for an abfurdity in compofition or performance.

Contre-*temps*, *Fr.* is a breach of time, or falfe accentuation. Rouffeau. But M. Framery (Encycl. Meth.) is not fatisfied with this definition. According to him, an air is *à contre-temps*, or out of meafure, when the clofes are prepared on the accented part of a bar, and made on the unaccented part. The ear expects that the clofe or final part of an air or movement fhould be on an accented part of a bar; in common time of four crotchets, on the firft and third; and in triple time, on the firft note of a bar. To this we accede, except in Polifh airs, called *Polonefi*, or *alla Polacca*, where the clofe is made on the fecond note of a bar. See Polonese.

CONTREBIA, in *Ancient Geography*, *Santavert*, a town of Spain, in the country of the Carpetani, eaft of Complutum. This town, in 571 or 572, was befieged by the Romans, under the conduct of Q. Flavius Flaccus; and, in confequence of the delay of fuccour, folicited from the Celtiberians, was obliged to furrender. When the Celtiberians afterwards arrived, they were furprifed by the Romans, and totally defeated.

CONTREKI, in *Geography*, a town of Arabia, 180 miles S. of Mofcat.

CONTRES, a fmall town of France, in the department of Loir and Cher, and chief place of a canton in the diftrict of Blois. Its population amounts to 1401, and that of the canton to 10,105, perfons, divided among 16 communes, upon a territory of 265 kiliometres in extent. It is fituated 10 miles S. of Blois.

CONTRI, Antonio, in *Biography*, was the fon of a lawyer at Ferrara. In his youth he fpent fome time in the ftudy of defign, which he practifed many years in the two capitals of Rome and Paris. Upon his return to Italy, he fettled at Cremona, where he ftudied the painting of landfcape, under Francefco Baffi. His pictures were frequently embellifhed with flowers: a fpecies of painting in which he moft excelled. But his claim to a place in this work refts principally on a very extraordinary difcovery which he made, of the method of transferring pictures, painted in frefco on the wall, to canvas, without in the fmalleft degree impairing the original beauty of the painting. This he effected by means of a ftrong cement, or rofin, which he fpread over a cloth, the fame fize as the picture he was defirous of removing. This was then firmly applied to the face of the frefco. A pannel of the fame fize was then faftened to the back of the cloth, when the plafter or frefco was cut round to the fize of the cloth. After fome days, the board with the cloth was removed from the wall, drawing with it the painting. Another cloth, prepared with a cement ftill ftronger than the firft, was then applied to the back of the picture; after which the former cloth was removed, leaving the picture in its original ftate of perfection. He fucceeded in many experiments of this kind in Cremona, Ferrara, and Mantua. This fecret, however, has been feldom divulged; and the late pope, Pius VI., for many years, gave a confiderable penfion to the only perfon who was acquainted with it at Rome, upon the condition of his removing no frefco paintings from the Ecclefiaftical State without his permiffion: wifely judging, that though the temples and palaces of Italy might be defpoiled of oil pictures, the frefcos of the great mafters would at all times furnifh fufficient example for ftudents, and ample gratification to the curious traveller. Antonio Contri died in 1732, leaving a fon named Francefco, who followed the footfteps of his father. Lanzi, Storia Pittorica.

CONTRIBUTA, in *Ancient Geography*, *Medina de las Torres*, a town of Spain, in the eaftern part of Betica; called alfo "Julia Contributa."

CONTRIBUTION, the payment of each perfon's quota, or the part he is to bear in fome impofition, or common expence.

Contributions are either *involuntary*, as thofe of taxes and impofts; or *voluntary*, as thofe of expences for carrying on fome undertaking for the intereft of the community.

When goods are caft into the fea, for the fafe-guard of a fhip, or other goods, &c. aboard, in a tempeft, there is a contribution among merchants, towards the lofs of the owners. (See Insurance.) And where a robbery is committed on the highway, and damages are recovered againft one or a few perfons, in an action againft the hundred, the reft of the inhabitants fhall make contribution to the fame. 27 Eliz. c. 13. See Robbery.

Contributions, *Military*, denote impofitions, duties, or taxes, which places and fometimes frontier countries pay to redeem themfelves or purchafe exemption from being pillaged, plundered, and infulted by the enemy.

It would coft a prince often too much to make war entirely at his own expence. If he adopt juft meafures according to his finances not to run fhort of money, he takes them alfo with his general for finding the means of augmenting or at leaft fparing his funds. Thefe means are contributions, which are of two kinds, *viz.* thofe which are exacted in fubfiftence and commodities, and thofe which are received in money.

Thofe that are paid in commodities, or fubfiftence, are different forts of grain, forage and provifions, carriage for things wanted as well by water as by land, wood of every fpecies, pioneers, and a particular treatment or entertainment of troops in their winter-quarters and lodgings.

No levy ought to be made or taxes raifed till a juft ftatement is procured of the fituation of the country intended to

to be laid under contribution, that the impofition may be rendered as equitable and little burthenfome as poffible. No demand, for example, is made of wood on thofe places that have only grain or meadows, or of land-carriages on thofe who make ufe of water-carriage.

The levy of different forts of grain is made on thofe tracts or diftricts of country, that have quietly and peaceably reaped their harveft, and as it were by way of gratitude or acknowledgment for the tranquillity they have enjoyed, through the good behaviour and difcipline of the army.

That of oats and other grain for horfes fhould be made under the colour or pretext of regularity or good order, by which means a country is infinitely lefs burthened than it would be, were it abandoned to the avidity of horfemen, who would carry off the grain, wherefoever they might find it, either in a regular or irregular manner, or with orders or without orders.

That of forage fhould be made in the fame manner, and a convenient time fhould be fixed on for the carriages that are to carry it to the places, where it is refolved it fhall be confumed and made ufe of.

That of provifions is ufually made, if it be poffible, in thofe diftricts of country, where the troops cannot winter, to prevent the occafioning of a fcarcity in that where they are to take up their winter-quarters.

Carriage, whether by land or by water, is neceffary for filling the magazines made in the rear of the armies with ammunition and provifions; or for the taking of heavy artillery and ammunition to a place befieged; or for the removing of fick and wounded; or for the tranfport of materials deftined for works.

Impofitions of wood are made for palifades, for the conftruction of cafernes and ftables, &c. and for fuel to the troops in winter.

Pioneers are affembled or collected together to fortify pofts deftined for wintering the troops in; for throwing up with promptitude and expedition lines of circumvallation round a place befieged; for repairing roads and opening defiles; for the conftruction of lines made with a defign to cover a country and thereby exempt it from *contributions*; and for levelling and filling the works made before a place after it is taken.

Utenfils and neceffaries for the troops taken in an enemy's country are raifed or obtained in two ways. The places, where they winter, fhould not furnifh more of them than the conveniencies which the foldier finds in the houfe of his landlord, fuppofing there are no barracks in thefe places. But if there are barracks, the contribution in money is compenfated by thefe commodities, and ought to be lefs than that which is raifed on a level country or in towns, where there are no troops lodged.

The contribution in money is extended as far as poffible. It is eftablifhed in two ways; voluntarily over tracts of country within reach of pofts and places deftined for winter-quarters; or by force, whether by the army itfelf whilft it is advancing, or by large parties that are detached for penetrating into thofe parts which you wifh to lay under contribution.

It is made alfo behind the places belonging to the enemy and rivers by means of terror, whether by incendiaries difguifed, who fpread and diffeminate billets, or by different ways, in which fmall parties are made to pafs the rivers, who endeavour to carry off fome perfons of confideration in the country, or to burn fome large habitation, or dwelling place, or building.

A prince in fhort ought to have an exact account kept of all contributions, and have thofe particularly looked after, who are employed in raifing and collecting them, fince it is but too common for them to make an improper ufe of what they raife or collect for their own perfonal advantage. And when the contributions are not judicioufly affeffed and demanded, the particular intereft of thofe who impofe them, or receive them, always prevails over the intereft of the prince or fovereign.

It is a great relief and eafement in contributions, when they are impofed with juftice, equality, and in an exact proportion to the abilities of thofe on whom they are raifed; and when they are collected without infolence, without feverity or oppreffion, and without being converted to the profit or benefit of individuals; and when, in default of money, other goods and commodities are taken, as cloths, provifions, &c. but moft of all when an army quits its own country to make war in that of the enemy or any other, whatever it may be.

Frederic II., or the Great, in fpeaking of the conduct of an officer fent out to levy contributions, expreffes his fentiments in the following words: "Contributions are generally levied under one of the following circumftances; either being fuperior to the enemy you cover the whole country; or you poffefs a part of it till the arrival of the enemy; or you are interrupted by their light troops.

"In the firft cafe it is common for the commander in chief to fix the fum to be raifed by the inhabitants, under pain of military execution. Upon this duty the officer muft vigoroufly exert his utmoft authority to make his huffars obferve the ftricteft difcipline and decorum, left the inhabitants fhould be ruined beyond recovery.

"The fecond cafe requires great circumfpection in the officer, and a perfect knowledge of the country, that he may not be furprifed by the unexpected arrival of the enemy; he muft pre-determine his plan of retreat, and fix the place of general depofit; and for his farther fecurity he muft advance fmall detachments towards the enemy, that he may have early notice of their approach, and fo interrupt all communication with the inhabitants.

"On his firft arrival in the country, he will difpatch circulating billets of delivery, the duplicates of which are to be carried by the parties which are fent to levy the contributions. Thefe parties are to have orders to return at a certain time, befides which they are to have fealed inftructions indicating the places of fecond and third rendezvous, but thefe orders are not to be opened unlefs in cafes of neceffity.

"When contributions are to be raifed in this manner, with the enemy at your heels, all lenity is out of the queftion. Where there is no coin to be had you muft take any thing, that may be eafily tranfported, or cattle, or hoftages; but thefe only as your laft refource. If you are clofe preffed by the enemy, it is beft to divide your booty and fend it different roads, that you may fave at leaft fome part of it.

"In the third cafe, namely, when the enemy hinders the inhabitants from delivering their quota, the peafants are in great danger of total ruin. Neverthelefs, as the exigencies of the army require it, you are to proceed with all poffible rigour, and even to punifh thofe who neglect to deliver their proportion at the time required, that the reft through fear may be more punctual in obeying the orders they have received."

CONTRIBUTIONE FACIENDA, in *Law*, a writ which lies where feveral perfons are jointly bound to the fame thing, and one or more of them refufe to contribute their fhare.

If tenants in common, or joint, hold a mill *pro indivifo*, and equally fhare the profits of the fame; the mill falling to decay,

decay, and one or more of them refuſing to contribute to its reparation, the reſt ſhall have the writ *de contributione facienda* to compel them. And if there be three coparceners of land that owe ſuit to the lord's court, and the eldeſt performs the whole; then may ſhe have this writ to compel the refuſers to a contribution. So when one ſuit is required for land, and that land being ſold to divers perſons, ſuit is demanded of them all, or ſome of them by diſtreſs, as entirely as if all the land were ſtill in one. Reg. Orig. 175. F. N. B. 162.

CONTRITION, in *Theology*, expreſſes a real ſorrow, reſulting from the thought of having offended God; from the ſole conſideration of his goodneſs; without any regard, or, at leaſt, independently of any reſpect, to the puniſhment annexed to the ſin; accompanied with a deteſtation of ſin, and of ourſelves on account of it. With this act of the mind, it is ſaid, that repentance, properly ſpeaking, begins.

Some of the Romiſh doctors avow, notwithſtanding the practice of their church, that contrition is valid, and carries with it every thing neceſſary to obtain pardon, without the ceremony, or as they call it, the *ſacrament* of confeſſion and abſolution.

And in this they make the difference between contrition and ATTRITION (which ſee) to conſiſt. This doctrine was maintained by F. Seguenot upon St. Auguſtine; but it was cenſured by the faculty of Paris.

CONTROL. See COMPTROL.

CONTROLLER. See COMPTROLLER.

CONTROLES, Fr. the ſame as MUSTER-ROLLS, or REGISTRY-BOOKS; which ſee.

CONTROLEUR *General d'Artillerie*, controller general of artillery. This appointment was of an old ſtanding in France, and was next to that of grand maſter or maſter general of artillery, except that of *garde general d'artillerie*. It was however ſuppreſſed, and in 1703 Louis XIV. created two offices in lieu of it, *viz.* that of directors general of artillery, and that of commiſſary general of powder and ſalt-petre. But by his declaration of the 21ſt July 1716, he ſuppreſſed theſe offices, and ſeveral others, and attached to that of controller general all the ancient functions, which that officer afterwards exerciſed in their full extent, and which had been eſtabliſhed by the edicts and declarations of Francis I. and his ſucceſſors.

It is an office of great military importance, and much reſponſibility. He has a number of commiſſaries paid by the ſtate to act and manage under him, by his orders, and in his name. They aſſiſt at the various proofs of powder and pieces of ordnance, and can take and demand an account of the purchaſes made in their abſence by the principal officer of artillery.

CONTROLEURS *Provinciaux d'Artillerie*, provincial controllers of artillery. Theſe officers in France uſed to control all the expences and purchaſes in general, of whatever kind they might be, that concerned the artillery, and could refuſe or reject the arms, ammunition, and in ſhort every thing that proved defective, on the deliveries of articles purchaſed or contracted for. They have each of them a key of the magazines where they reſide. And upon entering on the exerciſe of their office, they cauſed inventories to be given to them by the *gardes-magazins* of every article in them, of which they made a regiſter, and on it added the receipts, returns, and expenditures of ſtores, that they might be always able to render an account to the controller general, and the commandants of artillery. They often made their viſits, and chiefly at the ſame time that the commandants of artillery made theirs. They gave certificates of the dead and wounded, and made an inventory and ſale of the effects of the dead, with the concurrence of the commiſſaries, or the *major des equipage*.

CONTROLEUR *General de depenſes de l'Artillerie*, controller general of the expences of the artillery. Theſe officers kept regiſters or accounts of the receipt and expenditure in money which was made by the treaſurer general of artillery, as well as of the receipt and expenditure of pieces of ordnance, ammunition, and of purchaſes.

CONTROLEURS *des Guerres*, war-controllers. The functions of a *controleur des guerres* are to keep a regiſter and control of the muſters and reviews of troops. See the article MUSTER-MASTERS.

CONTROLEURS *d'Artillerie*, controllers of artillery. See the article CONTROLEURS *Provinciaux d'Artillerie*.

CONTROLEUR *General des Vivres*, controller general of proviſions. The undertakers uſed to chooſe for this employment an old commiſſary who was perfectly acquainted with the buſineſs, and was a perſon deſerving of confidence. He had a very extenſive commiſſion for inſpecting and taking cognizance of every thing that concerned proviſions; and the exerciſe of his duty was conſidered as conſiſting of two parts; namely, that he ſhould in the firſt place make himſelf properly acquainted with the ſtate of the magazines that were to ſupply the army, and in the ſecond place accompany the director general of proviſions, to whom he was ſubordinate when he ſhould take the field.

The firſt thing which the controller-general of proviſions uſed to do, was to make a liſt or ſtatement of all the places that depended on him, and of the commiſſaries who did duty there. He inquired what were their functions, into their character for zeal and ſpirit, the extent of their genius, their capacity, what offices they had been employed in, what families they were of, or had, the places of their birth, their age, and their manners.

He examined if the regiſters of the magazines were in proper form, both as to receipts and expenditures, and expences; as to the receipts, if the quantity in them is well ſpecified, the quality, the different names of the meaſures, the weights of the country reduced to avoirdupoiſe weight, in caſe it ſhould be different; if the name of the ſeller, the place of his abode, and the date of the purchaſe, are ſet forth in the article.

As to the expence, he examined what ſupplies the commiſſary had ſent to the magazines, or procured, the nature of the grain and flour, the quantities, and the copies of letters of carriage of the articles ſent. After taking an extract of the receipts and expences, he ſaw what remained in the magazine, he himſelf counted the ſacks, and made a certified ſtate of the whole to be given to him.

The duties of this office, in ſhort, were ſo many and troubleſome, that if this officer, who, we have already obſerved, was ſubordinate to the director general of proviſions, literally fulfilled them, he could not have had ſo much as one day of reſt or repoſe during the whole continuance of a campaign. See COMMISSARY-GENERAL *of Stores*.

CONTROLEUR *des Hoſpitaux Militaires*, controller of military hoſpitals. Whenever a ſick or wounded perſon enters an hoſpital, this officer writes upon a regiſter endorſed and marked by a commiſſary of war, the military appellation or deſignation of the perſon ſick or wounded, the name of his family, the place of his nativity, and the city neareſt to that place. He makes alſo two ſtatements of his money and his effects, one of which ſerves as an *etiquette au paquet*, or ticket to the parcel or packet, and the other is returned to the ſick or wounded man, in caſe of whoſe death an account is rendered to the major of the regiment to which he belonged.

For

For the moſt part, however, the undertakers are the heirs or inheritors, for after a year and a day no part of either can be demanded from them.

This officer ſigned the billets of ſoldiers when they entered an hoſpital, and made them report themſelves to him when they went out. He obliged the overſeers of infirmaries to render him an account of the dead immediately after their deceaſe, that he might take them off from his regiſter. In hoſpitals where there was no controller, every thing now mentioned was executed by the director.

CONTROVER, in *Law*, a perſon who of his own head deviſes or invents falſe or feigned news. 2 Inſt. 227.

CONTROVERSIAL DIVINITY. See POLEMICAL *divinity*.

CONTROVERSY, or CAUSE, *State of a*, among *Ancient Rhetoricians*, denotes the principal point in diſpute between contending parties, upon the proof of which the whole cauſe or controverſy depends. Ancient writers have expreſſed it by ſeveral other names, as "the conſtitution of the cauſe," "the general head," and "the chief queſtion." (Quint. Inſt. Orat. l. iii. c. 6.) As this is the principal thing to every controverſial diſcourſe, it alſo requires the primary conſideration of the ſpeaker, and ſhould be well fixed and digeſted in his mind, before he proceeds to inveſtigate arguments for its ſupport. See Antony's account of his own method of pleading, in Cic. de Orat. l. ii. c. 27. Quintilian (Inſt. Orat. l iii. c. 6.) deſcribes the ſubject of this article to be "that kind of queſtion which ariſes from the firſt conflict of cauſes." In judicial caſes, it immediately ſucceeds the charge of the plaintiff, and plea of the defendant. Our common law expreſſes it by one word, *viz.* the ISSUE: which ſee. This interpreters explain by deſcribing it to be "that point of matter depending in ſuit, upon which the parties join, and put their cauſe to the trial." Thus, in the cauſe of Milo, the charge of the Clodian party is, "Milo killed Clodius." Milo's plea or defence is, "I killed him, but juſtly." Hence ariſes the grand queſtion, or "ſtate of the cauſe;" "whether it was lawful for Milo to kill Clodius?" That Clodius was lawfully killed by Milo is what Cicero, in his admirable oration, in defence of Milo, principally endeavours to prove. The whole of his diſcourſe is to be conſidered as centering at laſt in this point. Again, in the caſe of Roſcius, the charge made againſt him is "that he killed his father." But he denies the fact. The grand queſtion therefore to be argued is; "whether or not he killed his father?" Cicero's deſign in his defence of him is to ſhew, that his accuſers had not made good their charge.

Beſides the principal queſtion, there are ſubordinate queſtions that occur in the courſe of a diſpute, which ſhould be carefully diſtinguiſhed from it: and more particularly that, which ariſes from the reaſon or argument alleged in proof of the principal queſtion. Thus, in the cauſe of Milo, his argument is, "I killed Clodius juſtly, becauſe he aſſaſſinated me." Unleſs the Clodian party be ſuppoſed to deny this, they give up their cauſe. Hence therefore a ſubordinate queſtion ariſes; "whether Clodius aſſaſſinated Milo?" Cicero ſpends much time in the proof of this, as the hinge, on which the firſt queſtion, and conſequently the whole cauſe depended. But whatever may be the number of ſubordinate queſtions, they are all dependent upon the firſt; and though each of them has its particular ſtate, yet neither of theſe is what the rhetoricians call "the State of the Cauſe," which is to be underſtood only of the principal queſtion. Beſides theſe ſubordinate queſtions, incidental ones are often introduced, having ſome reference to the principal queſtion and contributing towards the proof of it, though they are not neceſſarily connected with it, or dependent upon it. Each of theſe has its "ſtate," though different from that of the "cauſe." Many queſtions of this ſort occur in Cicero's defence of Milo, occaſioned by aſperſions that had been thrown out by the Clodian party to the prejudice of Milo. To each of theſe Cicero replies, before he proceeds to the principal queſtion. And therefore, though the queſtion, in which the "ſtate of a Controverſy" conſiſts, is ſaid by Quintilian to ariſe from the "firſt conflict of cauſes," yet we find from the inſtance of Cicero, now adduced, that it is not always the firſt queſtion in order, upon which the orator treats. It ſometimes happens, that the ſame cauſe or controverſy comprehends more than one ſtate. Thus in judicial cauſes, every diſtinct charge occaſions a new ſtate. All Cicero's orations againſt Verres relate to one cauſe, founded upon a law of the Romans againſt unjuſt exactions, made by the governors of provinces upon the inhabitants; but as that proſecution is made up of as many charges, as there are orations, every charge, or indictment, has its different ſtate. It may be obſerved, that diſcourſes of a deliberative and demonſtrative kind, as well as judicial, are managed in a controverſial way; and all controverſies have their "ſtate." And therefore Quintilian very juſtly obſerves (Inſt. Orat. l. iii. c. 6.) that "ſtates belong both to general and particular queſtions; and to all ſorts of cauſes demonſtrative, deliberative, and judicial." As to the number of theſe "ſtates," Cicero and Quintilian reduce them to three. "Three things," ſays the latter (Inſt. Orat. l. iii. c. 6.) "may be inquired into in all diſputes; whether a thing is, what it is, and how it is. And this is the method which nature preſcribes. For, in the firſt place, it is neceſſary the thing ſhould exiſt, about which the diſpute is; becauſe no judgment can be made either of its nature or quality, till its exiſtence be manifeſt; which is therefore the firſt queſtion. But though it be manifeſt, that a thing is, it does not frequently appear what it is; and when this is known the quality yet remains; and after theſe three are ſettled, no further inquiry is neceſſary." The firſt of theſe three ſtates is called the *conjectural* ſtate; the ſecond is called the *definitive* ſtate; and the third is called the ſtate of *quality*. The firſt occurs when it is inquired, "whether one perſon killed another?" The ſecond appears in an example of Cicero; "whether to take a ſacred thing out of a private houſe be theft, or ſacrilege?" The third is manifeſt, when the contending parties are agreed both as to the fact, and the nature of it; but the diſpute is, "whether it be juſt or unjuſt, profitable or unprofitable, and the like?" as in the cauſe of Milo. Ariſtotle (De Rhet. l. iii. c. 26.) and from him Voſſius (Inſt. Orat. l. i. c. 6. § 7.) add a fourth ſtate, namely that of *quantity; e.g.* "Whether an injury be ſo great as it is ſaid to be?" Quintilian, however, thinks (ubi ſupra) that this may be referred to one or other of the preceding ſtates; ſince it depends upon the circumſtances of the fact, as the intention, time, place, or the like. The importance and uſe of the preceding obſervations require little illuſtration. Whenever a perſon engages in a controverſy, he ought in the firſt place to conſider the main queſtion in diſpute, to fix it well in his mind, and to keep it conſtantly in his view: and it is equally neceſſary for his hearers duly to regard this point, as they will thus be enabled to diſtinguiſh and ſeparate from the principal queſtion what is only incidental, and to obſerve how far the principal queſtion is affected by it; to perceive what is offered by way of proof, and of illuſtration; not to be miſled by digreſſions, but to diſcern when the ſpeaker deviates from his ſubject and when he reſumes it; and ſo to accompany him through the whole diſcourſe and through his whole chain of reaſoning, as to be able to judge, upon the whole, how far his concluſion is

fairly

fairly drawn from his affumed premifes. A conftant regard to the ftate of the caufe, and principal point in difpute, is very neceffary for this purpofe. Although rhetoricians treat of thefe ftates only as they relate to controverfies, and become the fubject-matter of difpute between differing parties; yet every difcourfe has one or more principal heads which the fpeaker chiefly propofes to prove or illuftrate. Ward's Orat. vol. i. lect. vi.

CONTUBERNALES Magistratuum, companions of the magiftrates. Thefe were young men deftined for civil and military employments, whom the magiftrates, in the time of ancient Rome, took into their department to be formed under their eyes and in their houfes.

The fame appellation of *contubernales* was alfo given to ten foldiers, who lived in one and the fame room or under one and the fame tent.

CONTUBERNIUM, in *Antiquity*, denotes a fort of connection or cohabitation that took place between male and female flaves in the middle ages. Although their mafters or proprietors did not permit them to marry, they were allowed to form this kind of union. This practice fo much prevailed, that during feveral centuries after the barbarous nations embraced Chriftianity, flaves, who lived as hufband and wife, were not joined together by any religious ceremony, and did not receive the nuptial benediction from a prieft; when this conjunction between flaves came to be confidered as a lawful marriage, they were not permitted to marry without the confent of their mafter, and fuch as ventured to do it without obtaining that, were punifhed with great feverity, and fometimes were put to death.

CONTUCCI, Andrea, in *Biography*, likewife called Andrea Sanfovino, from a town in the Tufcan dominions, which gave him birth in the year 1460. Like Giotto he was the fon of a fimple fhepherd, and, like him, his genius for defign difcovered itfelf in childhood, by the drawings which he made in the fand, and the models which he amufed himfelf with forming out of clay. Thefe youthful productions were feen and admired by Simone Vefpucci, then chief magiftrate of the town of Sanfovino: he perceived in them the prognoftics of the future fame of our young artift, and obtained the permiffion of his father to carry him to Florence, where, under the tuition of Antonio Pollajuolo, he made a rapid progrefs, and ultimately became one of the moft celebrated architects and fculptors of his age. The chapel of the facrament, in the church of Santo Spirito at Florence, although fmall, is a beautiful fpecimen of the perfection which he attained in the former art, and is fo finely put together that it appears as if chifelled out of one ftone. By this, and other works, he foon acquired an extended reputation; infomuch, that he was invited into Portugal, where he erected many edifices, and amongft others a palace with four towers for the king. After nine years refidence in that country, he returned, loaded with prefents, to Italy, and was employed by Leo X. in many confiderable works; efpecially in the ftatues and baffo-relievos which ornament the Santa Cafa of Loretto. Several of his other productions in fculpture are at Rome, particularly two fepulchres within the choir of the Madonna del Popolo, and a fine group reprefenting St. Anne, Chrift, and the Madonna, in the church of St. Agoftino. He died much regretted in the year 1529, at the place of his nativity. Milizia, Mem. degli Architetti.

CONTUMACY, in *Law*, a refufal to appear in court when legally fummoned; a difobedience to the rules and orders of a court having power to punifh fuch offence.

The word is ufed in civil as well as in criminal matters; but more rarely in the firft, wherein the words *default*, and *contempt*, ordinarily fupply its place: the refunding of the charges of contempt, judged at the hearing, is alfo the penalty of contumacy. In a criminal fenfe, the contumacious is condemned, not becaufe the crime is proved on him, but becaufe he is abfent.

By the Roman laws, there was no procefs in cafe of contumacy, during the firft year of abfence: they only took an inventory of the goods of the fugitive, and if he died in the year, he died *integri ftatus*; but, after the year was expired, he was deemed culpable.

In England, contumacy is to be profecuted to outlawry. In France, all contumacies are annulled, if the accufed make his appearance in five years: if he die in that time, his relations are allowed to purge his memory.

CONTUS, κοντὸς, in *Antiquity*, a long fpear, chiefly ufed by the horfe.

CONTUSION, in *Surgery*, a bruife, from the Latin *contufio*. This term is applied to that kind of lefion which is occafioned by the application of a blunt fubftance to the furface of the body, with more or lefs violence, but without dividing the fkin; it is alfo ufed, when any part has been pinched, compreffed, or ftretched. The firft effects of a contufion are a laceration of fibres, or an entire lofs of tone in the bruifed part; and its common fymptoms are fwelling and inflammation. A violent contufion occafions confiderable lacerations; amongft the many fymptoms of which, effufion of fluids into the neighbouring cellular texture, and even fractures of the bones, are the moft frequent. (See Ecchymosis and *Contufed* Wound.) A violent contufion operates not only upon the part at which it immediately takes place, but alfo upon remote parts of the body; and the lefions thus produced are termed counter-injuries. See Counter-fissure.

The degree of the contufion does not always depend upon the force which has occafioned it, but alfo often upon the nature of the parts that have been bruifed. The contufion is always violent, when there is a bone in the injured part, which is little covered with flefhy fubftance. In every fuch cafe of contufion, inflammation, with all its bad confequences, is to be apprehended. In healthy perfons, violent contufions often produce as ferious confequences; but in perfons whofe folids are previoufly debilitated, flight contufions frequently produce gangrene and ulceration. Extravafated fluids, even though in large quantity, are difcuffed and reabforbed, efpecially when they are fituated in parts of a loofe fpongy texture, or where there are many abforbent veffels. In the more folid parts, for example, in tendinous and aponeurotic parts, fmall effufions cannot be difcuffed, and when fituated near to bones, they eafily give rife to caries by their preffure.

With regard to the cure, contufions frequently occafion more trouble to the furgeon than fractures; according as the operation and counter-operation of the force applied has been more or lefs violent, and alfo according as the patient does or does not give the injured part the requifite repofe, which is equally neceffary in cafes of contufion as it is in fractures. The flighter degrees of contufion require nothing more than the ufe of external difcutient and aftringent remedies; the beft of which are cold water, wine, brandy, vinegar, and folutions of fal ammoniac, or of alum, or decoction of Peruvian bark, &c. The weakened and ftretched parts (if there be not much pain or inflammation) may alfo be fupported by the preffure of a tight bandage; and when the contufion is of confiderable extent, by bandaging the whole limb. When the patient is plethoric, and the bruifed part is of importance, a vein muft be opened, or leeches applied to it.

In the more violent degrees of contufion, the patients require evacuations, efpecially cooling purgatives frequently repeated. External preffure and friction, when the extravafation is confiderable, will greatly aid its abforption, and is therefore beneficial. The more important is the bruifed part, and the more copious the extravafation, the more affiduoufly muft all thefe remedies be employed; but in lefs extenfive contufions, the external applications may be fufficient.

However, the cold fomentations and fpirituous aftringents muft not be applied without proper felection. A decoction of difcutient herbs in wine, or in a mixture of equal parts of wine and water, efpecially when aponeurotic and tendinous parts have been much injured, produces often the greateft benefit; and to this may be added alfo fal ammoniac, when the pain and tenfion have abated. But if the fkin be abraded, thefe faline applications cannot well be employed.

Sometimes the pain increafes, in fpite of thefe applications, to fuch a degree, that emollient cataplafms and oleaginous frictions become neceffary: the following method is particularly recommended in fuch cafes. Rub well the whole bruifed part, above and below the contufion, efpecially below it, with good oil, and then cover the whole with a mixture of olive oil and ftrong wine-vinegar, formed into a kind of liniment by agitation. This mixture may beft be applied upon thick lint, wrapped round the whole part; thus, when the ancle has fuffered the contufion, a part of the leg and foot muft be covered with it. Thefe dreffings are to be renewed twice or thrice a day, till the fwelling and pain difappear. The whole part muft then be frequently rubbed with camphorated fpirit of wine. When this has been done for about three or four days, a cloth may be applied, fpread with a thick ointment compofed of white of egg mixed with crude alum. This may be repeated about three times, with intervals of 12 hours.

The yellow or blue fpots that remain after the cure of contufions, may eafily be made to difappear, by applying to them a mixture of bran, falt, and vinegar, boiled together till the bran has imbibed the fluids.

When the quantity of extravafated blood is very large, or when it is fituated in a part where it cannot eafily be abforbed, or when it gives rife to fymptoms which demand fpeedy relief, it muft be immediately evacuated by an incifion, and the fore treated like a wound combined with contufion. The fame practice muft alfo be obferved, when the internal hæmorrhage by which the extravafation is produced, proceeds from a large veffel, continues, and requires to be ftopped by fome particular applications; or when, befides the extravafation, other lefions of the parts are alfo prefent, as, for example, when the bone has been fhattered. Should there ftill remain lumps of coagulated blood behind, after the ufe of the difcutient remedies, thefe muft alfo be removed by incifions, if they threaten to produce further mifchief by their preffure.

Blows and contufions of the *joints* deferve particular attention: for in thefe fituations, efpecially in the knee joint, they are always dangerous. The confequences are violent pain and impeded motion; the pain is generally fevere at firft, but fometimes not. In the firft cafe the ligaments, and in the fecond the glands, or interior parts, of the joint have been principally affected. In the latter cafe the confequences are dropfy, or even fuppuration of the joint, which frequently proves fatal. When the ligaments or other external parts of the joint have been injured, the part muft be kept quiet, and treated, according to the peculiar circumftances of the cafe, with the remedies formerly mentioned, but efpecially we fhould have recourfe to leeches: it may afterwards be wafhed with fpirituous and faline applications. When the pain has ceafed, and there remains behind, as often happens, a ftiffnefs in the part, the foap, liniment, and vapour bath may be employed with advantage. Should arthritic affections be fuperadded, fpeedy relief muft be procured, and the dangerous confequences obviated by cupping, blifters, friction with flannel, and the internal ufe of camphorated remedies. When the ligaments have been ftretched, and relaxed by a fall, the German furgeons apply, with good effect, fmall bags filled with the warm powder of plaifter of Paris, mixed with a fourth part of fal ammoniac and common falt.

When the glands, or internal parts of the joint, have been injured, the furgeon ought not to intermit the application of appropriate remedies, till the pain has entirely ceafed; efpecially repofe, blood-letting, and cold fomentations. The lefion of a joint, particularly of the knee, by a fall, blow, &c. eafily gives rife to a white fwelling of the part. In fuch cafes the furgeon cannot employ too great care and attention, as the fymptoms are fo numerous and diverfified, that it is in vain to expect a fortunate refult from a carelefs and inert practice.

Internal contufions are attended, more or lefs, with diftreffing and ferious fymptoms. If the head be violently contufed, there is danger left the brain fhould have fuffered at the fame time; or left the effufed blood, lying long upon the cranium, fhould injure the bone by its preffure, if it be not fpeedily abforbed.

When the thorax has been violently contufed, the heart, lungs, and large blood-veffels within the cheft, are liable to partake of the injury; or a rib may be fractured, and may pierce the lungs, fo as to occafion alarming confequences, if not death itfelf.

A general contufion of the abdomen, or a blow received upon it, may perhaps hurt the liver, ftomach, uterus, bowels, &c. or may rupture an important blood-veffel, and thus caufe the death of the patient by the internal bleeding, inflammation, or fuppuration.

The judicious furgeon will therefore, in fuch cafes, confider what internal parts are likely to have fuftained an injury, and will adapt his means to the peculiar circumftances which arife. See CONCUSSION, FRACTURE, and HÆMORRHAGE.

CONTWIG, in *Geography*, a fmall town of France, in the department of Mont Tonnerre, and chief place of a canton in the diftrict of Deux Ponts, with 780 inhabitants. The canton itfelf is compofed of 16 communes, and reckons 4114 inhabitants.

CONTY, a fmall town of France, on the river Seille, in the department of Somme, 12 miles S.E. of Amiens, which formerly gave the title of prince to the fecond line of the houfe of Bourbon Condé. It has only 759 inhabitants, but is the chief place of a canton, which, in 27 communes, and upon a territorial extent of 220 kiliometres, reckons 9675 perfons, and forms part of the diftrict of Amiens; $3\frac{1}{2}$ leagues N.N.E. of it.

CONTZ, a fmall town of France, in the department of Sarre, and chief place of a canton in the diftrict of Treves. The number of its inhabitants does not exceed 351, and the whole canton has 31 communes, and a population of 4972 individuals.

CONTZEN, ADAM, in *Biography*, a Jefuit, and native of the duchy of St. Juliers, has been celebrated for his deep knowledge in the learned languages which he taught in the college of Munich, where he died in the year 1635, after having publifhed "Commentarii in Evangelia in Epift. Pauli ad Rom. et ad Corinth." 2 tom. folio. He wrote likewife

likewife fome able pieces in defence of the Catholic religion as oppofed to the Proteftants. Moreri. Nouv. Hift. Dict.

CONVALESCENCE, in *Medicine*, the infenfible recovery of health; or that ftate in which, after the cure of a diforder, the body which has been reduced, has not yet regained its vigour, but begins to refume its powers. Proper aliments conduce to the re-eftablifhment of the languid faculties; but as the tone of the bowels is weakened, the digeftive faculty is not equal to its office, which is fhewn by light fweats over the whole body; and the fmalleft excefs in this refpect is oftentimes the occafion of dangerous relapfes. A perfon in this ftate is like a taper relumined, which the leaft degree of wind is fufficient to extinguifh. Encycl.

CONVALESCENT, recovering or returning to a ftate of health. In this country hofpitals are eftablifhed in different diftricts, for the prefervation and recovery of our troops when ill or indifpofed. Among others, there is in each diftrict a convalefcent hofpital.

Lift of convalefcents, is the return made out by the furgeon belonging to a battalion, hofpital, &c. in order to afcertain the fpecific number that may foon be expected to be able to do duty.

CONVALLARIA, in *Botany*. Linn.Gen. 425. Schreb. 575. Willd. 649. Gært. 67. Juff. 42. Vent. 2. 145. Muguet. Encyc. Clafs and order, *hexandria monogynia*. Nat. Ord. *Sarmentaceæ*, Linn. *Afparagi*, Juff. *Afparagoides*, Vent.

Gen. Ch. *Cal.* none. *Cor.* monopetalous, bell, funnel, or wheel-fhaped, fmooth, more or lefs deeply fix-cleft; fegments open or reflexed. *Stam.* Filaments fix, awl-fhaped, inferted into the corolla or the receptacle; anthers oblong, erect. *Pift.* Germ fuperior, globular; ftyle filiform; ftigma obtufe, trigonous. *Peric.* Berry globular, fpotted before it ripens, three-celled. *Seeds* one, two, or more in each cell, one or two of the cells frequently abortive.

Eff. Ch. Cor. fix-cleft. Berry fuperior, when unripe, fpotted; three-celled.

* *Corollas bell fhaped.* Lilium convallium, Tourn.

Sp. 1. C. *majalis*, fweet-fcented lilly of the valley. Linn. Sp. Pl. 1. Mart. 1. Poir. 1. Willd. 1. Flor. Dan. tab. 854. Lam. Ill. tab. 248. Eng. Bot. 1035. Gært. tab. 16. fig. 6. (Lilium convallium alpinum & latifolium; Bauh. Pin. 304. Polygonatum; Hall. n. 1241.) "Scapus femicylindrical; flowers in racemes, fomewhat unilateral, nodding." *Root* perennial, matted, creeping. *Leaves* radical, two, on long petioles, elliptical, ribbed, entire, acute; petioles equitant, invefted with fcales. *Scapus* extra-foliaceous, folitary, erect, fimple. *Flowers* white, pedicelled, alternate, bracteate, fweet-fcented; fegments recurved; pedicels recurved; ftamens fhort; ftyle club-fhaped, triangular upwards. *Berry* fcarlet when ripe. It varies in having broader or narrower leaves. A native of woods, particularly in hilly countries. 2. C. *japonica*, grafs-leaved lilly of the valley. Linn. Jun. Supp. 204. Mart. 2. Poir. 2. Willd. 2. Thunb. Flor. Jap. 139. (Monds. Kæmp. Amœn. with a figure.) "Scapus two-edged; flowers in racemes, unilateral; leaves linear, three times longer than the fcapus." *Root* perennial, tuberous. *Root-leaves* about ten, two feet long, drawn to a point at the bottom, triangular, ftriated, bent back. *Scapus* finely ftriated, feven inches long, quadrangular. *Flowers* white; peduncles aggregate, from two to fix together, from one to four flowered; bracte lanceolate, white, fhorter than the peduncle; divifions of the corolla lanceolate, fpreading. *Berry* blue, about the fize of a pea, egg-fhaped. *Seed* folitary, filling the berry. There is a variety with leaves about feven inches long, twice the length of the fcapus. A native of Japan, introduced into England in 1784. 3. C. *fpicata*. Mart. 3. Poir. 3. Willd. 3. Thunb. Jap. 141. "Scapus ftriated; raceme fpiked; flowers aggregate." *Root* perennial, fibrous. *Leaves* linear, narrowed towards the bafe, fomewhat obtufe, much ftriated, longer than the fcapus. *Scapus* from four inches to a foot high, upright, fimple, angular, ftriated, fmooth. *Flowers* violet, cluftered without order in a fpike-like raceme; peduncles very fhort, cylindrical, fpreading, fmooth, one-flowered; corolla almoft globular, fo deeply divided as to appear fix-petalled; divifions egg-fhaped, obtufe, concave; filaments inferted into the germ, Thunb. (receptacle, Poir.); anthers egg-fhaped, erect, two-celled; germ fix-ftriated, fmooth; ftyle erect, white, fhorter than the ftamens; ftigma fimple. *Fruit* not fufficiently known. A native of Japan, flowering in September.

** *Corollas funnel-fhaped.* Polygonatum, Tourn.

4. C. *verticillata*, narrow-leaved Solomon's feal. Linn. Sp. Pl. 2. Mart. 4. Poir. 4. Willd. 4. Eng. Bot. 128. (Polygonatum; Hall. n. 1244. P. anguftifolium non ramofum; Bauh. Pin. 303. Tourn. Inft. 78. β. ramofum; Bauh. Pin. 304.) "Leaves in whorls." *Root* perennial, flefhy, creeping. *Stems* two feet high, erect, commonly fimple, angular, fmooth, naked near the bottom. *Leaves* three or four in a whorl, five or feven at the top of the ftem, lanceolate, acute, feffile, glaucous underneath; ftipules none. *Flowers* white, green at the tip; peduncles axillary, folitary, flender, branched, drooping, two or three-flowered; corolla a little narrowed at the mouth of the tube; divifions bearded within under the tip, rather obtufe; ftamens fhort, inferted into the mouth of the tube; ftyle fhort. *Berry* globular, blue. There is a branched variety, defcribed by Clufius and others as a diftinct fpecies. A native of many parts of Europe, of Scotland, but not of England. 5. C. *polygonatum*, angular Solomon's feal. Linn. Sp. Pl. 3. Mart. 5. Poir. 5. Willd. 5. Flor. Dan. tab. 377. Eng. Bot. 280. Woodv. Med. Bot. tab. 44. (Polygonatum latifolium vulgare; Tourn. Inft. 78. Hall. Helv. n. 1242. P. latifolium flore majore odoro; Bauh. Pin. 303. Barrel. Ic. 711.) "Leaves alternate, half-embracing the ftem; ftem angular; peduncles axillary, generally one-flowered." *Root* perennial, creeping, flefhy, full of knots, which, when cut obliquely, are figured with veins, with fomewhat of the appearance of a feal, whence it is faid to have obtained the name of Solomon's feal. *Stems* feveral, a foot and half high, erect, nodding at the top, fimple, leafy half way down, angular, fomewhat two-edged, zig-zag, fmooth. *Leaves* nerved, fmooth, unilateral. *Flowers* white, with a green line down the fegments, nodding, fweet-fcented: * unilateral on the fide oppofite the flowers; peduncles axillary, folitary or in pairs, almoft always one-flowered; corolla oblong, a little narrowed in the middle; divifions fpreading, bearded; ftamens inferted into the middle of the tube; anthers projecting beyond the bafe of the divifions; ftyle half an inch long. *Berry* blue, with three feeds. A native of England and other parts of Europe. The root is mucilaginous, and in times of fcarcity has been made into bread. It has long been employed as a difcutient poultice to various kinds of tumours, but more particularly to bruifes, accompanied with extravafation of blood in the cellular membrane. It is alfo recommended as a cofmetic; and in the time of Galen was ufed by women to remove pimples and freckles of the fkin. The berries, flowers, and leaves are extremely acrid, and faid to be poifonous; but Poiret has often eaten the young fhoots in fpring and found them as tender and wholefome as thofe of afparagus. 6. C. *multiflora*,

flora. Many-flowered or common Solomon's ſeal. Linn. Sp. Pl. 4. Mart. 7. Poir. 6. Willd. 6. Flor. Dan. tab. 152 Eng. Bot. tab. 279. (Polygonatum latifolium maximum; Bauh. pin. 303. Tourn. Inſt. 78. Hall. helv. n. 1243.) "Leaves alternate, embracing the ſtem, ſtem cylindrical; peduncles axillary, many-flowered." *Root* perennial, creeping, fleſhy, knotted. *Stems* two feet high or more, ſimple, leafy, nodding. *Leaves* elliptical, nerved, a little paler than thoſe of C. polygonatum. *Flowers* white, green at the baſe and tip; peduncles ſolitary, about five-flowered; tips of the diviſions of the corolla ſcarcely bearded; ſtamens inſerted into the top of the tube; ſtyle half an inch long. *Berry* blueiſh black. A native of England and other parts of Europe, chiefly in mountainous parts of the country. The root has ſimilar properties to thoſe of the preceding ſpecies; the young ſhoots are likewiſe eſculent. 7. C. *hirta*. Poir. 7. Boſc. act. ſoc. h. nat. Paris. "Leaves alternate, a little embracing the ſtem; ſtem hiſpid; peduncles with about three flowers." *Root* ſpreading. *Stem* about a foot high, crooked, angular, ſprinkled with white ſtiff hairs. *Leaves* egg-ſhaped, broad, ending in a long obtuſe point; nerves of the inferior ſurface hairy. *Flowers* nodding, unilateral; peduncles axillary, about an inch long, villous. A native of North America, introduced into the Paris garden in 1789. 8. C. *latifolia*. Mur. ſyſt. veg. 334. Mart. 6. Poir. 8. Willd. 7. Jacq. Auſt. 3. tab. 232. "Leaves alternate, embracing the ſtem, acuminate; ſtem angular; peduncles axillary, many-flowered." This ſpecies has the habit of C. multiflora, the flowers of C. polygonatum, and the leaves of C. majalis. *Root* ſmall, ſpreading, fleſhy, very mucilaginous. *Stem* a foot and a half or two feet high, cylindrical at the baſe, then angular to the ſummit. *Leaves* egg-ſhaped, much nerved, quite entire; nerves of the under ſurface ſlightly villous when viewed through a lens. *Flowers* three times larger than thoſe of C. multiflora, white, green at the top, and marked lengthwiſe with greeniſh lines, nodding; peduncles ſlightly villous; ſtamens attached to the middle of the tube. *Berry* globular, blueiſh black. *Seeds* three or four, ſometimes five, in each cell. A native of Auſtria, on woody mountains.

*** *Corollas wheel-ſhaped.* Smilaces, Tourn.

9. C. *racemoſa*. Linn. Sp. Pl. 5. Mart. 8. Poir. 9. Willd. 8. Bot. Mag. tab. 899. (Polygonatum racemoſum; Corn. Canad. 36. tab. 37. Pluk. Alm. 301. tab. 311. fig. 2.) "Leaves ſeſſile; raceme terminal, compound." Linn. "Leaves alternate, ſeſſile, egg-ſhaped, acuminate; panicle terminal, naked." Willd. *Stem* two or three feet high, ſtiff, angular, flattened, zig-zag. *Leaves* nerved, thin, flexible, green on both ſides, ſlightly ciliated at the edges. *Flowers* white, very ſmall, on ſmall alternate branches, with ſhort peduncles; corolla open, divided almoſt to the baſe; diviſions egg-ſhaped, a little ſhorter than the ſtamens; anthers large, yellowiſh. *Berries* ſmall, red. A native of North America, called Oiole Nowote, child's phyſic, by the Cherokee Indians. It is a hardy perennial, eaſily propagated by parting the roots, but thrives moſt in a light ſoil and ſhady ſituation. 10. C. *ſtellata*. Linn. Sp. Pl. 6. Mart. 9. Poir. 10. Willd. 9. (Polygonatum virginianum. Moris. hiſt. 3. tab. 4. fig. 7. P. canadenſe; Corn. Canad. tab. 33.) "Leaves embracing the ſtem, numerous." Linn. "Leaves alternate, embracing the ſtem, elliptical, ſomewhat acute; raceme terminal, ſimple." Willd. *Root* white, ſpreading horizontally. *Stem* about two feet high, thick, not angular, weak, almoſt hollow within. *Leaves* growing very near together, large, even ſurfaced, ſmooth, ſlightly ciliated, green on both ſides. *Flowers* white, in a cloſe ſpike; corolla large, open, ſtellate, divided almoſt to the bottom; ſegments linear, obtuſe, ſtamens half the length of the corolla; filaments capillary; anthers yellow, ſmall, roundiſh; ſtyle the length of the ſtamens; ſtigma obtuſe. *Berries* red. A native of North America. 11. C. *trifoliata*. Linn. Sp. Pl. 7. Mart. 10. Poir. 11. Willd. 10. (C. floribus racemoſis, foliis ovatis oblongis; Gmel. Sib. 1. tab. 6.) "Leaves embracing the ſtem, in threes; raceme terminal, ſimple." *Root* perennial, long, jointed, knotty, with ſhort ſlender filaments at each joint. *Stem* about three or four inches high, ſlender, crooked. *Leaves* generally three together, oblong, rarely lanceolate, rather acute, even-ſurfaced, ſmooth, nerved, green on both ſides. *Flowers* ſmall, on long ſimple peduncles; corolla open, deeply divided; diviſions ovate-acute; ſtamens very ſhort, inſerted into the receptacle; germ roundiſh. *Berries* red, round. *Seeds* two or three, yellowiſh, compreſſed, pointed. A native of the foreſts in Siberia. 12. C. *bifolia*. Linn. Sp. Pl. 8. Mart. 11. Poir. 12. Willd. 11. Flor. Dan. tab. 291. Bot. Mag. Pl. 510. (Lilium convallium minus; Bauh. pin. 304. Barrel. Icon. 1212. Unifolium; Hall. helv. n. 1240.) "Leaves heart-ſhaped; flowers tetrandrous." *Root* perennial, ſmall, fibrous, creeping. *Root-leaves* ſolitary, on long petioles, ſpringing from diſtant parts of the root. *Stem* from a different part of the root, two or three inches high, ſlender, ſlightly angular. *Stem leaves* generally two, petioled, a little nerved, heart-ſhaped, acute, with two rounded lobes and ſome ſtiff hairs at the baſe. *Flowers* white, ſmall, ſhorter than the peduncles; peduncles very ſlender, quite ſimple, ſometimes two together, from the axil of a ſmall ſcale at their baſe; corolla deeply four cleſt; diviſions oval, open; ſtamens four; filaments long; anthers ſmall, ſhorter than the corolla; ſtyle ſhort, thick; ſtigma ſlightly bifid or trifid. *Berries* red, ſmall, two or three-celled. A native of the mountainous parts of Europe, abundant in Sweden. Poiret obſerves that the petioled leaves are a rare ſingularity in the family of the Liliaceæ.

Propagation and Culture.—The lilly of the valley requires a looſe ſandy ſoil and a ſhady ſituation. It is propagated by parting the roots in autumn, placing the ſets a foot aſunder. This ſhould be done every third or fourth year; their flowers will elſe be ſmall and few. All the ſorts of Solomon's ſeal are hardy. They prefer a light ſoil and ſhady ſituation, and are proper to ornament plantations which are not crowded with ſhrubs. They are propagated in the ſame manner and require the ſame treatment as the lilly of the valley. Miller.

CONVENÆ, in *Ancient Geography*, a people of Gaul, who derived their name from the Latin *convenire*. They were eſtabliſhed by Pompey, after his return from the Spaniſh war, againſt Sertorius, at the foot of the Pyrenées. Their country is Cominges.

CONVENT, from the Latin *conventus*, *meeting*, of *convenire*, *to come together*; a monaſtery of religious, of either ſex. See MONASTERY.

Convents are very numerous in Greece, as well as in many Popiſh countries; and they are generally, though not univerſally, ſanctuaries conſecrated to ignorance, ſuperſtition, and moſt frequently to ſloth. In the Grecian iſlands, the monks are denominated *caloyers*, from καλος, *kalos*, good, and γέρος, *geros*, old man, *q. d.* good old man. However, the Grecian convents are the habitations, not merely of old men, but of young boys, from 10 to 12 years of age, cloathed in the habit, which conſiſts of a plain long black gown, confined by a girdle.

CONVENTA PACTA. See PACTA.

CONVENTI, GIULIO CESARE, in *Biography*, a Bolog-

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nefe fculptor, who is fpoken of in high terms by Malvafia, in his defcription of the magnificent funeral of Agoftino Caracci, upon which occafion Conventi modelled a beautiful figure of virtue, which, with another, perfonifying honour, was reprefented, crowning with laurel, the buft of the deceafed artift. The celebrated fculptor, Algardi, received his firft inftruction in modelling from this mafter. Malvafia.

CONVENTICLE, a diminutive of *convent*, denoting, properly, a cabal, or fecret affembly, of a part of the monks of a convent, to make a brigue or party in the election of an abbot.

From the ill ufe of thefe affemblies, the word is come into difrepute; and now ftands for any mifchievous, feditious, or irregular affembly. F. Doucine obferves, the occidentals always efteemed the fifth general council an unlawful conventicle. The term conventicle is faid, by fome, to have been firft applied in England to the fchools of Wickliff, and has been fince ufed to fignify the religious affemblies of all in this country, who do not conform to the eftablifhed doctrines and worfhip of the church of England.

Conventicle, however, in ftrict propriety, denotes an unlawful affembly; and cannot, therefore, be juftly applied to the legal affemblies of proteftant diffenters, in places of worfhip certified, or licenfed, according to the requifitions of law. See Toleration.

This term occurs in the ftatutes 2 Hen. IV. c. 15, and 1 Hen. VI. c. 3; and 16 Car. II. c. 4. (A. D. 1664), which ftatute was made to prevent and fupprefs conventicles. This ftatute, which was enacted for three years, having expired, was revived A.D. 1670, by 22 Car. II. c. 1. which enacted, that if any perfons of the age of fixteen years, fubjects of this kingdom, fhall be prefent at any conventicle, where there are five or more affembled, they fhall be fined 5*s.* for the firft offence, and 10*s.* for the fecond; and perfons preaching incur a penalty of 20*l.* for the firft, and 40*l.* for the fecond offence. Alfo, fuffering a meeting to be held in a houfe, &c. is liable to 20*l.* penalty. Juftices of peace, on the oath of two witneffes, or any other fufficient proof, may record the offence under their hands and feals, and this record fhall be taken in law for a full and perfect conviction, and fhall be certified at the next quarter-feffions.. They, and alfo conftables, head boroughs, &c. have power to enter fuch houfes, and feize perfons affembled, &c. And if they neglect their duty, they fhall forfeit 100*l.* And if any conftable, &c. know of fuch meetings, and do not inform a juftice of peace, or chief magiftrate, &c. he fhall forfeit 5*l.*

"One claufe in this act," fays Mr. Hume (Hift. vol. vii. p. 457,) "is remarkable; that if any difpute fhould arife with regard to the interpretation of any part of the act, the judges fhould always explain the doubt in the fenfe leaft favourable to conventicles; it being the intention of parliament entirely to fupprefs them. Such was the zeal of the commons, that they violated the plaineft and moft eftablifhed maxims of civil policy, which require, that in all criminal profecutions, favour fhould always be given to the prifoner." The perfecution under this act continued to be very fevere, till the operation of the act was fufpended by the exercife of a difpenfing power, and the king's declaration of indulgence, A. D. 1671–2. However, alderman Love, member for the city of London, in the name of the diffenters, difavowed the difpenfing power, though it had been exercifed in their favour, becaufe, as he declared in his fpeech, "he had rather go without his own defired liberty, than have it in a way fo deftructive of the liberties of his country, and the proteftant intereft; and this (he faid) was the fenfe of the main body of diffenters." At length it was ordained, by the ftat. 1 W. & M. ft. 1. c. 18. that proteftant diffenters fhall be exempted from penalties; though if they meet in a houfe with the doors locked, barred, or bolted, fuch diffenters fhall have no benefit from that ftatute. By ftat. 10 Anne, c. 2. officers of the government, &c. prefent at any conventicle, at which there fhall be ten perfons, if the royal family be not prayed for in exprefs words, fhall forfeit 40*l.* and be difabled. See Nonconformists and Toleration.

CONVENTION, in our *Law-Books*, is ufed when a parliament is called, which fits and is diffolved without any act paffed, or judgment given. It is then faid not to be a *feffion* of parliament, but a *convention*. See Convention *infra*.

Convention *of Rouen*, the fame with burfe of Rouen.

Convention, a treaty, contract, or agreement between two or more parties. See Contract.

Every convention between men, provided it be not contrary to honefty, and good manners, produces a natural obligation, and makes the performance a point of confcience.

Every convention has either a name, and a caufe or confideration, or it has none: in the firft cafe, it obliges civilly and naturally; in the latter only naturally.

Conventions *entre fouverains pour reftitution des deferteurs*, conventions among fovereigns for reftitution of deferters. By thefe forts of *conventions*, the deferters from all armies are taken up or arrefted, if they get into the territories of a power, that is in agreement with that whofe colours they have deferted. Notice is given to the neareft commandant, who fhould fend people to find the deferters at the expence of the corps, and fhould pay thofe who took them up, for their fuftenance or fupport during the time of their detention.

Convention *fecrètes entre les officers d'un corps*, fecret conventions among the officers of a corps. See Concordat.

Secret conventions are alfo made in a treaty of peace, reciprocally agreed on, and concluded between the parties, who have received powers to treat. Then thefe conventions remain fecret and concealed, till what was agreed on between the treating and contracting parties is put in execution.

Convention is much ufed both in ancient and modern pleadings, for an agreement or covenant,

In the book of rolls of the manor of Hatfield in Yorkfhire, we have a record of a pleafant convention, anno 11 Edw. III. between Robert de Roderham, and John de Ithen; the latter of whom fold the devil in a ftring for three-pence halfpenny to the former, to be delivered on the fourth day after the convention; when, the purchafer making his demand, the feller refufed to give him livery, to the great lofs (as the record reprefents it), of forty fhillings to the purchafer, &c. But it appearing to the court, that fuch a plea does not lie among Chriftians, the parties were adjourned to hell for judgment.

Convention is alfo the name given to an extraordinary affembly of parliament, or of the ftates of the realm, held without the king's writ. Of this kind was the parliament which reftored Charles II. This parliament met above a month before his return, the lords by their own authority, and the commons, in purfuance of writs iffued in the name of the keepers of the liberty of England, by authority of parliament; and fat full feven months after his reftoration, and enacted feveral laws ftill in force.

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The neceffity of the cafe, in this inftance, fuperfeded all law; for if they had not fo met, it was morally impoffible that the kingdom fhould have been fettled in peace. After the king's return, the firft thing that was done, was to pafs an act, declaring this to be a good parliament, notwithftanding the defect of the king's writs. (Stat. 12 Car. II. c. 1.) Neverthelefs, though the king himfelf, who alone had a right to object, confented to wave the objection, it was at that time a great doubt among the lawyers (1 Sid. 1.) whether even this healing act made it a good parliament, and held by very many, fays judge Blackftone, in the negative: though, as he adds, it feems to have been too nice a fcruple. And yet, out of abundant caution, it was thought neceffary to confirm its acts in the next parliament, by ftatute 13 Car. II. c. 7. & c. 14.

The convention of eftates, in 1688, after the retreat of king James II. upon mature deliberation, came to a conclufion, that king James, by his practices here, and his flight hence, had abdicated the kingdom; and that the throne was vacant; and therefore devolved to king William and queen Mary. Upon this their affembly expired as a convention, and was converted into a parliament.

In this cafe, the lords and commons, by their own authority, and upon the fummons of the prince of Orange (afterwards king William) met in a convention, and therein difpofed of the king and the kingdom. On this occafion, the peers and bifhops, to the number of near 90, addreffed the prince, defiring him to fummon a convention by circular letters. In order to fatisfy his mind by a more general and exprefs declaration of the public confent, the following judicious expedient was adopted. All the members who had fitten in the Houfe of Commons during any parliament of Charles II., were invited to meet; and to them were added the mayor, aldermen, and fifty of the common council of London. This was regarded as the moft proper reprefentative of the people that could be fummoned during the prefent emergency. They unanimoufly voted the fame addrefs with the lords. The prince, being thus fupported by all the legal authority which could poffibly be obtained in this critical conjuncture, wrote circular letters to the counties and corporations of England, and his orders were univerfally complied with. Accordingly, the Englifh convention was affembled, June 22, 1689, and a vote was paffed in a few days by a great majority of the commons, and fent up to the peers for their concurrence. The words which expreffed it were thefe, "that king James II. having endeavoured to fubvert the conftitution of the kingdom, by breaking the original contract between king and people; and having, by the advice of Jefuits, and other wicked perfons, violated the fundamental laws, and withdrawn himfelf out of the kingdom, has abdicated the government, and that the throne is thereby vacant." (See ABDICATION.) The vote was carried to the upper houfe, and there met with great oppofition. After long debate, and free conference between the houfes, and after having obtained the fentiments of the prince, with regard to the fettlement of the government, the chief parties agreed, and the convention paffed a bill; in which they fettled the crown on the prince and princefs of Orange; the fole adminiftration to remain in the prince: the princefs of Denmark to fucceed after the death of the prince and princefs of Orange; her pofterity after thofe of the princefs, but before thofe of the prince by any other wife. The convention annexed to this fettlement of the crown, a declaration of rights, where all the points which had of late years been difputed between the king and people, were finally determined; and the powers of royal prerogative were more narrowly circumfcribed, and more exactly defined, than in any former period of the Englifh government. See CONSTITUTION.

This convention was affembled upon a fimilar principle of neceffity with that of the reftoration; that is, upon a full conviction, that king James had abdicated the government, and that the throne was thereby vacant; which fuppofition of the individual members was confirmed by their concurrent refolution, when they actually affembled. In fuch a cafe as the palpable vacancy of the throne, it follows "*ex neceffitate rei*," that the form of the royal writs muft be laid afide, otherwife no parliament can ever meet again. Let us fuppofe, for the fake of argument, that the whole royal line fhould at any time fail, and become extinct, which would indifputably vacate the throne; in this fituation, it feems reafonable to prefume, that the body of the nation, confifting of lords and commons, would have a right to meet and fettle the government, otherwife there muft be no government at all. Upon this, and no other principle, fays judge Blackftone, did the convention in 1689 affemble. The vacancy of the throne was precedent to their meeting, without any royal fummons, not in confequence of it. They did not affemble without writ, and then make the throne vacant; but, the throne being previoufly vacant by the king's abdication, they affembled without writ, as they muft do if they affembled at all. Had the throne been full, their meeting would not have been regular; but, as it was really empty, fuch meeting became abfolutely neceffary. Accordingly, it is declared by ftatute 1 W. & M. ft. 1. c. 1. that this convention was really the two houfes of parliament, notwithftanding the want of writs, or other defects of form.

A fimilar convention, by circular letters from the prince, was fummoned at Edinburgh, on the 22d of March 1689. As foon as the purpofe of this convention was difcovered, the earl of Balcarras, and vifcount Dundee, leaders of the tories, withdrew from the city; and the convention having paffed a bold and decifive vote, that king James, by his mal-adminiftration and abufe of power, had *forfeited* all title to the crown, they made a tender of the royal dignity to the prince and princefs of Orange.

The conftitution of Great Britain having placed the reprefentation of the nation, and the expreffion of the national will in the parliament, no other meeting or convention, even of every individual in the kingdom, would be a competent organ to exprefs that will; and meetings of fuch a nature tending merely to fedition, and to delude the people into an imaginary affertion of rights, which they had before delegated to their reprefentatives in parliament, could only tend to anarchy and confufion; and to overturn every fettled principle of government.

Accordingly, an act of parliament was paffed in Ireland, in the year 1793, to prevent any fuch meetings or conventions; and a few ignorant individuals, who in the fame year had dared to affemble under that title in Scotland, were quickly difperfed, and their leaders convicted of feditious practices; for which they were fentenced to tranfportation.

CONVENTIONAL ESTATES *for Life*, are thofe that are exprefsly created by the acts of the parties, in contradiftinction to fuch as are merely *legal*, or enacted by conftruction and operation of law. See ESTATE.

CONVENTIONAL *Subrogation*. See SUBROGATION.

CONVENTIONARY RENTS, in *Rural Economy*, is a term which is fometimes applied to the referved rents of life leafes. See LEASE.

CONVENTIONE Facienda, in *Law*, is a writ which lies for the breach of any covenant in writing. Fitzherbert calls it a writ of *covenant*.

CONVENTUAL, fomething belonging to a convent. See Coenobite.

Conventual is particularly ufed, fince the year 1250, for a religious who actually refides in a convent; in contradiftinction to thofe who are only guefts, or are entertained there, or are in poffeffion of benefices depending on the houfe.

Conventual likewife denotes a clafs of the order of Francifcans, who adopted the relaxation introduced into that order by pope Innocent IV. which allowed of property and poffeffions in their community. They were fo called in oppofition to the "Brethren of the Obfervance." This divifion took place in the year 1368.

Conventual *Church*, denotes a church that confifts of regular clerks, profeffing fome order of religion; or of dean and chapter, or other focieties of fpiritual men.

Conventual *Prior*, differs from a *clauftral prior*, in that the former has the full right and authority of an abbot; the only difference between them being in the name: whereas the clauftral prior is a dependent of the abbot, and derives all his authority from him.

The conventual prior is obliged to take prieft's orders in a year, or at moft in two years, from the day of his admiffion: in default whereof, the benefice becomes vacant. Some priories are actually conventual, *i. e.* they are ftocked with religious: others are only conventual *in habitu*, *v. gr.* where there have been no religious during the fpace of forty years: the continuance of one fingle religious, keeps the priory *conventual actu*; for, in default of one, the priory becomes fimple. See Prior.

By a declaration of the king of France, in 1680, it was decided, that a conventuality never degenerates, or ceafes, while there are regular places fubfifting in it for twelve religious, with revenues for their fupport.

Conventual *Auditors*. See Auditor.

CONVERGENCY *of Meridians*, in *Geographical Surveying*, is the angle formed between the meridian of any place and the parallel to the meridian of any other place, drawn through the firft mentioned place. Thus, if P (*Plate* II. *Surveying*, *fig.* 10.) be the pole of the earth, E Q a portion of the equator, P E a meridian drawn through a place or ftation G, and P Q a meridian drawn through another place R: then, if G R be a portion of a great circle paffing through the places G and R, and *a b* be a portion of a fmall circle paffing through G, parallel to the meridian of R (P Q), or perpendicular to the great circle *p* R, which is itfelf a perpendicular to the meridian P Q, in the point R, then is the angle *a* G P the angle of convergency of the two meridians P G and P R, at the place G. It is to be obferved, that at the equator any two meridians, as E P and Q P, are parallel to each other; but on their departure from thence, they converge more and more as they approach towards the pole, where the angle of convergency (*a* G P) becomes equal to the angle of longitude E P Q. It may alfo be remarked, that the angle of convergency, augmented by the excefs of the three angles of a fpherical triangle above 180°, is equal to the angle of longitude at the pole, on a fphere. Phil. Tranf. 1787, p. 218. The principles for applying this to an ellipfoid figure of the earth, or to any other given fpheroid, may be found in Mudge and Dalby's Trig. Survey, vol. i. art. 60, &c.

The late general Roy (Phil. Tranf. 1787, p. 216.) has explained the mode of applying the convergency of two meridians, obtained by reciprocally obferving the azimuth of a ftation on each, from the other, compared with the meridian there (determined by obfervations of the pole-ftar). to the finding of the difference of longitude, or angle at the pole between the meridians of thofe two ftations, by a method fomewhat different from that recommended by the Rev. Mr. Mitchell. Phil. Tranf. lvi. In the progrefs of the Government Trigonometrical Survey, this method was firft applied in the finding of the difference of longitude between Botley Hill ftation in Surrey (lat. 51° 16′ 41½″ N. and long. 0° 0′ 3″ E. of Greenwich Royal Obfervatory) and Goudhurft fteeple in Kent, about 23 miles diftant; as alfo for fettling the latitude of the latter place. Phil. Tranf. 1790, p. 206. It was afterwards applied, in a moft complete manner, to the determination of the difference of longitude between Beachy Head ftation in Suffex (lat. 50° 44′ 23.7″, long. 0° 15′ 11.9″ E.), and Dunnofe ftation in the Ifle of Wight, wherein the bearing of each of thefe places, with the meridian of the other, was accurately fettled by obfervation, although the places are more than 64 miles apart; and whence, the length of a degree of a great circle of the earth, perpendicular to the meridian in latitude 50° 41′, was calculated to be 61182.3 Englifh fathoms. The latitude of Dunnofe ftation, as determined by this operation, has fince been verified by a feries of accurate obfervations, made with a capital zenith fector, the laft work of the celebrated Ramfden, and has been found to err only $\frac{0}{10}$ of a fecond in defect. See Dunnose. This method of determining longitudes of ftations, by the convergency of meridians, has fince been applied to finding the longitudes and latitudes of Black-Down ftation in Dorfetfhire, long. 2° 32′ 22.4″ W. lat. 51° 41′ 14.7″ N. of Butterton ftation in Devonfhire, long. 3° 52′ 47.5″, lat. 50° 24′ 47.2″, and of St. Agnes Beacon in Cornwall, long. 5° 11′ 55.7″, and lat. 50° 18′ 27.9″. Phil. Tranf. 1800. But thefe deductions feem not to have all the pretenfions to accuracy, of which the method is fufceptible, for want of reciprocal obfervations; the three laft ftations being fo chofen as to be all invifible from each other: and although the firft of them is vifible from Dunnofe, that ftation was not vifited again, for the purpofe of completing the obfervations; but one of the angles of this, and both the angles of the other two polar triangles, were made to depend on thofe of the intermediate chains of triangles. It is with the utmoft regret that we obferve any opportunities omitted of fubmitting this grand trigonometrical furvey to all the poffible tefts of its accuracy, or of collecting and recording obfervations, likely to be of future ufe in drawing conclufions relative to the anomalies in the figure of the earth. The writer of this, from having affifted in the making of fome hundreds of obfervations with the admirable theodolites, which are in the hands of major William Mudge, and his able affiftants employed on the trigonometrical furvey, and from having been a witnefs to the great fkill and pains with which they are always ufed by thefe gentlemen, and from having fince applied his multiplied obfervations in accurately calculating the fituation of many different objects, by feries of 4 or 5, and in fome cafes 10 or 12, independent triangles, is enabled to affert, that an extreme degree of accuracy in the diftances and horizontal angles may be obtained in this furvey, perhaps unparallelled in any fimilar undertaking. He laments, therefore, that Ramfden's fine zenith fector (defcribed Phil. Tranf. 1804) fhould, during any favourable feafon of the year, lie idle in the Tower, inftead of being employed in determining the actual latitudes, and, with a theodolite, making pole-ftar obfervations, for obtaining the correct azimuths of all the many principal

principal ftations, whofe horizontal bearings and diftances have been fo very accurately fettled in this furvey; which does equal honour to the government that patronizes it, and to the gentlemen by whom it is conducted.

CONVERGING Curves. See Curve.

Converging, or Convergent *Lines*, in *Geometry*, are thofe which continually approximate, or whofe diftance becomes continually lefs and lefs: in oppofition to *divergent* lines, whofe diftance becomes continually greater. Lines that converge one way, diverge the other.

Converging *Rays*, in *Dioptrics*, are thofe rays which in their paffage out of one medium into another, of a different denfity, are refracted towards one another; fo that, if far enough continued, they will meet in a point, or focus.

All convex lenfes make the rays converge, and concave ones diverge, *i.e.* the one inflects them towards a centre, and the other deflects them from it; and the more, as fuch lenfes are portions of fmaller fpheres. On which properties, all the effects of lenfes, microfcopes, telefcopes, &c. depend.

Rays coming converging out of a denfer medium into a rarer, become more convergent, and concur fooner than if they were to continue their motion through the firft. Rays coming converging out of a rarer into a denfer medium, converge lefs, and concur later, than if they had continued their motion through the firft medium.

Parallel rays, paffing from a denfer into a rarer medium, *v. gr.* from glafs into air, the furface of the glafs being towards the air, will become convergent, and concur in a focus.

Diverging rays, or rays coming from a point, under the fame circumftances, become converging, and meet in a focus; and as the radiant point comes nearer, the focus recedes farther off: if the radiant be near, the focus will be infinitely diftant; *i. e.* the rays will be parallel: and if the point be brought nearer ftill, the rays will diverge.

Converging *Series*, in *Mathematics*. See Series.

CONVERSANO, in *Geography*, a town of Italy, in the kingdom of Naples, and province of Bari; the fee of a bifhop, fuffragan of Bari; 15 miles E.S.E. of it.

CONVERSATION, Discourse; thefe two words denote an interlocution between two, or among more perfons: with this diftinction, that the converfation is ufed for any general intercourfe of fentiments whatever; whereas a difcourfe means a converfation limited to fome particular fubject. Thus we fay, a converfable man; meaning a man able to converfe on a variety of fubjects, or a man of general knowledge; but we do not fay a difcourfable man. The word difcourfe is generally ufed when we mention a fuperior talking to an inferior.

Conversation *Point*, in *Geography*. a head-land on the fouth fide of a bay on the coaft of California. N. lat. 32° 30′. W. long. 119°.

CONVERSAZIONES, denote evening affemblies held at Rome, where perfons of both fexes met, not for inftructive or even amufing converfation, but in order to fee and pay tranfient compliments to one another; and where a perfon may enjoy the happinefs of being fqueezed and preffed among the beft company in the city. Several of thefe take place in the fame evening, and they are formed by the paffing vifits of the fame perfons, who thus feek amufement by a mere change of place and company. Thefe affemblies generally break up about 9 o'clock; a fmall party excepted, who are invited to fupper. They refemble our modern *routs*. Moore's View of Society, &c. in Italy, vol. i. p. 337, &c.

CONVERSE, in *Geometry*, *&c.* A propofition is faid to be the converfe of another, when, after drawing a conclufion from fomething firft fuppofed, we proceed to fuppofe what had been before concluded, and to draw from it what had been fuppofed. Thus, it is demonftrated in geometry, that if the two fides of a triangle be equal, the two angles oppofite to thofe fides are equal alfo: the converfe of the propofition is, that if the two angles of a triangle be equal, the two fides oppofite to thofe angles are equal alfo.

Converse *Direction*, in *Aftrology*, is ufed in oppofition to *direct* direction, *i. e.* by the latter, the promoter is carried to the fignificator, according to the order of the figns; but by the former it is carried from eaft to weft, contrary to the order of the figns.

CONVERSERA, in *Geography*, an ifland of the Adriatic, near the coaft of Iftria. N. lat. 45° 20′. E. long. 18° 44′.

CONVERSION, in a *Moral Senfe*, a return from evil to good; refulting from a fenfe, either of the natural deformity of the one, and amiablenefs of the other: or of the advantages and difadvantages that fpring from the one and the other, refpectively.

Or, it is the change of the heart, with regard to the morals, paffions, defires, and purfuits; and of the mind, with regard to the fentiments, &c. See Regeneration. For an account of the converfion of St. Paul, confidered as an argument for the truth of Chriftianity, fee Paul.

Conversion, in *Law*, is where a perfon having the goods of another in his poffeffion, converts them to his own ufe, without confent of the owner; for which the proprietor may maintain an action of trover and converfion againft him.

This action of trover and converfion was, in its original, an action of trefpafs upon the cafe, and a recovery of damages againft the offender, from which it derived its name. Refufal to reftore goods is, *primâ facie*, fufficient evidence of a converfion, though it does not amount to a converfion. 10 Rep. 56. See Trover.

Conversion, *Converfio*, in *Logic*, a circumftance or affection of propofitions, wherein the order of the terms, or extremes, is changed; fo that the fubject comes into the place of the predicate, and the predicate into that of the fubject; without any alteration in the quality of either.

As, "No virtue is vice; No vice is virtue:" in which we fee the fubject of the former, made the predicate of the latter, and the predicate the fubject; yet both true.

Converfion is ufually defined a due change of the order of the extremes, *i.e.* under fuch a habitude and coherence with refpect to each other, that the one is rightly inferred from the other.

Hence, in every legitimate converfion, two things are required: 1. A communication, or reciprocation of terms; not in refpect of words, but of order. 2. The inference of one propofition to the other.

Ariftotle makes two kinds of converfion; the one *fimple*, by others called *univerfal*; wherein nothing is changed befide the order of extremes, *i. e.* the terms are tranfpofed, without altering either the quality or quantity thereof: as, "No mind is body; No body is mind."

The fecond, *per accidens*, called alfo *particular*; wherein, befide changing the places of the terms, there is a change of an univerfal fign into a particular one; as, "Every good man ftudies the welfare of his country; fome man that ftudies the welfare of his country is good."

To thefe, fome of Ariftotle's followers add a third kind of converfion, called *by contrapofition*: as, "Every man is an animal; every no-animal is no-man."

Conversion,

Conversion, in *Rhetoric, &c.* is underftood of arguments which are returned, retorted, and fhewn on oppofite fides, by changing the fubject into the attribute, and the attribute into the fubject.

There are converfions of arguments, from one figure to another, and alfo from general propofitions to particular ones. Thus Cicero againft Antony: "Doletis tres exercitus P.R. interfectos? Interfecit Antonius. Defiderates clariffimos cives? Eofque vobis eripuit Antonius. Auctoritas hujus ordinis afflicta eft? Afflixit Antonius."

Conversion, in *War*, denotes a military movement or manœuvre, which turns the front of a battalion, where the right or left flank was, when either flank is attacked.

Conversion *of Difeafes*. A difeafe is faid to be converted, when new fymptoms arife in its progrefs, which require a different defignation, and which either put a period to the original diforder, or, combining with it, alter the phyfician's views refpecting the prognoftics, or the method of cure. Many inftances of this kind are familiar; as the converfion of intermittents into continued fevers, or obftructions of the vifcera; of hœmoptöe into phthifis; of jaundice into dropfy, and the like. Others are more unufual, and unexpected, and deferve to be noticed, becaufe they occafion much perplexity in practice, when they occur, and efpecially as this fubject has been much overlooked by medical writers.

We owe the firft obfervation on the fubject of converfion, to Hippocrates, and his annotators. Hoffman has curioufly touched on it, in his fhort differtation *de morborum tranfmutatione*. Baglivi, though very defirous that it fhould be treated at length, and though liberal in promifes of affiftance, confines his recital of facts in a great meafure to thofe of Hippocrates. An exprefs treatife was written on the fubject by Rodericus à Caftro, under the quaint title of *Quæ ex Quibus*, a work better conceived than executed. And an excellent effay was more recently publifhed by Dr. Ferriar, of Manchefter, in the 2d vol. of his "Medical Hiftories and Reflections," in which the fubftance of this article will be found.

This fubject was formerly arranged under two divifions: when the original difeafe fubfifted after the acceffion of the fecond, it was termed a cafe of *epigenefis*, or *propagation*; when the fecond difeafe put a period to the firft, it was called an inftance of *metaptofis*, *metaftafis*, or *tranflation*. But this is a loofe diftinction, which excludes many cafes of converfion. The chief difference between the *metaptofis* and *epigenefis* is, that the relation of the fucceffive morbid appearances, and their dependence upon each other, cannot be fo clearly perceived in one cafe as in the other. It would have been more ufeful, to have diftinguifhed converfions by their influence on the event of the difeafe; as fome are dangerous, and generally fatal; others, while they terminate the original diforder, conduce to a more fpeedy reftoration of health. Thus, when a continued fever fupervenes to pneumonic inflammation, the patient is in great danger, it is *gravi malo grave malum accedere;* when a diarrhœa fupervenes to continued fever, in certain ftages, it terminates the fever earlier than the regular courfe of the difeafe could have done.

All cafes of converfion may perhaps be conveniently referred to the following heads. 1. The fupervening difeafe may be produced by the remote caufes of the original diforder: in this cafe, the action of thofe caufes, after producing its firft effect, is prolonged fo as to excite a new train of fymptoms. 2. The fupervening difeafe may arife from the excefs or combination of the fymptoms of the original complaint. 3. The ftate of the habit, produced by the firft difeafe, may give rife to a new diforder. 4. Converfion may happen, from the imprudent fuppreffion of habitual difeafes.

I. The application of certain remote caufes, may be fufficiently powerful to produce a frefh difeafe, after the firft has been brought on by their action. It is common to find pneumonic inflammation fupervene to typhus, by a continuance of the application of cold or dampnefs, which operates as a remote caufe of the fever. On the contrary, from the tendency of the fyftem to inflammation, or from the manner in which cold has been applied, the pneumonic fymptoms precede the fever in fome cafes, and even run their courfe, before the fever affumes a regular form. In a fatal cafe of the converfion of pleurify into typhus, the left lobe of the lung was deftroyed by fuppuration. (Lieutaud. Hift. Anat. Med. tom. i. Obf. 378.) I have feen, fays, Dr. Ferriar, a cafe of peripneumonia notha end in typhus, and the typhus in mania. He alfo relates, chiefly from his own obfervation, the converfion of acute rheumatifm into typhus in the firft week, a circumftance which we have alfo witneffed;—the converfion of the mild fynochus, or typhus, into inflammation of the peritoneum, or villous coat of the inteftines;—of cholera into typhus;—of dyfentery and diarrhœa into continued fever;—of hyfteria into epilepfy and infanity, &c.; changes which are not very unfrequent.

Cafes of hyfterical converfions, which belong to the head, are very common fources of error to young practitioners, and fometimes deceive even the moft experienced. Sydenham long ago enumerated an ample catalogue of the difeafes, the fymptoms of which the maniac, hyfteria, frequently affumes. This mafterly effay, with which Dr. Ferriar appears to have been unacquainted, contains a full difclofure of the converfions of this diforder. The fymptoms of apoplexy, paralyfis, epilepfy, cough, the iliac paffion, jaundice, ftone in the kidneys, and in the bladder, vomiting, diarrhœa, rheumatifm, lumbago, &c. have been terminated by the acceffion of a complete hyfterical paroxyfm. (See Hysteria.) "We are ignorant," fays Dr. Ferriar, who has defcribed a fimilar variety of hyfterical converfions, "by what laws the body poffeffes a power of reprefenting the moft hazardous diforders, without incurring danger; of counterfeiting the greateft derangement in the fyftem, without materially altering its movements; of producing madnefs, confcious of its extravagancies, and of increafing the acutenefs of fenfation, oppreffing the common fenforium. In hyfterical affections, all thefe appearances are excited, which are incompatible with the reafonings of every fyftem-maker, who has yet endeavoured to explain the inexplicable. Nature, as if in ridicule of the attempts to unmafk her, has, in this clafs of difeafes, reconciled contradictions, and realized improbabilities, with a myfterious verfatility, which infpires the true philofopher with diffidence, and reduces the fyftematic to defpair."

II. The fymptoms of an idiopathic difeafe may, by their violence, affume the appearance, and require the attention due to a new complaint; or affections of particular vifcera, which, in their incipient ftate, are only regarded as fymptoms of general indifpofition, may, as they gain ground, extinguifh the original difeafe, or be protracted beyond it. This head comprehends fuch a variety of cafes, that to treat it fully, would be to give the hiftory of all fymptomatic difeafes. A few illuftrations will fuffice.

Dr. Percival mentions, that he had feen an effufion into the cavities of the brain, produced by the fucceffions of coughing, in a confirmed pulmonary confumption, which effufion terminated fatally, with a previous fuppreffion, more than a week before death, of all the pulmonic fymptoms.

It is one of the most perplexing occurrences in medicine, when the supervening disease is produced by a symptom of some latent complaint: when, for example, phthisical symptoms arise in a scrofulous or gouty patient, who exhibits, at first, no other appearance of those two diseases. Dr. Ferriar saw an instance, in which all the characters of confirmed phthisis pulmonalis were present, that terminated in recovery, upon the patient's coughing up some solid particles, which, upon examination, proved to be chalk-stones. Dr. Percival relates, that a gentleman of rank was supposed to be in an advanced state, of what is called a galloping consumption, having an incessant cough, an expectoration apparently purulent, continued heats, and night sweats: yet his cure was accomplished by giving wine-whey copiously, and by administering doses of hartshorn and spermaceti. A gentle fit of the gout was produced by this cordial regimen. The fever, cough, and spitting, were progressively diminished, and the health of the patient was soon perfectly re-established.

There is, indeed, a strong resemblance between hysteria and gout, in the power of counterfeiting different diseases, but with this material distinction; that the hysterical representations are commonly void of danger, while those produced by gout are often more dangerous than the simple disorder which they imitate. The hysterical hæmoptöe, for example, is seldom productive of bad consequences, but the arthritic apoplexy, pneumonia, and cardialgia, are much more alarming, and run their course quicker than similar complaints originating from other causes. But these diseases agree in this respect, that the accession of the regular paroxysm puts a favourable period to the irregular symptoms.

The prognostics, in conversions of this second class, must evidently vary according to the seat and degree of the supervening disease, and its favourable action upon the original disorder.

III. The original disease, if acute, when it has run its usual course, may leave the habit in a state favourable to the production of another disease: or if the original be a chronic disorder, such a state of the habit may take place during its continuance, and the accessary disease may be simply superadded, or it may vary the form, or affect the duration of the former.

Continued fevers are converted into different diseases, the production of which admits one general explanation. During the increased action of the circulating system, if any part of the body be originally weak, or have been rendered infirm and irritable by preceding disease, congestion, and its consequences, may be expected there. It is therefore easy to conceive, why one patient should suffer a paralytic affection, another phthisis, or a third nephritis, in consequence of tedious cases of typhus. The glandular suppurations, consequent on fevers, seem to depend on the same principle; for although they are represented as critical, by the older medical writers, we sometimes see striking proofs of the contrary. The exanthemata are frequently converted into diseases, which become both chronic and dangerous. The small-pox often produces severe coughs, diarrhœa, and ophthalmia. In some rare instances, tumours of the joints supervene, which suppurate and destroy the patient. The pneumonic inflammation attending the measles, is too often converted into phthisis pulmonalis. Glandular swellings, and general dropsy, frequently succeed the scarlatina anginosa. There is a curious case in Dr. Percival's Essays, Medical and Experimental, (vol. i. p. 148.) of a woman, in whom a conversion of fever took place, first into palsy, afterwards into epilepsy, and then into amaurosis. Fevers often terminate in hysterical disorders, especially in women. Nephritis also is a common conversion of fever: it seldom supervenes with considerable violence, excepting in persons who have formerly undergone it; but when it has been familiar to the patient, a very large quantity of gravel is commonly passed, with extraordinary pain in the state of conversion. The accession of nephritis always extinguishes the fever. Other conversions of fever have been noticed, some of them peculiar to certain epidemics.

Various instances of conversion of diseases, under this head, may be found in the writings of physicians. Jaundice is said, by Baglivi, to be converted to tympanites; tympanites, by Dr. Ferriar, to diarrhœa and ischuria; dyspeptic complaints of long standing, to general dropsy; ascites to chronic inflammation of the bowels, and diarrhœa, which generally prove fatal; mania, as observed by Dr. Mead, to fatal epilepsy; and also to a cutaneous eruption, with recovery; &c. &c.

IV. Conversions may arise, when a disease, regular in its usual course, or long familiar to the habit, is violently terminated by improper methods, or suddenly extinguished by accidental circumstances.

Thus epileptic fits have been produced by the retrocession of the itch, in consequence of some external application; the epilepsy having resisted all the usual methods of treatment, was only cured by producing the itch. Instances of the production of melancholy and madness, by the suppression of eruptions, or the healing of old ulcers, and habitual drains, are common in practical writers.

The diseases originating from the suppression of the menstrual and hæmorrhoidal discharges are also well explained in different books. Dr. Hoffman's treatise, *De Morborum transmutatione*, relates almost entirely to this class of disorders. Tedious dyspeptic cases are often converted to cutaneous eruptions, in distinct pimples, of a fiery red colour; such eruptions extinguish the complaint in the stomach. Examples of conversions might be multiplied infinitely: but we must here content ourselves with adverting to the important conclusions, respecting the prognostics and cure of diseases, which may be drawn from an observation of those phenomena. The following most obvious deductions have been pointed out and illustrated by Dr. Ferriar.

1. Whenever local inflammation supervenes to an acute disease, it shortens or extinguishes the original disorder. The danger, or salubrity of this conversion, appears to depend greatly on the nature of the part attacked by inflammation. In fever, for instance, if it be a conglobate, or conglomerate gland, the prognosis will be favourable, but if the brain, the pleura, or the peritoneum, be inflamed, the danger is increased. In the former case, the cure of the fever may be in a great measure trusted to the supervening disease; in the latter, the progress of the inflammation will demand our chief attention. Thus, however, contra-indications will be avoided, and the safety of the patient will be better consulted, than by the temporizing practice usually adopted on such occasions.

This deduction serves also to explain the action of blisters, which, by producing local inflammation, imitate the process, and, in proportion to their action, exhibit the effect of this kind of conversion. It explains also the salubrity of the gouty inflammation, when it seizes a part not necessary to life.

2. It is so far certain, that medicines operate by producing conversions, that we perceive very considerable diseases resulting from the use of certain remedies, such as mercury; and we judge of the extinction of the original complaint, in some measure, by the increase and permanency of the

remedial difeafe. Thus when we give diuretics, or cathartics, we endeavour to excite a difeafe in the inteftines, or kidneys; for an extreme increafe of natural action, in any part, is certainly morbid. In like manner, Dr. Darwin has obferved, that fome derangements of mind cannot be removed, without exciting an artificial delirium.

3. The convulfion denominated hyfterical, when it feizes the mufcular fibre, in cafes of converfion, is always falutary, and may be regarded, in many inftances, as the crifis of chronic diforders.

4. Internal inflammation, fupervening to chronic difeafes, has a lefs tendency to extinguifh the original complaint, than a fimilar converfion of acute diforders, and is equally dangerous.

5. Cutaneous eruptions often extinguifh dangerous difeafes. Excepting the regular exanthemata, fuch converfions feldom happen in acute diforders. But madnefs and melancholy, epilepfy, delirium, protracted after fever, dyfpepfia, various pulmonary affections, are all obferved to be mitigated, or removed, on the appearance of cutaneous diforders; efpecially on the return of thofe, which, after becoming familiar, had been fuddenly fuppreffed.

6. As it appears that many converfions are proceffes, conftituted by nature for the cure of difeafes, and that fome of the moft active remedies operate in a fimilar manner, we may not only improve the hiftory of difeafes, but the practice of medicine, by paying clofer attention to the connection and operation of diforders upon each other. With this view of the fubject, the moft complicated cafes will admit an inftructive developement, and every additional fact may find an ufeful place. See Metastasis.

Conversion *of equations*, in *Algebra*, is when the quantity fought, or any part thereof, being in fractions, the whole is reduced to one common denomination; and then, omitting the denominators, the equation is continued in the numerators only.

Thus, fuppofe $a-b=\frac{aa+cc}{d}+h+b$; multiply all by d, and it will ftand thus, $da-db=aa+cc+dh+db$.

In arithmetic, we ufe the term *proportion by converfion of ratio*, for a comparifon of the antecedent, and confequent, in two equal ratios.

Thus, as there is the fame ratio between two and three, as between eight and twelve; it is concluded there is the fame ratio between two and one, as between eight and four.

Or, according to Euclid (lib. v. Def. 17.), it is the inference, in the cafe of four proportionals, that the firft is to its excefs above the fecond, as the third is to its excefs above the fourth.

E.G. If we have - - - - - - - $8 : 6 :: 4 : 3$.
Then convertendo, or by converfion, $8 : 2 :: 4 : 1$.
Or, if we have - - - - - - - - $a : b :: c : d$.
Then convertendo - - - - - - $a : a-b :: c : c-d$.

Conversion, *Centre of.* See Center.

CONVERSOS. See Convert.

CONVERT, a perfon who has undergone Conversion.

Convert is chiefly ufed in refpect of changes from one religion, or religious fect, to another.

Converts with relation to the religion turned to, are denominated *apoftates* with regard to that they have relinquifhed.

The Jews formerly converted to Chriftianity in England, were called *converfos*. Henry III. built them a houfe in London, and allowed them a competent fubfiftence for their lives; which houfe was called *domus converforum*. But the number afterwards increafing, they became a burthen to the crown; upon which they were diftributed among the monafteries: and after the expulfion of the Jews under Edward III. the *domus converforum* was given for keeping of the rolls.

Converts, in a *Monaftic Senfe*, are lay-friars, or brothers, admitted for the fervice of the houfe; without orders, and not allowed to fing in the choir.

Till the eleventh century, the word was ufed for perfons who embraced the monkifh life at the age of difcretion; by which they were diftinguifhed from thofe devoted in their childhood by their parents, called *oblati*.

But in the eleventh century, when they began to receive into monafteries illiterate perfons, incapable of being clerks, and only deftined for bodily labour; the fignification of the word was neceffarily changed. F. Mabillon obferves, that it was John, firft abbot of Vallombrofa, who firft introduced thefe *brother-converts*, diftinguifhed by their ftate from the monks of the choir, who were then either clerks, or capable of becoming fo.

CONVERTIBILITY *of elements* into one another. See Elements.

Convertibility *of fpirits* into one another. See Spirits.

CONVERTIBLE Husbandry, in *Agriculture*, is that fort of farm-management in which the land is cultivated, under the alternate fyftems of tillage and grafs.

The lands which are the moft proper for this kind of hufbandry are thofe in which the foil is of the more dry and friable defcription, and in which there is a difpofition to take on or produce grafs. Wet clayey foils are confidered by Mr. Davis as wholly unfit for this fort of management. All the loamy forts of land which are capable of producing good turnips, and the rich fandy foils, are particularly fuited to this method of hufbandry. And on many other varieties of land it may be had recourfe to with confiderable benefit and advantage, where proper care is taken in the cultivation; but it is unqueftionably a mode of culture which ftands in need of great attention, in order to conduct it in the moft proper and beneficial manner, both for the land and the farmer.

It has however been obferved by Mr. Nairmith, in his "Elements of Agriculture," that "though it were poffible to make drill culture univerfal, and cultivate the whole country like a garden, it is doubtful if it would be provident. It is to be feared that it would be fomething like the conduct of a perfon who confumes part of his capital yearly, along with his annual revenue. Whatever may be faid to the contrary, all foils certainly fuffer fome degree of deterioration by long, unremitted tillage. When divefted of that cloathing with which nature always defends it if undifturbed, and when turned up naked to abide the force of the blaft, the happy medium of confiftence is deranged, its beft particles carried away in torrents; and it is left a feeble fkeleton, poffeffing only the faint femblance of departed fertility. This is ftrongly exemplified, he fays, in the once fertile ifland of Barbadoes, in the Weft Indies. It has been faid that this ifland, no doubt fomewhat hyperbolically, fince it began to be cultivated by the Europeans, has loaded more veffels with produce than would have been fufficient to have carried away the whole ifland; and now, it is reported, that the foil is fo exhaufted, that no kind of culture or manure can reftore its fertility. We have correfpondent accounts from the county of Norfolk, and other diftricts, where unceafing tillage has been practifed: the fpecies of crop which has been moft run upon is now lefs productive than formerly. In fhort, there are numerous inftances within the perfonal knowledge of

of many, that wherever the ground has been long dunged and laboured for cropping, without reſt, though the crops may be as bulky, they are generally leſs productive than they were at an earlier period.

"Convertible huſbandry, or regular alternations of tillage crops and paſtures, ſeem therefore, he ſays, to be the only ſyſtem by which the fertility of the country can be preſerved and improved. The proviſions of a country are not derived from tillage crops alone. A conſiderable proportion is obtained from the dairy and the ſhambles. Contraſts have been made to ſhew the vaſt diſproportion between the quantity of food obtained from any given extent of land in a cultivated crop, and what the ſame extent of paſture yields. But it ſhould be remembered, that the fertility of a cultivated field is often acquired by its having lain in paſture. The quantity of food from cultivated crops is not always in proportion to the extent of the land cultivated. The county of Ayr, in the weſt of Scotland, contains, he ſays, a great deal of good ſoil. It is not much more than forty years ſince he remembers the inhabitants of that county paſſing in crowds with horſes, pack-ſaddles, and empty bags, to the Eaſt, to bring peaſe and barley, of which they made a kind of bread to ſerve them in ſummer. At that time the farmers were under no reſtraint as to the proportion of their farms, which they might have in tillage. Soon after, a gentleman who had the management of a great eſtate in that county, made a regulation in the leaſes, by which the farmers were bound to have never more than a third of their farms in tillage. Other proprietors adopting the ſame regulations, it became general: and the farmers were afterwards reſtricted to plough no more than one fourth. Of late, this county, though not leſs populous than formerly, ſends always a great deal of grain to the neighbouring diſtricts; and inſtead of empty bags and pack-ſaddles, ſends carriages loaded with cheeſe to Leith, to be ſhipped for London. Thus by laying land which has been in tillage, frequently in paſture, the future fertility of the country is enhanced, and its preſent produce is not diminiſhed.

"But it has been ſtated, he remarks, from high authority, that there is nothing more difficult than to bring old tillage lands to produce good paſture. A perſon who has been in the habit of attending to the culture of the fields, will have ſome difficulty in comprehending this poſition. He will have obſerved, that when the ſeeds of any of the graſſes are permitted to vegetate on land which has been long under tillage culture, they grow with remarkable luxuriancy, if they be not overwhelmed by the growth of weeds in their infancy. If his experience has been of a long ſtanding, he will remember the introduction of clover and rye-graſs into this country, and will recollect that the firſt time theſe ſeeds were ſown on old tillage lands, the crops of graſs were generally more weighty than any that have ſucceeded on the ſame ground. Having found ſuch grounds ſo much diſpoſed to produce graſs, he will be at a loſs to conceive why they ſhould not produce good paſture. As graſs ſeeds vegetate beſt on ground which is of a pretty ſolid conſiſtence, they will ſometimes fail, when the texture is too looſe, unleſs that fault has been remedied by early ploughing, or by ſufficient rolling, or both. But the beſt native *gramina* (graſſes), having numerous fibrous roots, extending horizontally, are not eaſily ejected, after they have gained ſtrength, and become unfailing. In the inſtances which have given riſe to the above poſition, the ground muſt not, he thinks, have been ſtocked with thoſe perennial plants proper to compoſe a good paſture. In a long courſe of tillage, the ſeeds and roots of the native graſſes are worn out and baniſhed: the plants introduced from artificial hay frequently fail in a few years; and the ground is left naked, or ſtocked only with ſuch coarſe weeds as have kept footing in the ground, or had their ſeeds carried there by winds and birds. But to make tillage grounds bear ſtanding paſture, they ſhould be ſtocked with the ſeeds of ſuch indigenous perennial plants as are known to be adapted to that purpoſe.

"The chief of which are, he ſays, *anthoxanthum odoratum*, *lolium perenne*, and *alopecurus pratenſis*, for ſpring paſture, to be followed by *cynoſurus criſtatus*, *poa trivialis*, &c. The leguminous plants for paſturage, he adds, are of the genus *trifolium*, the *pratenſe*, the *repens*, the *lupulinum*, and the *procumbens*; of the genus *vicia*, the *cracca* and *ſepium*, the *lathyrus pratenſis*, &c. If lands which have been long in tillage are ſtocked with the ſeeds of theſe, and care taken not to ſuffer the young plants to be overwhelmed by rank weeds before they get themſelves eſtabliſhed in the ground, all difficulties will be overcome, and ſuch grounds will be found to yield the moſt ſubſtantial and unfailing paſture.

"As all vegetables are compoſed of the ſame elements, and nouriſhed by the ſame kind of juices, it may appear ſomewhat unphiloſophical, in a ſpeculative view, to maintain that the fertility of the ſoil is preſerved by cultivating one ſpecies of plants upon it one year, or ſeries of years, and plants of a different ſpecies and quality the following.

"But it is a generally received aphoriſm, he obſerves, that nature delights in variety, and this aphoriſm is ſupported by experience in this as well as in other reſpects. Some kinds of vegetables extend their roots near the ſurface, others penetrate deeper into the ſoil, ſome by overſhadowing the earth with their broad leaves render it ſoft and mellow; others, whoſe naked ſtalks admit the free circulation of the air, conſolidate the ſoil; ſome derive the greateſt part of their nouriſhment from the juices lodged in the earth; others draw a conſiderable proportion from the atmoſphere; ſome, having a longer period of exiſtence, continue long to demand nouriſhment; others arrive more quickly at maturity, and muſt be eaſier ſupported. Beſides, among the various tribes of inſects ſo feeble in themſelves, but ſo formidable and deſtructive by their numbers, each has ſome vegetables which it prefers to others for its food, and reſorts to the places where ſuch food is produced; and as they propagate their kinds where their food is found, they muſt become more numerous, and conſequently more deſtructive, where the cultivation of the ſame plant is often repeated. There are weeds too, he ſays, which bear in this reſpect ſome analogy to thoſe inſects, and as they cannot be at all times fully eradicated, propagate the more, the oftener they meet with the crop moſt agreeable to them. By the effects which the growth of different vegetables produce on the ſoil, the proper medium of conſiſtence is in ſome meaſure preſerved, the vegetable food better huſbanded, and the injuries from noxious inſects and weeds ſomewhat eluded. On all theſe accounts, the maxim of modern agriculturiſts, that crops of a different nature and quality ſhould ſucceed one another, is juſtified.

"But the arguments in favour of alternations of tillage and paſture, are, he remarks, ſtill more urgent. The derangement of that happy medium between extremes of too great friability and compactneſs, which he has endeavoured to ſhew is eſſential to the general purpoſes of vegetation, is the unavoidable conſequence of long repeated tillage.

"This is always, he contends, in ſome degree reſtored, when land is left to reſt. If it has been properly treated when in tillage, and well ſtocked with perennial herbage, when left to reſt, it will quickly aſſume a cloſe cover over its ſurface, which, from whatever principle it proceeds, experience has always ſhewn, has a powerful influence in diſpoſing the soil to fertility. In this ſtate, the waſhing to which tillage

lage lands are expofed in times of rain, is, he fuppofes, completely fufpended, and the water flows away limpid. While the ground continues covered with a clofe turf, the root-leaves of the herbage fpreading over the furface, abforb and digeft the carbonic acid of the atmofphere, and perhaps, alfo, earthy particles which probably float continually in the air, as before ftated. As thofe leaves are fmothered and decay, they are perpetually increafing the ftock of carbon and vegetable mould. The celebrated Mr. Kirwan, indeed, is, he fays, of a different opinion. He fuppofes, that ground lying in pafture is annually diminifhing in fertility, though in a lefs degree than that from which a vegetable crop is carried off, becaufe a part is reftored in the excrements of pafturing animals. But though poor foils which are incapable of producing a clofe turf over their furface, gain little by lying at reft, it is evident, that every foil, which either from its natural conformation, or from the improvements made on it by proper culture, has attained a clofe cover of fweet herbage, is perpetually gaining. Whenever the temperature is mild, a continual reproduction is taking place; and all the horizontal foliage, which efcapes the mouths of pafturing animals, falls into decay and accumulates on the furface. On breaking up fuch old paftures a furfaced ftratum may be obferved, differing in colour and conformation from that which lies under it, the thicknefs of which is in proportion to the time the ground has lain at reft. What is here ftated, is, he thinks, corroborated by the following experiment. Having fometimes obferved a kind of turf formed over the hardeft ftones in certain fituations, he collected fome of it which had grown to more than an inch thick on fome flat ftones, lying in a damp place, at the foot of a northerly declivity under fome trees. It feemed to have commenced with the growth of fome of the fmaller *mufci* and *algæ*. On this ground the *feftuca ovina* and *poa glauca* had taken root, and formed a ftrong turf. After it was dried, he fubjected a pound of it to combuftion on an iron fhovel over a fire till it was reduced to black duft. The refidue weighed half an ounce, whereas the greateft refidue he ever obtained from a pound of dried peat burnt, was not more than five drams. If fuch a quantity of mould could thus be accumulated by the graffes growing on a naked rock, may it not accumulate at leaft in as great a proportion on the foil where the fucceffion of growth is incomparably greater?

"It is true, he obferves, that fome foils by long lying at reft, condenfe fo much as to incommode the roots of the graffes, and on others the moffes prevail fo much as to overcome the efculent herbage, but the fertility of the foil is not thereby diminifhed. Its prefent energy is only fufpended, while it is acquiring additional vigour for future exertions. When fuch land is again employed in tillage, the fpoils of the turf, together with a great part of what has been confumed by pafturing animals reftored in excrements, are turned down and mixed with the foil, by which its conformation is improved, and its thicknefs and principle of fertility augmented. Hence the tillage crops are plentiful—the ears large and plump—and the produce of one year equal to two or more on land wearied out by perpetual turning.

"It muft not be underftood, by what is here or formerly faid, that he means to undervalue the operation of the plough. But, as we are ftudying in what manner the fertility of the country may be preferved and improved, and the greateft quantity of difpofable produce obtained at the leaft poffible expence, it is neceffary to examine how all thofe aids which nature offers may be made to co-operate with the artificial means of agricultural improvement, and not blindly expect from mechanical labour, more than it can poffibly produce. When barren foils are to be brought from a wild ftate, it is by mechanical labours only that their obftinacy can be fubdued, and the different ingredients properly blended. The turf of old grafs ground will frequently require a good deal of mechanical operation to mix it with the earths, and facilitate its putrefaction. But when thefe, and fuch other aids as mechanical labour is adapted to accomplifh, are obtained, that medium of confiftence on which fertility depends will be beft preferved by alternate fucceffions of labour and reft. The proportion and order of thofe fucceffions muft no doubt vary greatly according to circumftances. While thofe where the foil is deep and of the moft favourable conftruction, and where adventitious manure is attainable, may be much occupied in tillage crops, without fuffering great deterioration; in the more elevated grounds, where the foil is generally lefs happily conftructed, expofed to feverer wafhings and manure lefs abundant, a greater proportion of the farm ought always to be in pafture. But in all fituations and circumftances, the foil will be benefited by being occafionally at reft, provided care has been taken to lay it down unexhaufted, free of weeds, and well ftocked with proper graffes. By this fyftem of alternations of tillage and grafs crops, the attention of the hufbandman is lefs diffipated, and his labours more regularly diftributed. The live ftock fed on his pafture, furnifh him with manure to enrich his tillage fields, and the more they are enriched, they are the better fitted to yield an abundant return of grafs, when they come in courfe to be laid to reft. When ground is brought to yield abundance of fweet grafs it is profitable in pafture, and while it continues fo is ftill improving in fertility, and becomes more and more adapted to yield plentiful tillage crops. Thus under good management, the fertility of the country may progreffively advance, and the difpofable quantity of provifions for the ufe of the confumer, and the net return to the hufbandman, perhaps, exceed what the operofe and expenfive fyftem of perpetual fallowing, and crops without reft, could produce.

"Convertible hufbandry is not lefs fuperior to perpetual grafs. Land which lies perpetually in grafs, is deprived of the advantage of having the vegetable fubftance accumulating on the furface from time to time mixed into the foil. By the working of moles, ants, and other vermin, by the condenfation of the foil, by the prevalence of moffes and ufelefs weeds, the turf is deformed and the reproduction of fweet pafture diminifhed. Water is frequently detained on the furface, and chills the growth of efculent herbage, and thus the growth becomes more feeble and flow. In proportion to the decay of efculent herbage, plants which are noxious or unprofitable prevail; the pafture becomes gradually lefs, and the fertility of the foil is almoft ufelefs to the owner and to fociety, while it remains in that ftate."

The practice of this hufbandry muft of courfe in many inftances be highly profitable to the cultivator. See TILLAGE and GRASS.

CONVEX, bending down on every fide, as the outfide of a globular body.

CONVEX *freeze*, *leaf*, *lens*, *mirror*, *fuperficies*. See the feveral fubftantives.

CONVEXITY, the exterior furface of a *convex*, *i. e.* gibbous and globular thing; in oppofition to *concavity*, or the inner furface, when hollow or depreffed.

The word is of particular import in catoptrics, and dioptrics; where it is applied to *mirrors* and *lenfes*; which fee. See alfo REFRACTION.

CONVEYANCE, in *Law*, a deed, or inftrument, by which lands, &c. are *conveyed*, or transferred, by the proprietor, to fome other perfon. In the difcuffion of this fubject, it is proper to inquire *who* may thus aliene and to *whom*; and then *how* a man may aliene, or the feveral modes of

of conveyance. With regard to the firſt inquiry, who is capable of conveying and who of purchaſing, the ſubject of conſideration is rather the incapacity, than the capacity, of the ſeveral parties: for all perſons in *poſſeſſion* are *primâ facie* capable both of conveying and purchaſing, unleſs the law hath laid them under any particular diſabilities. But if a man has only in him the *right* of either poſſeſſion or property, he cannot convey it to any other, leſt pretended titles might be granted to great men, by which juſtice might be trodden down, and the weak oppreſſed. (Co. Litt. 214.) Yet reverſions and veſted remainders may be granted, becauſe the poſſeſſion of the particular tenant is the poſſeſſion of him in reverſion or remainder; but *contingencies*, and mere *poſſibilities*, though they may be releaſed, or deviſed by will, or may paſs to the heir or executor, cannot be aſſigned to a ſtranger, unleſs coupled with ſome preſent intereſt. (Sheppard's Touchſtone, 238, 239. 322. 11 Mod. 152. 1 P. Wms. 574. Stra. 132.)

Perſons attainted of treaſon, felony, and præmunire, are incapable of conveying, from the time of the offence committed, provided attainder follows, for ſuch conveyance by them may tend to defeat the king of his forfeiture, or the lord of his eſcheat. But they may *purchaſe* for the benefit of the crown, or the lord of the fee, though they are diſabled to *hold* the lands ſo purchaſed, if after attainder, being ſubject to immediate forfeiture; if before, to eſcheat as well as forfeiture, according to the nature of the crime. (Co. Litt. 42. 2.) Thus alſo corporations, religious or others, may purchaſe lands: yet, unleſs they have a licence to hold in mortmain, they cannot retain ſuch purchaſe; but it ſhall be forfeited to the lord of the fee. Idiots and perſons of non-ſane memory, infants, and perſons under dureſs, are not totally diſabled either to convey or purchaſe, but *ſub modo* only. For their conveyances and purchaſes are voidable, but not actually void. The king indeed, on behalf of an idiot, may avoid his grants or other acts. (Co. Litt. 247.) See Idiot. A feme-covert may *purchaſe* an eſtate without the conſent of her huſband, and the conveyance is good during the coverture, till he avoids it by ſome act declaring his diſſent. And though he does nothing to avoid it, or even if he actually conſents, the feme-covert herſelf may, after the death of her huſband, waive or diſagree to the ſame; nay, even her heirs may waive it after her, if ſhe dies before her huſband, or if in her widowhood ſhe does nothing to expreſs her conſent or agreement. (Co. Litt. 3.) But the conveyance or other contract of a feme-covert (except by ſome matter of record) is abſolutely void, and not merely voidable (Perkins, § 154. 1 Sid. 120.); and therefore cannot be affirmed or made good by any ſubſequent agreement. The caſe of an alien born is alſo peculiar.—For he may purchaſe any thing; but after purchaſe he can hold nothing, except a leaſe for years of a houſe for convenience of merchandize, if he be an alien-friend: all other purchaſes (when found by an inqueſt of office) being immediately forfeited to the king (Co. Litt. 2.). Papiſts, and perſons profeſſing the popiſh religion, and neglecting to take the oath preſcribed by ſtatute 18 Geo. III. c. 60. within the time limited for that purpoſe, are by ſtat. 11 and 12 W. III. c. 4. diſabled from purchaſing any lands, rents, or hereditaments; and all eſtates made to their uſe, or in truſt for them, are void. (1 P. Wms. 354.)

In anſwer to the ſecond inquiry, or *how* a man may aliene or convey, we are led to ſtate the ſeveral modes of conveyance. A tranſlation, or transfer, of property being admitted by law, it became neceſſary that this transfer ſhould be properly evidenced, in order to prevent diſputes as to the fact, or in relation to the perſons concerned, or with regard to the ſubject-matter, or with reſpect to the mode and quality of the transfer. The legal evidences of this tranſlation of property are called the *common aſſurances* of the kingdom. See *Common* Assurances.

Deeds (ſee Deed) which ſerve to *convey* the property of lands and tenements from man to man, are commonly denominated *conveyances;* and theſe are either conveyances at *common law*, or ſuch as receive their force and efficacy by virtue of the *ſtatute of uſes*. Of conveyances by the common law, ſome may be called *original* or *primary* conveyances; which are thoſe by means of which the benefit or eſtate is created or firſt ariſes; and others are *derivative* or *ſecondary*, by which the benefit or eſtate, originally created, is enlarged, reſtrained, transferred, or extinguiſhed. *Original* conveyances are the following, *viz. Feoffment, Gift, Grant, Leaſe, Exchange,* and *Partition;* which ſee reſpectively. *Derivative* conveyances are *Releaſe, Confirmation, Surrender, Aſſignment,* and *Defeazance;* which ſee under their proper titles. For other conveyances, which have their force and operation by virtue of the *ſtatute of uſes*, which have been derived from it or introduced in conſequence of it; ſee Uses. See alſo Covenant *to ſtand ſeiſed to uſes*, Bargain *and* Sale, Lease *and* Release, and Revocation *of Uſes*.

A conveyance cannot be fraudulent in part, and good as to the reſt: for if it be fraudulent and void in part, it is void in all; and it cannot be divided. 1 Lill. Abr. 311. Fraudulent conveyances to deceive creditors, defraud purchaſers, &c. are void, by ſtatutes 13 Eliz. c. 5. 27 Eliz. c. 4. See Fraud.

CONVICT, in *Common Law*, one who is found guilty of an offence, by the verdict of a jury. This conviction may accrue two ways; either by his confeſſing the offence and pleading guilty; or by his being found ſo by the verdict of his country. Judge Blackſtone ſays, that in the Roman republic, when the priſoner was convicted of any capital offence by his judges, the form of pronouncing that conviction was peculiarly delicate, not that he was guilty, but that he had not been ſufficiently on his guard, "parum caviſſe videtur."

According to Crompton, a perſon is alſo a convict, or ſaid to be convicted, when, after having been outlawed, he appears and confeſſes, or is found guilty by the inqueſt; and he ſays, moreover, that when a ſtatute excludes from clergy perſons found guilty of felony, &c. it extends to thoſe who are convicted by confeſſion. (Cromp. Inſt. 9.)

The law implies that there muſt be a conviction before puniſhment, though it is not ſo mentioned in a ſtatute; and where any ſtatute makes a ſecond offence felony, or ſubject to a heavier puniſhment than the firſt, it is always implied that ſuch ſecond offence ought to be committed after a conviction for the firſt. (1 Hawk. P. C. c. 10. § 9. c. 41. § 3.) Judgment amounts to conviction; though it doth not follow that every one who is convicted is adjudged. A conviction at the king's ſuit may be pleaded to a ſuit by an informer, on a penal ſtatute; becauſe while in force it makes the party liable to the forfeiture, and no one ought to be puniſhed twice for the ſame offence; but conviction may be pleaded to a new ſuit by the king. (1 Hawk. P. C. c. 10.) A perſon convicted or attainted of one felony may be proſecuted for another, to bring acceſſaries to puniſhment, &c. (Fitz. Coron. 379.)

Perſons convicted of felony by verdict, &c. are not to be admitted to bail, unleſs there be ſome ſpecial motive for granting it; as where a man is not the ſame perſon, &c. for bail ought to be before trial, when it ſtands indifferent whether

whether the party be guilty or not. (2 Hawk. P. C. c. 15. § 43, 80.) See Bail. Conviction of felony, and other crimes, disables a man to be a juror, witness, &c. Conviction and attainder, &c. are, in our law-books, frequently confounded. On conviction, (or even upon an acquittal when there was reasonable ground to prosecute, and, in fact, a *bona fide* prosecution,) for any grand or petit larceny, or other felony, the reasonable expences of prosecution, and also, if the prosecutor be poor, a compensation for his trouble and loss of time, are by statutes 25 Geo. II. c. 36., and 18 Geo. III. c. 19. to be allowed him out of the county stock, if he petitions the judge for that purpose; and by statutes 27 Geo. II. c. 3. explained by the same statute 18 Geo. III. c. 19; all persons, appearing upon recognizance or *subpœna* to give evidence, whether any indictment be preferred or not, and as well without conviction as with it, are entitled to be paid their charges, with a farther allowance (if poor) for their trouble and loss of time. Moreover, on a conviction of larceny in particular, the prosecutor shall have restitution of his goods, by virtue of the statute 21 Hen. VIII. c. 11. And the construction of this act having been in great measure conformable to the law of appeals, it has therefore in practice superseded the use of appeals of larceny. It is now usual for the court, upon the conviction of a felon, to order (without any writ of restitution) immediate restitution of such goods as are brought into court to be made to the several prosecutors, or else, without such writ, the party may peaceably retake his goods, wherever he happens to find them, unless a new property be fairly acquired in them. Or, if the felon be convicted and pardoned, or be allowed his clergy, the party robbed may bring his action of trover against him for his goods, and recover a satisfaction in damages. But such action does not lie before prosecution; for then felonies would be made up and healed (1 Hal. P. C. 546.): and also recaption is unlawful, if it be done with intention to smother or compound the larceny; it then becoming the heinous offence of *theft-bote;* which see.

When a person is convicted of a misdemesnor which principally and more immediately affects some individual, as a battery, imprisonment, or the like, it is not uncommon for the court to permit the defendant to *speak with the prosecutor,* before any judgment is pronounced; and if the prosecutor declares himself satisfied, to inflict but a trivial punishment. This is done, to reimburse the prosecutor his expences, and make him some private amends, without the trouble and circuity of a civil action. This, says judge Blackstone, is a dangerous practice, which, though intrusted to the discretion of the judges in the superior courts of record, ought never to be allowed in local or inferior jurisdictions, such as the quarter-sessions; where prosecutions for assaults are by such means too frequently commenced, rather for private lucre than for the great ends of public justice. Above all, he says, it should never be suffered, where the testimony of the prosecutor himself is necessary to convict the defendant; for there the rules of evidence are entirely subverted; the prosecutor becomes in effect a plaintiff, and yet is suffered to bear witness for himself. Nay, even a voluntary forgiveness, by the party injured, ought not, in true policy, to intercept the stroke of justice. "This," says an elegant writer (Beccaria, ch. 46) who pleads with equal strength for the *certainty* as for the *lenity* of punishment, "may be an act of good nature and humanity, but it is contrary to the good of the public. For, although a private citizen may dispense with satisfaction for his private injury, he cannot remove the necessity of public example. The right of punishing belongs not to any one individual in particular, but to the society in general, or the sovereign who represents that society; and a man may renounce his own portion of this right, but he cannot give up that of others." Blackst. Comm. Book iv.

Convict *recusant,* he who has been legally presented, indicted, and convicted, for refusing to come to church to hear the common prayer, according to the statutes 35 Eliz. and 3 Jac. I.

This is commonly understood to be a popish recusant; though any others who refuse coming to church on the same account are as properly denominated recusants.

CONVICTION, in *Law.* See Convict.

Conviction, in *Theology,* expresses the first degree of repentance; wherein the sinner becomes sensible of his guilt, of the evil nature of sin, and of the danger of his own ways.

Conviction, *summary,* in *Law,* is such as is directed by several acts of parliament, for inflicting certain penalties created by those acts, without the intervention of a jury: the party accused being acquitted or condemned by the suffrage of such person only, as the statute has appointed to be his judge. Of this kind are all trials of offences contrary to the laws of Excise, and other branches of the Revenue, proceedings before Justices *of the peace,* and the method used by superior courts of justice for punishing contempt by attachment. See Contempt.

CONVIVIUM, *banquet,* in our *Ancient Customs,* and *Law-Books,* signifies the same thing among the laity as procuration among the clergy; *viz.* when the tenant was obliged, in virtue of his tenure, to provide meat and drink for his lord once, or oftener, in the year.

Convivium *militare,* a military banquet or repast. The repast of Roman soldiers was a particular object of military discipline, which the commanders themselves paid attention to. The soldiers were not suffered to eat alone but by troops, in order to preserve union and good fellowship amongst them.

CONULI, in *Natural History, Conuli* Kleinii, a class of the *Echinus,* in the Mollusca order of Vermes. See Echinus.

CONULUS, a genus of the *Trochus,* in the Testacea order of Vermes. See Trochus.

CONVOCATION, a general assembly of the representatives of the clergy of a province, summoned by the king's writ to consult of the more weighty affairs of the church, as oft as a parliament is convoked to consult of those of the state.

The king's writ is directed to the archbishop of each province, requiring him to summon all bishops, deans, archdeacons, cathedral and collegiate churches, &c.

Upon which, the archbishop directs his mandate to his dean provincial, first citing him peremptorily; then willing him, in like manner, to cite all the bishops, deans, &c. and all the clergy of his province: but directing, withal, that one proctor sent for each cathedral and collegiate church, and two for the body of the inferior clergy of each diocese, may suffice: which the dean accordingly does.

The place where the convocation of the province of Canterbury has been usually held, is St. Paul's church; whence they have been prorogued to St. Peter's in Westminster, in the chapel of Henry VII. or the Jerusalem Chamber, where there is an upper and lower house.

The *upper* house, in the province of Canterbury, consists of twenty-two bishops, whereof the archbishop is always president, who prorogues and dissolves the convocation by mandate from the king: and before the reformation abbots, priors, and other mitred prelates sat with the bishops. All,

at the opening of a convocation, are in their fcarlet robes and hoods.

The *lower* houfe confifts of twenty-two deans, fifty-four archdeacons, twenty-four proctors for the chapters, and forty-four proctors, reprefenting the parochial clergy; in all 144.

Each houfe hath a prolocutor chofen from among themfelves; and that of the lower houfe is prefented to the bifhops. Things are firft ufually propofed in the upper houfe; then communicated to the lower. All the members of both houfes have the fame privilege in freedom from arreft, as the members of parliament have, ftat. 8 Hen. VI. c. 1. and the proctors of the clergy received wages from their conftituents.

The convocation exercifes jurifdiction in making canons with the king's affent, (ftat. 25 Hen. VIII. c. 19.) This ftatute which reftrains the convocation from making or executing any canons repugnant to the king's prerogative, or the laws, cuftoms, and ftatutes of the realm, was merely declaratory of the old common law (12 Rep. 72.); that part of it only being new, which makes the king's royal affent actually neceffary to the validity of every canon. To the convocation alfo belong the examination and cenfure of heretical and fchifmatical books and perfons. But appeal lies from their proceedings to the king in chancery, or to his delegates. In cafe the king himfelf be a party, the appeal lies by ftat. 24 Hen. VIII. c. 12. to all the bifhops affembled in the upper houfe of convocation. See COURT *of delegates*.

The archbifhop of York, at the fame time, holds a convocation of the clergy of his province, after the like manner at York; and, by conftant correfpondence, debates and concludes of the fame matters as are debated by that of Canterbury; but they are diftinct and independent of each other; and when they ufed to tax the clergy, they granted different fubfidies. In the province of York, the convocation confifts only of one houfe; and on account of the fmall number of diocefes in this province, each archdeaconry elects two proctors. It has been cuftomary with the convocation, for many years back, regularly to affemble, and to adjourn without proceeding to any bufinefs; fo that the convocation now exifts more in form than for any effective purpofe. See CHURCH *of England*.

In the year 1711, the convocation was affembled with the new parliament; the lower houfe chofe Atterbury for its prolocutor; and both houfes concurred in cenfuring fome tenets that favoured Arianifm, broached and fupported by Mr. Whifton, mathematical profeffor in Cambridge. The archbifhop doubted whether this affembly could proceed againft a man for herefy; the judges were confulted, and the majority gave their opinion that the convocation had a jurifdiction. Five of them profeffed the contrary fentiment, which they maintained from the ftatutes made at the reformation; the queen, not doubting their jurifdiction, expected them to proceed, but frefh fcruples arifing, they determined to examine the book, without proceeding againft the author, and this was cenfured accordingly. An extract of the fentence was fent to the queen, but fhe did not fignify her pleafure on this fubject, and the affair remained in fufpence. Before the queen's death, in 1714, the lower houfe of convocation had declared, that a book publifhed by Dr. Samuel Clarke, under the title of "The Scripture Doctrine of the Trinity," contained affertions contrary to the Catholic faith. They fent up extracts from this performance to the bifhops; and the doctor wrote an anfwer to their objections. He was prevailed upon to write an apology, which he prefented to the upper houfe; but apprehending that it might be publifhed feparately, and mifunderftood, he afterwards delivered an explanation to the bifhop of London. This was fatisfactory to the bifhops; but the lower houfe refolved, that it was no recantation of his heretical affertions. (See the article CLARKE.) In the year 1717, the proceedings in the convocation turned chiefly upon two performances of Dr. Hoadly, bifhop of Bangor. One was entitled "A Prefervative againft the principles and practices of the Non-jurors;" the other was a fermon preached before the king, under the title of "The nature of the kingdom of Chrift;" the convocation appointed a committee to examine the bifhop's two performances; and thus commenced the famous controverfy, called "Bangorian;" in confequence of a letter written on the fubject of the bifhop's difcourfe by Dr. Snape, mafter of Eton college. The convocation drew up a reprefentation, in which the prefervative and the fermon were cenfured, as tending to fubvert all government and difcipline in the church of Chrift; to reduce his kingdom to a ftate of anarchy and confufion; to impugn and impeach the royal fupremacy in caufes ecclefiaftical, and the authority of the legiflature to enforce obedience in matters of religion by civil fanctions. Before this reprefentation could be brought into the upper houfe, that whole affembly was prorogued by a fpecial order from the king. This meafure, however, inflamed the controverfy. A great number of pens were drawn againft the bifhop; but his chief antagonifts were Dr. Snape, and Dr. Sherlock, whom the king removed from the office of his chaplains. The convocation has not been permitted by government to do any bufinefs of confequence fince this time, but merely to confine itfelf to matters of form. See CHURCH *of England*.

The Englifh clergy, anciently, had their reprefentatives in the lower houfe of parliament; as appears by the record, much prized by lord Coke. Among the freeholders who were prefent in parliamentary meetings, we find many of the inferior, fecular, clergy; an order of men who were, certainly, of too great eftimation and account in the ftate not to have had a fhare in the legiflature, either perfonally or by reprefentatives. There are not, indeed, any writs of fummons now remaining, which require proctors to be fent for them to the parliaments of this kingdom, before the 23d year of Edward I.; but from the annals of Burton (p. 355, fub anno 1255.) it appears, that the whole body of the clergy were fo reprefented in the 39th of Henry III. Nor is this remarked as a novelty by any of the hiftorians who wrote in that age; though, being all ecclefiaftics, they would probably have thought it more worthy of obfervation than any event in which the laity alone were concerned. It may be therefore prefumed, that, not only the attendance of the inferior clergy in parliament, which is evidently proved by many paffages in more ancient hiftorians, but this kind of reprefentation of them had been cuftomary long before. (See BOROUGH.) In later times, from a defire of independence on the ftate, to which they were incited more and more by the pope, they gradually withdrew themfelves from any attendance in parliament, either perfonally, or by reprefentatives; fo that, after the reign of Henry VI., they are hardly ever mentioned as prefent there; although in the 21ft year of Richard II. the commons had fhewn in a petition to the king, "how that before thofe times many judgments and ordinances, made in the times of the progenitors of our lord the king in parliament, had been repealed and difannulled, becaufe the ftate of the clergy were not prefent in parliament at the making of the faid judgments and ordinances." After the reformation of religion, in the reign of Edward VI., an attempt was made in convocation to have the lower houfe united to the houfe of commons, "according to ancient cuftom, *ficut ab antiquo fieri confuevit.*" It was alfo propofed to queen Elizabeth, but rejected. The clergy continued to tax themfelves in a feparate body, till the reftoration of Charles II.; foon after which

which they were taxed in the ſame manner and conjointly with the reſt of the commons; and have ever ſince been repreſented in parliament by the ſame perſons, which has more *embodied* them with the laity, and prevents the ſetting up of a church intereſt diſtinct from that of the people. It is remarkable, that this very important alteration in the ſtate of the kingdom was made *without any law*, by agreement with the clergy. (Littleton's Hiſt. Hen. II. vol. iii.)

In the parliament of Ireland, originally formed on the model of that of England, the clergy continued to be members of the houſe of commons, till they were excluded by an act of parliament, 28 Hen. VIII. A. D. 1536, becauſe they ſupported the authority of the pope, and obſtructed the reformation of the church. Whilſt the clergy continued to grant their own money in their convocations, their grants were not effectual till they were confirmed in parliament. In the 15th century the clergy of England had great influence in all the public councils of the kingdom, and particularly in parliament: they conſtantly reſided in the kingdom, and were preſent in theſe councils; while the nobles and great men were engaged in warlike expeditions into France or Scotland. Beſides all the archbiſhops and biſhops, twenty-five abbots and two priors were ſummoned to every parliament, and ſometimes many more; ſo that the ſpiritual lords were generally double the number of the temporal lords in the houſe of peers. (Prynne's regiſter of writs, vol. i. & iv.) This enabled the prelates to procure ſanguinary laws againſt heretics, and to ſecure the immenſe poſſeſſions of the church, together with all her abſurd errors and wretched ſuperſtitions, from all attacks. 1 Hen. IV. c. 15. 2 Hen. V. c. 7.

CONVOLVULI, in *Botany*, the tenth natural order of dicotyledonous hypogynous plants, in the ſyſtem of Juſſieu, with the following character. *Calyx* five-cleft, moſt frequently permanent. *Corolla* regular, commonly with a five-cleft border. *Stamens* generally five, inſerted at the baſe of the corolla, and alternating with its ſegments. *Style* one, or definitely divided; when one, with a ſtigma either ſimple or divided; when more than one, with as many ſimple ſtigmas as there are diviſions. *Fruit* capſular, often three-celled, more rarely two or four-celled; cells with one or more ſeeds. *Seeds* marked with an umbilical eye at the baſe, ſomewhat oſſeous, and affixed below to the central partition; valves free, with their edges adjoining to the angles of the partition; radicle of the arched corculum inferior. (Corculum ſhut up by the periſperm?) *Stems* ſhrubby, or more frequently herbaceous; many twining; many lacteſcent. *Leaves* alternate, very rarely almoſt oppoſite, (always ſimple, Vent.). This order is nearly allied to the Borragineæ and Polemonia, in its regular five-cleft pentandrous corolla, and alternate leaves; but differs from the latter, in having the partition adjoining to the edges, not to the middle of the valves; and from the former, in the fruit not being gymnoſpermous. Juſſieu aſſigns to it the following genera: 1. With a ſingle ſtyle. Maripa, Aubl.; mouroucoa, Aubl.; retzia, Thunb.; endrachium, (humbertia, Commers.); convolvulus, Linn.; ipomæa, Linn. 2. With ſeveral ſtyles. Evolvulus, Linn.; nama, Brown and Linn.; hydrolea, Linn.; ſagonea, Aubl.; creſſa, Linn. 3. Allied to the convolvuli. Cuſcuta, Linn.; diapenſia, Linn.; loeſelia, Linn.

Ventenat has changed the name of the order to convolvulaceæ, and has included in it only convolvulus, ipomæa, evolvulus, and creſſa; entirely omitting marupa, mouroucoa, retzia, endrachium, nama, hydrolea, and ſagonea; and removing cuſcuta to his undetermined plants, and diapenſia and loeſelia to the polemonia, his polemonaceæ. La Marck's natural family of liſerons correſponds exactly with the firſt two ſections of Juſſieu.

CONVOLVULUS, (ſo called, *a convolvendo*, becauſe many of the ſpecies are twining). Linn. Gen. 215. Schreb. 287. Willd. 323. Lam. Illuſt. 296. Gært. 780. Juſſ. 133. Vent. ii. 396. Claſs and order, *pentandria monogynia*. Nat. Ord. *Campanaceæ*, Linn. *Convolvuli*, Juſſ. *Convolvulaceæ*, Vent.

Gen. Ch. *Cal.* perianth five-cleft. *Cor.* monopetalous, bell-ſhaped or funnel-ſhaped, plaited; border generally ſpreading, more or leſs five-lobed. *Stam.* filaments five, awl-ſhaped, ſhorter than the corolla, approximating at the baſe. *Piſt.* germ ſuperior, roundiſh; ſtyle filiform; ſtigma ſimple or bifid. *Peric.* capſule ſurrounded by the calyx, roundiſh; one, two, three, or four-celled; one, two, three, four, or many-valved. *Seeds* one or two in each cell.

Eſſ. Ch. Five-cleft. Corolla bell or funnel-ſhaped. Stigmas one or two. Pericarp a capſule, or dry berry. Seeds one or two in each cell.

Obſ. Authors often call the calyx five-leaved, when it is very deeply five-cleft.

* *Stems twining.*

Sp. 1. C. *arvenſis*. Linn. 1. Mart. 1. Deſrouſſeaux, Encyc. 2. Lam. Ill. 2001. Willd. 1. Bauh. Pin. 294. Flor. Dan. tab. 459. Curt. Flor. Lond. 2. 13. Eng. Bot. 312. (C. minor; Bauh. Hiſt. 2. 157. C. purpureus; Lob. Obſ. 340. fig. 2. C. minor arvenſis, flore roſeo; Tourn. Inſt. 83. Smilax levis minor; Ger. Emen. 861. Helxine foliis ſagittatis, ciſſampelos; Mat. 1011. Camer. Epit. 753.) "Leaves arrow-ſhaped; lobes acute; flowers generally ſolitary; bractes minute, awl-ſhaped, remote from the flower." *Root* perennial, creeping, ſtriking deeply into the ground, not eaſily extirpated. *Stems* numerous, angular. *Leaves* alternate, petioled, ſmoothiſh. *Flowers* fleſh-coloured, ſometimes white, ſweet-ſcented, opening only in clear weather; peduncles axillary, generally one-flowered, thickened above. A troubleſome weed in cultivated ground, twining cloſely about the culms of wheat, and other kinds of corn, and thence in many parts of England called bindweed. Its juice is ſlightly purgative. The bloſſoms give a deep yellow or orange tincture to water, which is heightened by alum and alkalis. A native of Great Britain, and moſt parts of Europe. 2. C. *auriculatus*. Deſr. 3. Lam. 2002. (C. arvenſis β; Linn. C. minimus, anguſto auriculato folio; Bocc. Muſ. tab. 33. Pluk. Alm. 116. tab. 24. fig. 3. C. arvenſis minimus; Rai. Syn. 276.) "Leaves linear, haſtate-acuminate; lobes entire." Diſtinguiſhed from the preceding by its narrow elongated leaves, longer petals, and bractes placed nearer the flower. A native of Great Britain, and other parts of Europe: found by Commerſon in the Iſle of France, where it is ſuppoſed to have been brought with wheat from Perſia. 3. C. *ſepium*. Linn. 2. Mart. 2. Deſr. 1. Lam. 1. Willd. 2. Flor. Dan. tab. 458. Curt. Flor. Lond. 1. tab. 13. Eng. Bot. 313. (C. major, albus; Bauh. Pin. 294. Tourn. Inſt. 82. Smilax lævis major; Ger. Emen. 861.) "Leaves arrow-ſhaped; lobes truncate; peduncles ſquare, one-flowered; bractes larger than the calyx, and cloſe to it." β americanus; with a fleſh-coloured flower. Bot. Mag. 732. *Root* perennial, about the thickneſs of a gooſe-quill, white, creeping, not eaſily eradicated. *Stems* numerous, from ſix to ten inches high, or more, angular, ſmooth, not much branched. *Leaves* alternate, petioled, dependent. *Flowers* large, generally white, ſometimes fleſh-coloured; nectary a yellow gland, ſurrounding the baſe of the germ. A native of Great Britain,

Britain, and most parts of Europe, climbing up hedges in moist ground. Its inspissated juice, taken in doses of twenty or thirty grains, is a powerful purgative. 4. C. *Wheeleri.* Mart. 84. Willd. 3. Vahl. Symb. 2. 366. (C. sagittariæ foliis, Wheeleri; Pluk. Phyt. tab. 85. fig. 3. Ipomæa sagittata; Poir. It. 2. 160. tab. 3.) "Leaves arrow-shaped, roundish behind, entire; peduncles cylindrical, one-flowered." Wholly smooth. *Leaves* acute; petiole the length of the leaf. *Peduncles* shorter than the petiole, thicker, bractate towards the middle, thicker under the flower. Allied to C. sepium. A native of Spain and Barbary. 5. C. *scammonia.* Linn. 3. Mart. 3. Desr. 81. Lam. 2079. Woodv. Med. Bot. 13. tab. 5. (C. syriacus, sive scammonia; Moris. Hist. 2. 12. tab. 3. fig. 5. Bauh. Pin. 294.) "Leaves triangular-arrow-shaped; peduncles cylindrical, nearly double the length of the leaves, about three-flowered." *Root* perennial, long, thick, fleshy, full of a milky juice. *Stems* cylindrical, slender, somewhat villous. *Leaves* alternate smooth, acute; posterior lobes diverging, with a tooth on the inner side of each. *Flowers* large, purplish white or pale yellow; peduncles solitary; segments of the calyx emarginate; bractes small, awl-shaped, spreading, remote from the flower. *Capsule* three or four-celled. A native of Syria and Asia Minor. For its medical uses, see SCAMMONY. 6. C. *involucratus.* Willd. 5. "Leaves cordate-hastate, pubescent; peduncles about three-flowered; calyxes bracteate." *Stem* cylindrical, pubescent-villous. *Leaves* oblong, obtuse, mucronate, quite entire, pubescent on both sides; truncate at the base, undivided, rather obtuse; petioles villous. *Peduncles* about the length of the leaves, pubescent. *Bractes* two at the division of the peduncle, pubescent, oblong, acute; two others at the base of each flower, villous-pubescent, elliptical, rather acute, longer than the calyx, and involving it. A native of Guinea. 7. C. *sagittifolius.* Smith Prod. Fl. Gr. p. 133. Flor. Græc. tab. 193. "Leaves cordate-hastate, covered with long distinct hairs, angular at the base; peduncles generally one-flowered; capsules hirsute." A native of the islands in the Archipelago, in vineyards and cultivated ground. 8. C. *sibiricus.* Linn. Mantis. 203. Mart. 4. Desr. 80. Lam. 2078. Willd. 6. (C. rupestris; Pallas It. 3. n. 80. tab. R.) "Leaves cordate-acuminate, even-surfaced; peduncles two-flowered; stipules retuse, decurrent." *Root* annual. *Stems* from four to six feet long, slender, slightly winged from the decurrence of the stipules, but not two-edged. *Leaves* ending in a point, which extends to half their whole length, soft, thin, smooth, veined, entire, paler underneath; stipules vertical, small, obtuse. *Flowers* small, scarcely twice the length of the calyx, whitish or flesh-coloured, fugacious; bractes often wanting; when present, bristle-shaped, sometimes at the division of the peduncle, sometimes on the pedicels; calyx smooth, deeply divided; stigma capitate, two-lobed. A native of Siberia, floweringin July and Aug. Introduced into England in 1779. 9. C. *rupestris.* Willd. 7. "Leaves obtusely heart-shaped, oblong, lanceolate, acute; peduncles one-flowered." *Stem* smooth, but little twining, somewhat shrubby. *Leaves* two inches long, smooth, slightly hairy underneath, and at the edges, when viewed through a lens. *Flowers* violet; peduncles almost the length of the leaves; bractes two, awl-shaped, about the middle of the peduncle; calyx-leaflets, egg-shaped, acute, a little hairy; corolla flat, five-plaited; plaits a little hairy on the outside. Supposed to be a native of Siberia. 10. C. *farinosus.* Linn. Mant. 203. Mart. 5. Desr. 79. Lam. 2077. Wild. 8. Jacq. Hort. Vind. 1. 13. tab. 35. Salisb. Par. Lond. 45. "Leaves heart-shaped, acuminate, repand; peduncles three-flowered; stem mealy." Linn. "Stem with a silky pubescence, which appears at a little distance like dust; leaves cordate, arrow-shaped, with the base of the sinus prominent, repand-toothed, smooth above: panicles from three to seven-flowered; border of the corolla sharply five-cleft; stigmas smooth." Salisb. *Root* annual. *Stem* six feet high, about the thickness of a goose-quill. *Leaves* remote, but from the number of branches appearing crowded. *Flowers* pale rose-coloured; peduncles longer than the leaves, slender, cylindrical; pedicels turned upward after flowering; bractes small, tinged with dull purple towards the top; segments of the calyx purplish, mucronate; tube of the corolla pale green, funnel-shaped, pentangular, shining; filaments whitish, attached to the tube nearly its whole length, slightly pubescent; anthers pale blue. *Nectary* deep yellow. *Capsule* two-celled, two seeds in each cell. Salisb. Four-celled, one seed in each cell. Jacq. A native of fields and hedges in Mysia, Livadia, and Peloponnesus; Sibth. Madeira; Masson. 11. C. *lanuginosus.* Mart. 85. Willd. 9. Vahl. Symb. 3. 23. "Leaves heart-shaped, oblong, somewhat hastate, tomentous-silky, auricled, toothed; peduncles three-flowered; stem hairy." *Stem* herbaceous, beset with numerous ferruginous hairs. *Leaves* on short peduncles, acute; auricles with two teeth. *Flowers* resembling those of scammony, yellowish, having a purplish lanceolate line, with a pile of yellow hairs on each segment of the border; bractes two at the division of the peduncle, lanceolate; two others on each lateral pedicel near the flower; middle pedicel shorter, without bractes; peduncles axillary, solitary, hairy; three outer leaflets of the calyx egg-shaped, acuminate, rough with hairs; style bifid. Supposed to be a native of the Levant. 12. C. *incanus.* Mart. 86. Willd. 10. Vahl. Symb. 3. 23. "Tomentous-silky; leaves lanceolate-arrow-shaped, obtuse, often with two teeth at the base; peduncles two-flowered." *Stem* herbaceous, cylindrical. *Leaves* an inch and half long, rounded at the end, mucronate, gradually wider towards the base; auricles rounded behind; petioles one fourth of the length of the leaf. *Peduncles* the length of the leaves; pedicels one shorter and thicker, with two bractes at the base; one longer, with two bristle-shaped bractes in the middle; segments of the calyx egg-shaped, acute; outer ones more villous; corolla villous on the outside; style bifid. *Capsule* smooth, globular. A native of America. 13. C. *salicifolius.* Desr. 17. Lam. 2016. "Leaves lanceolate, serrated, on short petioles; calyx angular." *Stems* cylindrical, slender. *Leaves* three or four inches long, narrowed to a point at both extremities. *Peduncles* shorter than the leaves, axillary, solitary, one-flowered; bractes two, very small, awl-shaped, at a distance from the flower; calyxes five-leaved. A native of St. Domingo; specimen in the herbarium of La Marck. 14. C. *emarginatus.* Mart. 87. Willd. 11. Vahl. Symb. 3. 23. (C. uniflorus; Desr. 18. Lam. 2017. Burm. Ind. 47. tab. 21. fig. 2.) "Leaves lanceolate; lower ones emarginate, mucronate; peduncles one-flowered; outer calyx-leaves semiovate, large." *Stem* rooting at the bottom, muricated upwards, with small spines, and having minute hairs scattered over it at the top. *Leaves* thickish, veinless, smooth; lower ones acute at the base: upper ones rounded at the base, mucronate. *Peduncles* solitary, with two minute bractes above the middle; calyx-leaves smooth, the length of the corolla; three outer ones acute, mucronate; two inner ones linear-lanceolate, attenuated; corolla with five lines on the outside, which are closely beset with fulvous shining hairs; stigma capitate. Capsule smooth, shorter than the calyx. A native of the East Indies. 15. C. *nitidus.* Desr. 19. Lam. 2018. "Leaves oval, shining, silky-white underneath; peduncles one-flowered,

ered, ſhorter than the petiole." *Root* perennial. The young branches, petioles, leaves, peduncles, and calyxes, cloathed with a ſilky ſhining down. *Stem* cylindrical, woody, almoſt ſmooth. *Leaves* broad-oval, alternate, acute, entire, nerved, about twice the length of the petioles. *Peduncles* axillary, ſolitary, with two awl ſhaped bractes about the middle; calyxes ſhort; two inner leaves ſmaller; corollas at leaſt two inches long, funnel-ſhaped. A native of the Philippine iſlands. Specimen in the herbarium of Juſſieu. 16. C. *chenopodioides*. Deſr. 21. Lam. 2020. "Villous; leaves egg-ſhaped, ſerrate-ſinuated; flowers ſolitary, nearly ſeſſile." *Stems* ſlender, weak, cylindrical. *Leaves* an inch long; petioles about half their length, channelled. *Peduncles* axillary, ſolitary; bractes two, ſmall, filiform, rather long; leaves of the calyx egg-ſhaped, acute, corollas narrow, tabular. In the herbarium of La Marck. 17. C. *medium*. Linn. Sp. Pl. 4. Mart. 6. Deſr. 10. Lam. 2009. Willd. 12. "Leaves linear, haſtate-acuminate; auricles toothed; peduncles one-flowered; calyxes arrow-ſhaped." Plant ſmooth in all its parts. *Root* annual. *Stems* very ſlender. *Peduncles* axillary, ſolitary, often bent in the middle at the origin of the two bractes; upper half angular, thicker; three outer leaves of the calyx large, nearly as long as the peduncles, acute, arrow-ſhaped at the baſe, like thoſe of campanula medium; auricles terminated by two or three ſmall teeth; two inner ones entire, acute, a little ſhorter; corolla not longer than the calyx. A native of Madagaſcar and the Eaſt Indies. 18. C. *filicaulis*. Mart. 88. Willd. 13. Vahl. Sym. 3. 24. "Leaves linear-lanceolate, obtuſe, mucronate, dilated and toothed at the baſe; calyx leaves oblong." *Root* annual. *Stem* herbaceous, filiform, branched. *Leaves* on very ſhort petioles, diſtant, two inches long or more, tender, veined, quite ſmooth. *Peduncles* axillary, filiform, thicker at the top; bractes two, oppoſite, awl-ſhaped, above the middle of the peduncle; calyx-leaves mucronate, ſmooth; ſtigma ſimple, bluntiſh. A native of Guinea. 19. C. *tridentatus*. Linn. Sp. Pl. Ed. 1. Mart. 76. Deſr. 12. Lam. 2011. Willd. 14. Pluk. Alm. 117. tab. 276. fig. 6. & Mant. 117. tab. 167. fig. 5. (Evolvulus tridentatus; Linn. Sp. Pl. Ed. 2. Fendera-claudi; Rheed. Mal. 11. 133. tab. 65.) "Leaves ſpatulate-linear, three-toothed at the tip, dilated and toothed at the baſe; calyx-leaves elliptical, cuſpidate." *Root* annual. *Stems* filiform, ſmooth, ſlightly ſtriated, almoſt ſimple. *Leaves* alternate, about half an inch long, ſmooth; petioles about a line long. *Flowers* purpliſh at the baſe, with a yellowiſh white border; peduncles axillary, ſolitary, one-flowered, longer than the leaves, with two ſmall bractes near their ſummit. A native of the Eaſt Indies. Introduced into England in 1778, by ſir Joſeph Banks. 20. C. *anguſtifolius*. Mart. 89. Deſr. 32. Lam. 2030. Willd. 15. (Ipomæa anguſtifolius; Jacq. ic. 2. tab. 317.) "Leaves linear, haſtate, obtuſe, mucronate, ſmooth; auricles generally entire; peduncle one-flowered." *Root* ſpindle-ſhaped, riſing about an inch above the ſurface of the ground, with the appearance of a ſlender, ſimple, erect, leafleſs ſtem. *Stems* ſeveral, ſcarcely a foot high, a little twining, almoſt ſimple, filiform, weak. *Leaves* an inch long, about a line broad, numerous, on very ſhort petioles. *Flowers* yellow, longer than the calyx; peduncles axillary, ſolitary, ſhorter than the leaves, with two awl-ſhaped bractes, about the middle, upper half thicker; calyx-leaves connivent, lanceolate, mucronate; corolla funnel-ſhaped; border very open; diviſions egg-ſhaped, obtuſe; ſtigma globular, didymous. *Capſule* two-celled. A native of Guinea and the Eaſt Indies. 21. C. *ariſtolochifolius*. Mill. Houſton MSS. "Leaves haſtate-lanceolate; auricles rounded; peduncles many-flowered." *Root* annual. *Stem* ten feet high, ſlender. *Flowers* yellow, in ſmall cluſters, on long peduncles. *Capſules* trigonous, three-celled. *Seeds* two in each cell. Seeds ſent to Mr. Miller from Carthagena in New Spain. 22. C. *Adanſonii*. Deſr. 82. Lam. 2080. "Leaves haſtate, linear; ſtipules in pairs, ſomewhat filiform; calyx muricated." *Stems* herbaceous, weak, a little villous. *Leaves* alternate, diſtant, petioled, entire, ſmooth, from three to four inches long; ſtipules about an inch long. *Flowers* near two inches long, axillary; peduncles nearly the length of the petioles, ſmooth, with two ſmall bractes about the middle; calyx-leaves egg-ſhaped, rough, with ſharp tubercles. A native of Senegal. 23. C. *japonicus*. Mart. 7. Deſr. 6. Lam. 2005. Willd. 16. Thunb. jap. 85. (Kos and Kudſi vulgo Firaga wo; Kempf. Amæn. 5. 856.) "Leaves haſtate, lanceolate, acute; lateral lobes one-toothed; peduncles one-flowered; ſtem ſimple." *Stems* filiform, ſmooth. *Leaves* alternate, almoſt unilateral, petioled, ſmooth; middle lobe an inch long, lanceolate, entire, acute; ſide ones a little reflexed, ſhorter. *Flowers* axillary, ſolitary; peduncles as long as the leaves, filiform, ſmooth; calyx-leaves egg-ſhaped, acute, entire, ſmooth. A native of Japan. 24. C. *ebracteatus*. Deſr. 7. Lam. 2006. "Leaves cordate-arrow-ſhaped, obtuſe behind; peduncles ſhorter than the petiole, without bractes." Whole plant, except the corolla, cloathed with ſhort white hairs. *Stems* ſcarcely a foot and a half long, ſlender. *Leaves* alternate, acute. *Flowers* white, ſmall; peduncles one or two-flowered; ſegments of the calyx five; two outer ones broader; ſtigmas two, globular, purpliſh. Native country unknown. Cultivated in the botanic garden at Paris. 25. C. *leucanthus*. Deſr. 8. Lam. 2007. (Ipomæa leucantha; Jacq. Coll. 2. 280. ic. 2.) "Leaves heart-ſhaped, acuminate: peduncles ſhorter than the petiole." *Root* annual. *Stems* about four feet high, ſlender, cylindrical, branched, reddiſh, and ſomewhat rough towards the bottom. *Leaves* alternate, entire, or ſlightly ſcolloped, ſmooth. *Flowers* white; peduncles axillary, ſolitary, an inch long, erect, cylindrical, ſmooth, one-flowered: calyx leaves mucronate, a little open at the ſummit, ciliated at the baſe; corolla funnel-ſhaped: anthers purpliſh; ſtigma two-lobed. A native of America in the torrid zone. 26. C. *fruticuloſus*. Deſr. 9. Lam. 2008. "Shrubby; leaves ſomewhat heart-ſhaped at the baſe, linear, lanceolate, petioles ſhort; flowering branches, thick ſet with leaves." *Root* perennial. *Stems* three or four feet high, cylindrical, ſlender. *Leaves* not more than two lines broad, ſloped at the baſe, on very ſhort petioles. *Flowers* with five purple rays; peduncles larger than the petioles, ſcarcely the length of the flowers; bractes two, ſmall, awl-ſhaped, unequal, ſituated nearer to the ſtem than to the calyx; calyx ſmooth; corolla ſhallowly five-lobed. A native of the Canary iſlands, flowering in April and May. 27. C. *dentatus*. Mart. 90. Willd. 17. Vahl. Symb. 3. 25. "Leaves haſtate, ſmooth; auricles toothed; peduncles many-flowered, muricated." *Stem* cylindrical, ſmooth. *Leaves* ſcarcely an inch long, ſomewhat heart-ſhaped at the baſe; middle lobe lanceolate, quite entire; ſide ones roundiſh, unequally four or five-toothed; petioles filiform, often ſomewhat muricated towards the baſe. *General peduncles* ſpreading, thicker, and a little longer than the petioles; partial peduncles in threes; that in the middle one-flowered; ſide ones with two or three pedicelled flowers; both muricated; rigid; calyx-leaves oblong, obtuſe, mucronate, equal. A native of the Eaſt Indies, found by Schumacher. 28. C. *haſtatus*. Mart. 79. Willd. 18. Vahl. Symb. 1. 15. Forſk. deſcr. 203. "Leaves lanceolate, haſtate; peduncles axillary, in pairs, two-flowered." *Stem* hairy. *Leaves* remote, quite entire, ſmooth on the upper ſurface, villous on the lower; au-

 ricles

ricles rounded, ſometimes with one tooth behind: petiole half the length of the leaf. *Peduncles* ſhorter than the petiole, villous; calyx-leaves hairy, acuminate, patulous at the tip. A native of Egypt and Arabia. 29. C. *Sonneratii.* (C. haſtatus; Deſr. 11. Lam. 2010. Tala-neli; Rheed. Mal. 11. 113. tab. 55.) "Leaves linear, haſtate-acuminate; auricles toothed; calyx-leaves ſimple." Whole plant ſmooth. *Stems* very ſlender, ſlightly angular. *Leaves* about two lines broad, alternate, nearly ſeſſile. *Peduncles* longer than the flower, ſlender, one or two-flowered, often bent at the inſertion of the bractes, thicker upwards; bractes two, ſmall, awl-ſhaped, ſituated a little above the middle of the peduncle. *Flowers* yellowiſh-white, twice the length of the calyx; calyx-leaves egg-ſhaped, acute. A native of the Eaſt Indies, communicated to La Marck by Sonnerat. 30. C. *aſarifolius.* Deſr. 89. Lam. 2087. "Leaves kidney-ſhaped, broad, veined; peduncles one or two-flowered." *Stems* cylindrical, ſmooth, not much branched. *Leaves* alternate, large, entire, ſmooth, firm; petioles about two inches long, channelled. *Peduncles* longer than the petioles; bractes from two to four, ſmall, awl-ſhaped, ſituated almoſt cloſe to the flowers; calyx-leaves ſhort, egg-ſhaped, obtuſe, two outer ones ſmaller; corollas at leaſt two inches long, tubular; tube about half an inch diameter; border but little open, with five pointed diviſions; ſtigma capitate, didymous. A native of Senegal. 31. C. *tiliæfolius.* "Shrubby; leaves heart-ſhaped, rounded; younger ones ſomewhat tomentous; flower and fruit very large." *Stems* cylindrical, almoſt ſmooth. *Leaves* alternate, a little orbicular, entire; petioles about half the length of the leaves, channelled. *Flowers* large; peduncles not more than eight or ten lines long, axillary, ſolitary, one-flowered; calyx-leaves ſhort, obtuſe, almoſt round; corolla at leaſt three inches long, almoſt cylindrical; tube narrow as far as the length of the calyx, afterwards eight or ten lines in diameter; ſtigma capitate, two-lobed. *Capſule* about the ſize of a walnut, apparently two-celled. A native of the Iſle of France, and the Cape of Good Hope. Found by Commerſon. 32. C. *panduratus.* Linn. Sp. Pl. 5. Mart. 8. Deſr. 91. Lam. 2089. Willd. 19. (C. megalorrhizos; Dill. Elth. 101. tab. 85. fig. 99.) "Leaves, ſome heart-ſhaped, entire, others panduriform or three-lobed; peduncles longer than the petiole, about two-flowered." *Root* perennial, thick, ſpindle-ſhaped. *Stems* long, ſlender. *Leaves* diſtant, petioled. *Flowers* large, white, with the bottom of fine purple; peduncles axillary, ſolitary, from one to three-flowered; calyx-leaves ſhort, two outer ones ſhorter and narrower. *Capſule* two-celled. *Seeds* hirſute, one in each cell. A native of Carolina and Virginia, flowering from June to September. 33. C. *betonicifolius.* Mart. 72. "Leaves cordate-arrow-ſhaped, acute; peduncles one-flowered." *Stem* five or ſix feet high, ſlender. *Flowers* white, with purple bottoms; peduncles long, ſlender. A native of Africa, cultivated by Miller in 1730. 34. C. *bracteatus.* Mart. 91. Vahl. Sym. 3. 25. "Leaves heart-ſhaped, almoſt entire, and three-lobed, haſtate, attenuated; peduncles one-flowered; outer calyx-leaves bracte-ſhaped." *Stem* thinly beſet with ſhort hairs. *Leaves* two inches long; petioles ſhorter than the leaf, pubeſcent. *Peduncles* the length of the leaf, ſolitary; bractes two, lanceolate, acute, ſituated a little below the calyx; calyx pubeſcent; inner calyx-leaves oblong, bluntiſh, nerved; outer ones much broader, encloſing the others as between two bractes; corolla villous on the outſide, tender, ſilky; border five-cleft; ſtigma capitate, two-lobed, found in the Eaſt Indies by Koenig. 35. C. *bicolor.* Mart. 92. Willd. 21. Vahl. Symb. 3. 25. "Leaves heart-ſhaped, villous, ſomewhat angular-lobed at the baſe; peduncles one-flowered; outer leaves of the calyx reſembling bractes." *Stem* villous. *Leaves* acute, mucronate, not attenuated, nearly equal in length and breadth, one, two, or three-lobed at the bottom, villous on both ſides; very ſoftly villous, hoary, and obſcurely veined underneath; the younger ones ſilky. *Flowers* white, with a violet purple baſe; bractes, calyx, and corolla, as in the preceding ſpecies. Found in the Eaſt Indies by Schumacher. 36. C. *Geffroyenſis.* (C. bicolor; Deſr. 96. Lam. 2094.) Hairy; leaves ſomewhat heart-ſhaped, three-lobed, hoary underneath; peduncles many-flowered." On a ſuperficial view having the appearance of a bramble. *Stems* ſlender, cylindrical; beſet, as well as the petioles, peduncles, and calyxes, with blackiſh points, and hiſpid with rather long ſtiffiſh hairs. *Leaves* alternate, longer than their petioles, cloathed with fine recumbent hairs, green on the upper ſurface, hoary underneath; lobes oval, acute, entire. *Flowers* ſmall; peduncles axillary, ſolitary, thicker and longer than the petioles, dichotomous; bractes two, linear, awl-ſhaped, ſituated at each diviſion of the peduncles; calyx-leaves narrow, acute, rather long. Brought from Senegal by M. Geoffroy. 37. C. *trilobus.* Willd. 22. Thunb. prod. 35. "Leaves heart-ſhaped, villous, three-lobed; lobes egg-ſhaped, acute; peduncles one-flowered." A native of the Cape of Good Hope. 38. C. *ſubquinquelobus.* (C. trilobus; Deſr. 94. Lam. 2092. Ipomæa triloba; Linn.) "Lower leaves heart-ſhaped, three-lobed; upper ones ſomewhat five-lobed; peduncles three-flowered." *Root* annual. *Stems* two or three feet long, ſlender, ſlightly angular, ſmooth. *Leaves* alternate, generally ſhorter than their petioles; middle lobes of the lower leaves egg-ſhaped, obtuſe, mucronate, ſmooth; lateral lobes of the upper leaves with a deep ſinus, which makes them appear five-lobed. *Flowers* purple or violet; peduncles angular, nearly the length of the petioles; pedicels very ſhort, bractes ſmall, egg-ſhaped; calyx-leaves half the length of the corolla, ſmooth, egg-ſhaped, acute, connivent; corollas ſmall, cylindrical; border with five ſharp teeth. A native of South America, cultivated in the botanic garden at Paris. 39. C. *platanifolius.* Mart. 93. Willd. 23. Vahl. Symb. 3. 26. Pluk. phyt. tab. 167. fig. 3. Feuil. peruv. 3. 16. tab. 11. "Leaves heart-ſhaped, three-lobed; lateral lobes toothed-angular; peduncles, ſomewhat three-flowered; calyxes almoſt as long as the peduncles, ſmooth." Whole plant quite ſmooth, except the petioles. *Stem* cylindrical. *Leaves* two inches long or more, glaucous, green underneath, with purpliſh veins; lobes lanceolate; middle one longer, broader, quite entire, acuminate; lateral ones narrower, attenuated, with a ſmaller broader lobe at the bottom on each ſide, rounded behind, and furniſhed with an angular tooth; petioles ſhorter than the leaf, beſet with a few ſcattered hairs. *Peduncles* ſolitary, ſhorter than the leaf, thickened at the top; lower ones three-flowered; middle ones two-flowered, uppermoſt one-flowered; calyx-leaves oblong, ſomewhat membranous, ending in a briſtle; ſtigma capitate. It differs altogether from C. batatas in the ſmoothneſs of the ſtem, and the form of the leaves. A native of America. 40. C. *acuminatus.* Mart. 94. Willd. 24. Vahl. Symb. 3. 26. "Leaves heart-ſhaped and three-lobed, attenuated; peduncles elongated, many-flowered; calyxes ſmooth." *Stem* with a few minute ſcattered hairs, preſſed cloſe, and viſible only with a magnifier. *Leaves* four inches long, three or more broad at the baſe, three-lobed or entire, quite ſmooth, nerved, acute; lateral lobes lanceolate; middle one egg-ſhaped, attenuated; petioles longer than the leaf. *Flower* large, bell-ſhaped, purple with a pale baſe and five paler rays running to the margin; peduncles axillary, the length of the petioles alternate; pedicels about five, an inch and half long; bractes at the baſe of each pedicel two, lanceolate, attenuated, finely nerved,

nerved, smooth; calyx-leaves lanceolate, attenuated, tender, finely nerved, quite smooth; two inner ones a little shorter, stigma capitate. A native of the island of Santa Cruz in the West Indies. 41. C. *carolinus*. Linn. Sp. Pl. 6. Mart. 9. Desr. 90. Lam. 2088. Willd. 25. Dill. elth. 100. tab. 84. fig. 98. "Leaves heart-shaped, entire, and three-lobed, villous; calyxes even-surfaced; capsules hirsute; peduncles one or two-flowered." *Root* perennial. *Stems* slender, reddish towards the root, hairy at the joints. *Leaves* alternate, scarcely two inches long, some entire, others like those of ivy; petioles about the length of the leaves, slender, channelled. *Flowers* pale purple, resembling those of C. arvensis; peduncles the length of the petioles, thicker, axillary, solitary, angular, with a few narrow bractes; calyx-leaves egg-shaped, acute, scarcely half the length of the corolla, a little ciliated at the edges with whitish hairs. *Capsules* round, hairy towards the summit, two-celled, four-valved. *Seeds* two in each cell. A native of Carolina. 42. C. *hederaceus*. Linn. Sp. Pl. 7. Mart. 10. Desr. 92. Lam. 2090. Dill. elth. 99. tab. 83. fig. 96. Gært. tab. 134. fig. 2. "Leaves heart-shaped, entire and three-lobed; corollas undivided; fruit erect." Linn. "Peduncles about three-flowered; calyxes tubercled." Lam. *Root* annual. *Stems* sarmentous, cylindrical, dull red, two or three feet high. *Leaves* alternate, petioled, cloathed with fine short hairs. *Flowers* fine blue, with a pale base; peduncles nearly the length of the petioles, axillary, solitary, hairy; bractes small; pedicels very short; calyx-leaves rough with numerous long hairs, and small black tubercles; two of them narrower. *Capsules* spherical, smooth, thin, three-celled, three-valved. *Seeds* two in each cell, black, smooth. A native of Asia, Africa, and America. 43. C. *Dillenii*. Desr. 22. Lam. 2021. Dill. elth. 97. tab. 81. fig. 93. "Leaves heart-shaped, entire, and three-lobed; flowers solitary, almost sessile." Distinct from the preceding, with which it has been confounded. *Root* annual. *Stems* long, slender, hairy. *Leaves* alternate, slightly villous, paler underneath; lobes angular; petioles shorter than the leaves, hairy. *Flowers* fine blue, with a whitish base; peduncles axillary, solitary; calyxes oblong, five-cleft, hairy; corollas large, very open, almost entire, supposed to be a native of Africa. 44. C. *nil*. Linn. Sp. Pl. 8. Mart. 11. Willd. 27. Bot. Mag. 188. C. cæruleus; Ger. em. 864. fig. 1. C. hederaceo angulofo folio; Bauh. p. 295; Dill. elth. 96. tab. 8. fig. 91, 92. Ipomæa hederacea; Lam.? J. trilobata; Thun. Flor. jap. 86. Linn. Transf. 2. 330.) "Leaves heart-shaped, three-lobed; corollas semiquinquefid; peduncles shorter than the petiole." *Root* annual. *Stem* eight or ten feet high. *Leaves* woolly, acuminate, on long petioles. *Flowers* deep blue, with purple rays; peduncles two-flowered. *Fruit* erect. Nil is an abbreviation of Anil, one of the names of indigo. A native of America. 45. C. *purpureus*. Linn. Sp. Pl. 9. Mart. 12. Willd. 28. Bot. Mag. 113. (C. purpureus folio subrotundo; Bauh. p. 295. Ipomæa purpurea; Lam.) "Leaves heart-shaped, undivided; fruit nodding; pedicels thickened." β. cæruleus minor, folio subrotundo. Dill. elth. 98. tab. 83. fig. 95. smaller, blue-flowered, with a roundish leaf. γ. C. folio cordato glabro. Dill. elth. 98. tab. 84. fig. 97. with a heart-shaped smooth leaf. δ. elatior; Bot. Mag. 1005. Stems very high; leaves orbicular-heart-shaped; flowers white, with five spots, elegantly shaded with blue and carmine. All the varieties are natives of America. The first is a hardy annual, common in the English gardens, under the name of Convolvulus major. 46. C. *obscurus*. Linn. Sp. Pl. 10. Mart. 14. Desr. 15. Lam. 2014. Willd. 29. Dill. elth. 98. tab. 83. fig. 95. "Leaves heart-shaped, undivided; stem somewhat pubescent; peduncles thickened, one-flowered; calyxes smooth." *Root* annual. *Stems* cylindrical, villous towards the top, three or four feet high. *Leaves* alternate, acute, green, and smooth above, paler and a little villous underneath; petioles one or two inches long. *Flowers* white, with a purple base and yellowish rays; peduncles longer than the petioles, slender, slightly pubescent towards the bottom, with two small bractes. A native of Java, and other parts of the East Indies. 47. C. *flavus*. Willd. 30. (Evolvulus hederaceus; Burm. Ind. 77. tab. 30. fig. 2.) "Leaves heart-shaped, repand, somewhat lobed, with small mucronate teeth; peduncles bifid, many-flowered." *Stem* rather smooth. *Leaves* acuminate, somewhat scabrous. *Peduncles* much longer than the leaves; upper ones three-flowered; lower ones bifid; branches three-flowered, with a single flower at the division. A native of the East Indies. 48. C. *angularis*. Linn. Mant. 203. Mart. 13. Desr. 98. Lam. 2098. Willd. 31. Burm. Ind. 46. tab. 19. fig. 2. "Leaves heart-shaped, pentangular, quite entire, villous; peduncles many-flowered." *Stems* pubescent. *Leaves* on short petioles, quite entire, rough with reddish shining hairs. *Flowers* orange; peduncles the length of the leaves, axillary, solitary, most commonly three-flowered; calyx hairy; segments acute; corollas bell-shaped, three times longer than the calyx. A native of the East Indies. 49. C. *Batatas*. Linn. Sp. Pl. 11. Mart. 15. Willd. 32. (Batatas; Bauh. Pin. 91. Rumph. Amb. 5. 367. tab. 130. C. radice tuberosa esculenta; Catesb. Car. tab. 60. Ipomæa Batatas; Lam.) Spanish or sweet potatoes. "Leaves heart-shaped, hastate, five-nerved; stem hispid, creeping, bearing tubers." *Root* perennial. *Stem* cylindrical, perennial, hispid, prostrate, creeping; sending out scattered, oblong, acuminate tubers, purple or pale on the outside. *Leaves* angular, on long petioles. *Flowers* purple, large, about three together, on upright peduncles. A native of the West Indies, whence it is said to have been introduced by the Spaniards into the Philippine islands. It is now extensively cultivated in the tropical climates of both hemispheres, for the sake of its tubers. They are sweet, sapid, and esteemed nourishing, and are the common potatoe of our old English botanists. There are several varieties, and probably more than one distinct species. 50. C. *maximus*. Linn. jun. Sup. 137. Mart. 25. Willd. 33. Vahl. Symb. 3. 268. (C. marginatus; Desr. 72. Lam. 2071. Tiru-tali; Rheed. Mal. 11. 109. tab. 53) "Leaves heart-shaped, acute, smooth; peduncles many-flowered, smooth; stem somewhat hairy." *Root* perennial, fibrous. *Stems* cylindrical, slender, reddish. *Leaves* alternate, thin, soft, even-surfaced, bordered with red; petioles rather long, thick, channelled, reddish. *Flowers* pale red, with a purple base, funnel-shaped; peduncles axillary, solitary, thicker than the branches from which they spring, seven or eight-flowered; calyx-leaves short, somewhat acute; stigma capitate, two-lobed. A native of the East Indies. 51. C. *biflorus*. Linn. Sp. Pl. Append. p. 1668. Mart. 16. Willd. 34. "Leaves heart-shaped, pubescent; peduncles in pairs; corollas with trifid lobes. *Root* annual. *Stem* cylindrical, hairy, branched at the base, about the size of C. arvensis. *Leaves* oblong; petioles cylindrical, hairy, shorter than the leaf. *Flowers* white; peduncles hairy, approximating at the base, shorter than the petioles; calyx five-leaved; two outer leaves cordate-oblong; two inner ones linear-lanceolate; the fifth semi-heart-shaped; corolla small, campanulate, quinquefid, plaited; lobes trifid at the tip; middle lobe smaller; tube shorter than the calyx; stigmas two, capitate, purple. A native of China. 52. C. *gemellus*. Mart.

Mart. 95. Defr. 71. Lam. 2070. Vahl. Symb. 3. 27. Burm. ind. 46. tab. 41. fig. 1. "Leaves heart-fhaped, fomewhat villous underneath, peduncles two-flowered." *Stem* tender, pubefcent at the top. *Leaves* an inch long, obfcurely feven-nerved, a little acuminate; petioles the length of the leaves. *Flowers* white; peduncles the length of the petioles; pedicels almoft as long as the peduncles; one fhorter, without bractes; the other with two bractes in the middle; both turned back when the fruit ripens; calyx-leaves oblong, obtufe: corolla campanulate, fix times as large as the calyx, fmooth: ftigma capitate. A native of Java and Tranquebar. 53. C. *triflorus*. Mart. 102. Willd. 42. Vahl. Symb. 5. 30. "Leaves cordate-lanceolate, attenuated, obtufe, fmooth; peduncles three-flowered." *Stem* herbaceous, fmooth. *Leaves* two inches long, quite entire, fimply veined, rounded at the end and mucronate; lobes rounded at the end, fometimes but rarely obfcurely angular; petiole fhort. *Peduncles* fhorter than the leaf; pedicels angular, without bractes, equal, almoft the length of the peduncle. *Calyx-leaves* obtufe. *Corolla* three times the length of the calyx; lobes hairy at the tip. *Stigma* capitate. A native of the Eaft Indies, obferved by Koenig. 54. C. *latifolius*. Defr. 85. Lam. 2083. Plum. Cat. 1. and MSS. "Leaves heart-fhaped, fmooth; peduncles about three-flowered; corolla falver-fhaped, very large." *Stems* very long. *Leaves* alternate, large, thin, acuminate, bright green; petioles channelled. *Flowers* white: peduncles axillary, folitary, thicker than the petioles, a little angular under the pedicels: calyx-leaves fmall; three outer ones long, acute; two inner ones egg-fhaped, obtufe; tube of the corolla long, narrow, greenifh; border near five inches in diameter, expanded, almoft flat, flightly finuated at the edges, marked with a greenifh-white ftar. *Fruit* membranous, top-fhaped, about the fize of a walnut. *Seeds* three or four. A native of St. Domingo and Martinico. 55. C. *hypocrateriformis*. Defr. 84. Lam. 2082. "Leaves heart-fhaped; corolla falver-fhaped; border five-cleft; fegments emarginate." *Branches* woody, cylindrical. *Leaves* alternate, near together, about an inch long, coriaceous, fmooth, fcarcely pointed; petioles rather fhorter than the leaves, angular. *Peduncles* axillary, folitary, or in pairs, one-flowered, nearly as long as the petioles, thickened upwards; bractes fituated above the middle of the peduncle, linear-lanceolate, reaching almoft to the top of the calyx; calyx leaves fhort, egg-fhaped, obtufe; tube of the corolla near two inches long; border at leaft an inch and half in diameter, very flat. A native of the Eaft Indies; defcribed from an imperfect fpecimen gathered by Sonnerat. 56. C. *ftriatus*. Mart. 96. Willd. 36. Vah. Symb. 3. 28. "Leaves heart-fhaped, attenuated, fmooth; peduncles longer than the leaf, about four-flowered; corollas fmooth, ftriated on the outfide." *Stem* herbaceous, cylindrical, flender, pubefcent. *Leaves* two inches long, remote, quite entire, with a rounded mucronate point, fmooth on both fides except the rib, fimply veined; petioles the length of the leaves, pubefcent. *Peduncles* longer than the leaves, folitary, pubefcent; pedicels in threes; lateral ones jointed, one of them often two-flowered; intermediate one fhorter, thicker, without bractes. *Bractes* two, fituated at the joints about the middle of the lateral pedicels, oblong, concave, fmall, villous, deciduous. *Calyx-leaves* oblong, obtufe, concave, equal; two outer ones villous, fomewhat hoary. *Corolla* campanulate, twice the length of the calyx, white, with a purplifh bafe and five paler lanceolate-ftriated rays extending to the margin; ftigma capitate, two-lobed. 57. C. *domingenfis*. Defr. 59. Lam. 2058. "Leaves heart-fhaped; racemes numerous, unilateral; calyx acute, fmooth." *Stems* flender, cylindrical, fmooth, frutefcent. *Leaves* alternate, acute, fmooth, except the middle nerve underneath; petioles of a moderate length, channelled. *Flowers* in fmall peduncled racemes, numerous, fituated near the extremities of the branches, often pendant; bractes very fmall, awl-fhaped, at the foot of the pedicels; calyx-leaves fmooth, egg-fhaped, elongated, unequal in fize; corollas bell-fhaped, expanding; ftigmas capitate, two-lobed. A native of St. Domingo. 58. C. *finenfis*. Defr. 69. Lam. 2068. "Hairy; leaves heart-fhaped, acute; peduncles two or three flowered; calyx-leaves heart-fhaped." Whole plant, efpecially near the fummit, cloathed with feparate, fine, whitifh hairs. *Stems* flender, cylindrical. *Leaves* alternate, entire, on longifh fomewhat villous petioles. *Peduncles* fhorter than the petioles, axillary, folitary; bractes fmall, awl-fhaped; three exterior calyx-leaves broader than the others, heart-fhaped at the bafe, very rough with hairs; corollas campanulate, a little longer than the calyx. Suppofed to be a native of China. 59. C. *pentanthus*. Willd. 37. Jacq. ic. rar. 2. 316. Collect. 14. 210. "Leaves heart-fhaped, acuminate, fmooth, fomewhat repand; umbels peduncled, capitate, five-flowered; calyxes ciliated." *Root* perennial. *Stem* fhrubby. *Flowers* nearly feffile. Native country unknown. 60. C. *guianenfis*. Mart. 97. Defr. 58. Lam. 2057. Aubl. guian. 1.136. tab. 52. "Leaves fomewhat heart fhaped, mucronate, tomentous; flowers collected into a kind of corymbous head, on very long peduncles." *Root* perennial. *Stems* a little woody at the bafe, cylindrical, villous. *Leaves* alternate, two inches long, quite entire, veined, nervelefs; petiole only half the length of the leaf, a little channelled, tomentous. *Flowers* pale blue, or whitifh; peduncles feven inches long, axillary, villous; pedicels very fhort, intermingled with filiform bractes; calyxes villous, deeply divided into five lanceolate fegments; corollas fmall; lobes of the border acuminate; ftigmas two, reflexed. A native of Guiana. 61. C. *capitatus*. Mart. 98. Defr. 57. Lam. 2056. Willd. 39. Vahl. Symb. 3. 28. "Hifpid; leaves heart-fhaped; flowers capitate, involucred: peduncles fcarcely longer than the petiole." Whole plant hifpid, with long diftinct hairs of a dirty white colour, placed on minute tubercles. *Stem* flender, cylindrical. *Leaves* from two to three inches long, alternate, acute, entire; petioles nearly the length of the leaf. *Peduncles* axillary, folitary, with about five feffile flowers collected into a clofe head. *Involucre* confifting of fix or feven egg-fhaped acute bractes, of unequal fize, generally as long as the calyx: calyx-leaves one third of the length of the corolla, ovate-lanceolate, acuminate, fmooth within; corolla hifpid on the outfide with long hairs arranged in five lines. *Capfule* globular, fhorter than the calyx, even-furfaced, fmooth. Found in the Eaft Indies by Koenig and in Senegal by Geoffroy. 62. C. *crinitus*. Defr. 112. Lam. 2114. "Leaves heart-fhaped, almoft fmooth; heads of flowers very hirfute, on long peduncles, involucred; capfule even-furfaced." *Stem* herbaceous. Specimen in the herbarium of Juffieu. 63. C. *hifpidus*. Mart. 99. Willd. 40. Vahl. Symb. 3. 29. "Extremely hirfute; leaves cordate-egg-fhaped; flowers umbelled; peduncles very fhort." *Leaves* from two to three inches long, attenuated, quite entire; petiole half the length of the leaf. *Pedicels* the length of the peduncle. *Calyx-leaves* lanceolate, attenuated, fmooth within, lax. *Corolla* fmooth. *Stigma* capitate. A native of the Eaft Indies. 64. C. *parviflorus*. Mart. 100. Willd. 42. Vahl. Symb. 3. 29. (Ipomæa paniculata; Burm. Ind. 50. tab. 21. fig. 3.) "Leaves heart-fhaped, acuminate, fmooth; peduncles many-flowered; calyxes acuminate, villous." *Stem* weak, flightly villous at the top. *Leaves*

Leaves an inch long; petiole the length of the leaf, filiform, villous. *Flowers* blue; peduncles the length of the petioles; pedicels umbelled; lateral ones ſometimes branched; calyx-leaves egg-ſhaped, acuminate, ſmall; corolla ſmooth, twice the length of the calyx, five-cleft; ſtigma bifid; ſegments revolute. A native of Java. 65. C. *verticillatus*. Linn. 12. Mart. 17. Willd. 43. Brown. Jam. 153. (C. nodiflorus, Lam?) "Leaves oblong, heart-ſhaped, oblong, naked; peduncles umbelled, bifid, many-flowered." *Leaves* roughiſh, ſomewhat repand. *Flowers* blueiſh, ſmall, campanulate, not cut; peduncles ſhorter than the leaf; pedicels often ſomewhat divided. A native of North America. 66. C. *ſolanifolius*. (C. parviflorus; Deſr. 66. Lam. 2065. Quamoclit purpurea ſolanifolia minor; Plum. MSS. 2. tab. 62. Burm. Amer. 83. tab. 94. fig. 2.) "Leaves cordate-oblong, mucronate; peduncles branched, many-flowered, ſhort, appearing verticillate." Diſtinct from the preceding. *Roots* the thickneſs of the human little finger, much branched. *Stems* very ſlender, long, branched. *Leaves* ſinuated, ſlightly tomentous; petioles rather ſhort. *Flowers* purpliſh, ſmall, campanulate, deeply five-cleft, as repreſented in Plumier's figure; peduncles axillary, ſhorter than the leaves; pedicels forming a corymb. *Capſules* four-celled. *Seeds* yellow, angular. A native of St. Domingo, on ſtony hills, communicated to La Marck by Joſeph Martyn. 67. C. *violaceus*. Mart. 101. Willd. 44. Vahl. Symb. 3. 29. "Leaves cordate-egg-ſhaped, acute: peduncles elongated, bifid, many-flowered; two outer calyx-leaves cordate-egg-ſhaped, acute." *Stem, petioles, peduncles*, and *calyxes* villous. *Leaves* an inch long. *Flowers* violet, with five lanceolate paler rays; peduncles four or five times longer than the leaf; pedicels three or five-flowered, with a pair of linear-lanceolate bractes at the baſe; calyx-leaves tender; two innermoſt ones only half the ſize of the others, ſomewhat membranous, ſmooth, mucronate; corolla campanulate; ſtigmas two, reflexed. It varies with reſpect to the hairineſs of the leaves. A native of the iſland of Santa Cruz. 68. C. *azureus*. Deſr. 56. Lam. 2055. "Leaves ſomewhat heart-ſhaped, acute, naked; flowers collected into a head on a very long petiole." *Stem* woody, finely ſtriated, firm and greyiſh near the bottom, twining and ſomewhat villous towards the top. *Leaves* near an inch and half long, a little longer than the petioles, repand, ſmooth, rather glaucous underneath. *Flowers* fine azure blue, ſmall; peduncles axillary, ſolitary, divided at the ſummit into ſhort ramifications intermingled with ſmall bractes; calyxes deeply divided; ſegments acute. A native of South America. 69. C. *cymoſus*. Deſr. 64. Lam. 2063. (C. lævis minor; Rumph. Amb. 5. 451. tab. 158.) "Leaves heart-ſhaped, oblong, acuminate; peduncles cymous; fruit nodding." *Stems* long, ſlender, cylindrical, almoſt ſmooth. *Leaves* four or five inches long, alternate, petioled, nerved, even-ſurfaced, ſlightly ſinuated. *Peduncles* axillary, about the length of the petioles, branched about the middle into a cyme. *Calyx-leaves* egg-ſhaped, obtuſe. *Corollas* long, not very open. *Stigma* capitate, two lobed. A native of the Eaſt Indies. 70. C. *umbellatus*. Linn. Sp. Pl. 13. Mart. 18. Deſr. 63. Lam. 2062. Willd. 45. (C. luteus polyanthos; Plum. Am. 88. tab. 102. Sloan. Jam. 53.) "Leaves heart-ſhaped; petioles ſtipulaceous at the baſe; peduncles umbelled." *Root* perennial. *Stem* herbaceous, cylindrical, filiform, ſtiff, ſubdivided, pubeſcent. *Leaves* above two inches long, and as broad at the baſe, deeply heart-ſhaped, lanceolate, ſomewhat ſinuated, entire, dark green, hoary underneath; petioles three inches long, with two ſtipules at the baſe a little decurrent on the ſtem. *Flowers* yellow; peduncles three inches long or more; partial peduncles three quarters of an inch long, three-flowered; each flower on a pedicel longer than the partial peduncles; two of the calyx-leaves a little ſhorter than the reſt; ſtigma bifid, globular. *Capſule* two-celled. *Seeds* one or two in each cell, covered with a velvety down. A native of the Weſt Indies. 71. C. *multiflorus*. Mart. 69. "Leaves heart-ſhaped, ſmooth; peduncles many-flowered. *Seeds* villous, ferruginous. *Root* annual. *Stems* eight or ten feet high, ſlender. *Leaves* ſhaped like thoſe of C. ſepium. *Flowers* purple, on rather long peduncles, growing in bunches. *Capſules* trigonous, three-celled, with one ſeed in each cell. A native of Jamaica. Linnæus quotes Plukenet's Alm. tab. 167. 1. for the preceding ſpecies; Miller for the preſent. 72. C. *tuguriorum*. Mart. 73. Willd. 46. Forſt. Prod. 35. "Leaves cordate-arrow-ſhaped, acute; ſtem angular; peduncles tetragonal, one-flowered." A native of New-Zealand. 73. C. *buſalinus*. Mart. 77. Lour. Cochin. 109. "Stem ſhrubby; leaves cordate-arrow-ſhaped, ſmooth; peduncles many-flowered; anthers ſpiral." *Stem* large, ſhrubby, branched, ſmooth. *Leaves* alternate, petioled. *Flowers* yellow, large, campanulate; anthers filiform. *Capſule* two-celled, with one ſeed in each cell. A native of the woods of Cochinchina. 74. C. *cordifolius*. Willd. 47. Thunb. Prod. 35. "Leaves heart-ſhaped, haſtate, toothed; peduncles bifid-umbelled." A native of the Cape of Good Hope. 75. C. *roſeus*. Mart. 71. Houſt. MSS. "Leaves heart-ſhaped, acuminate; peduncles two-flowered." *Root* annual. *Stem* ſeven or eight feet high. *Leaves* on very long petioles. *Flowers* large, of a fine roſe colour, on long peduncles. *Seeds* large, covered with a fine down. A native of Jamaica, cultivated by Miller. 76. C. *bifidus*. Mart. 103. Willd. 48. Vahl. Symb. 3. 30. (C. lævis mas; Rumph. Amb. 5. 431.) "Leaves heart-ſhaped, oblong, acuminate, very ſoft underneath; peduncles bifid, many-flowered." β lævis minor; Rumph. 5. 431. tab. 158. "Leaves heart-ſhaped, lanceolate-oblong, ſmooth." *Stem* villous. *Leaves* from two to three inches long, an inch wide at the baſe, mucronate; petiole one-third of the length of the leaf, hoary. *Peduncles* axillary, ſolitary; pedicels numerous, ſomewhat umbellated, oblong, ferruginous, deciduous, with minute ſcales at the baſe inſtead of bractes. *Calyx-leaves* pubeſcent at the baſe, rounded at the tip, equal. *Corolla* almoſt funnel-ſhaped, three times the length of the calyx, with five ſlender villous lines on the outſide; lobes acute, bearded at the tip. *Stigma* capitate, two-lobed. *Capſule* egg-ſhaped, ſtriated, ſmooth. It has the habit of C. umbellatus, but has ſmaller narrower leaves. The variety differs only in the ſmoothneſs, and its narrow leaves. 77. C. *malabaricus*. Linn. Sp. Pl. 14. Mart. 19. Deſr. 68. Lam. 2067. Willd. 49. (Katta-kelengu; Rheed. Mal. 11. 105. tab. 51.) "Leaves heart-ſhaped, ſmooth; ſtem perennial, villous." *Root* perennial. *Stem* ſomewhat woody, cylindrical, weak, villous. *Leaves* alternate, acute, quite entire; petioles reddiſh, thicker than the ſtem. *Flowers* yellowiſh white, with a deep purple baſe; peduncles axillary, ſolitary, cylindrical; bractes narrow, ſituated near the calyx; calyx five-leaved; leaves acute, three outer ones larger; corolla campanulate, open, villous on the outſide; ſtigma capitate; two-lobed. A native of the coaſt of Malabar. 78. C. *cœleſtis*. Mart. 74. Lam. 2112. Willd. 50. Forſt. Flor. Auſt. 77. "Leaves heart-ſhaped, very acuminate, pubeſcent; peduncles elongated, umbellate-trifid." A native of the iſland of Tanna in the South Seas. 79. C. *canarienſis*. Linn. Sp. Pl. 15. Mart. 20. Deſr. 65. Lam. 2064. Willd. 51. Comm. Hort. 2. 101. tab. 51. Pluk. Alm. 114. tab. 325. fig. 1. "Leaves heart-ſhaped, acute, ſomewhat tomentous, ſoft;

ſoft; peduncles axillary, about three-flowered, rather long." *Root* perennial. *Stems* woody, twenty feet high or more, cylindrical, a little branched, woolly. *Leaves* alternate, not deciduous, whitiſh underneath, on ſhort tomentous petioles. *Flowers* purple-violet or pale blue, ſometimes white; peduncles axillary, longer than the petioles, tomentous; pedicels three, rarely five or ſix, ſhort, intermingled with filiform bractes; calyxes very villous, with five deep acute ſegments; corollas a little villous on the outſide; border almoſt flat; ſtigmas bifid, filiform. A native of the Canary Iſlands. 80. C. *pannifolius*. Saliſb. Par. Lond. tab. 20. "Stem angular; leaves haſtate-wedge-ſhaped, ſhaggy, with hairs on both ſides; peduncles two or three-flowered; tube of the corolla a line and half long; ſegments ſomewhat mucronate; pericarp tender, hairy." *Leaves* pale green, halberd-ſhaped, very hairy on both ſides, like a piece of woollen cloth. *Flowers* pale purple, with a darker baſe; bractes narrow, attenuated; calyx hairy; margin of the corolla and the wedge-ſhaped folds of its border pubeſcent; filaments white, covered with a glandular pubeſcence towards the bottom; anthers blue; nectary yellow, with a whitiſh margin; ſtyle white, about three lines long; ſtigmas white, longer than the ſtyle, ſpreading out wide, quite linear, obtuſe. *Capſule* two-celled. *Seeds* two in each cell. Raiſed from ſeeds received from Liſbon by Meſſrs. Lee and Kennedy. 81. C. *ferrugineus*. Willd. 52. Vahl. Eclog. 1. 17. "Ferruginous-downy; leaves heart-ſhaped, acute; peduncles axillary, four-flowered." *Root* perennial. A native of South America. 82. C. *muricatus*. Linn. Mant. 44. Mart. 21. Deſr. 73. Lam. 2072. Willd. 53. "Leaves heart-ſhaped; peduncles thickened, and, as well as the calyxes, even-ſurfaced; ſtem muricated." Reſembling C. purpureus, but the ſtem has a very even ſurface, with harmleſs prickles ſcattered over it. *Root* annual. *Flowers* purple; peduncles often two-flowered; corolla more funnel-ſhaped than that of C. purpureus. Diſtinct from ipomæa bona nox. A native of Surat; introduced into England by Dr. Solander; flowering in July and Auguſt. 83. C. *anceps*. Linn. Mant. 43. Mart. 22. Willd. 54. "Leaves heart-ſhaped; ſtem keeled on both ſides." *Stem* ſmooth, winged from leaf to leaf with two decurrent membranes. *Leaves* three inches long, ſmooth, veined, obtuſe, quite entire; petioles nearly the length of the leaf; peduncles axillary, the length of the petioles, thicker, four or five-flowered, villous; pedicels thickened, ſomewhat umbelled, villous; bractes two, at the baſe of the calyx, broad, egg-ſhaped, membranous, mucronate, villous, deciduous; two outer calyx-leaves egg-ſhaped, villous on the outſide, ſmooth within, mucronate; inner ones only half the ſize, oblong; corolla twice as long as the calyx, bell-ſhaped; ſtigma capitate. A native of Ceylon and Java. 84. C. *triqueter*. Mart. 104. Willd. 54. Vahl. Symb. 3. 30. "Leaves heart-ſhaped, acute, ſomewhat villous; peduncles many-flowered; ſtem three-keeled." *Stem* pubeſcent. *Leaves* two inches long and more; petiole villous, ſhorter than the leaf. *Peduncle* the length of the leaves, three or five-flowered; lateral pedicels often two-flowered; middle one one-flowered, ſhorter, gradually thickened; bractes at the baſe of the pedicels, egg-ſhaped, concave, tender, acute, mucronate, coloured, pubeſcent, deciduous; two outer calycine leaves reſembling bractes, egg-ſhaped, acute, mucronate, ſilky; inner ones ſhorter, ſmooth, rounded at the tip; ſtigma capitate. Nearly allied to the preceding, but the leaves are not obtuſe, and the rings on the ſtem much narrower. A native of the iſland of Santa Cruz. 85. C. *Turpethum*. Linn. Sp. Pl. 17. Mart. 23. Deſr. 86. Lam. 2084. Willd. 56. (Turpethum; Bauh. Pin. 149. C. zeylanicus alatus; Herm. Lugdb. 177. tab. 178, 179.) "Leaves heart-ſhaped, angular; ſtem membranous, quadrangular; peduncles many-flowered." *Root* perennial, about an inch thick, little branched, ſtriking deep into the ground, throwing out thick fleſhy tubers, abounding in a milky juice, which ſoon hardens into a reſinous ſubſtance when expoſed to the air. *Stems* woody and reddiſh near the bottom, ſlender, with four decurrent wings, branched. *Leaves* alternate, crenulate, ſoft, clothed with a thin whitiſh down, ſlightly mucronate; petioles ſhorter than the leaves, winged, channelled. *Flowers* white, reſembling thoſe of C. ſepium; peduncles longer than the petioles, axillary, ſolitary, trifid; pedicels one or two-flowered; bractes two, egg-ſhaped, at the baſe of the calyx; two outer calyx-leaves egg-ſhaped, villous; three inner ones ſmooth; anthers ſpiral; ſtigma capitate, two-lobed. *Capſule* membranous, globular-depreſſed, two-celled. *Seeds* one or two in each cell, black, angular on one ſide. A native of Malabar, Ceylon, the Society and Friendly Iſles, and the new Hebrides. For an account of the medicinal qualities of the root, ſee TURBITH. 86. C. *grandiflorus*. Linn. jun. Sup. 136. Mart. 24. Deſr. 14. Lam. 2013. Jacq. Hort. 3. tab. 69. (Munda-valli; Rheed. Mal. 11. 103. tab. 50.) "Leaves cordate-egg-ſhaped, rather obtuſe, quite entire; peduncles generally two-flowered; calyxes coriaceous; ſtem and petioles pubeſcent." Linn. jun. "Leaves heart-ſhaped, acute, on long petioles; peduncles ſhort, one-flowered; corollas very large, funnel-ſhaped." Lam. *Root* perennial. *Stem* woody at the baſe, cylindrical, branched, ſmooth, about twelve feet high. *Leaves* large, with rounded lobes, ſmooth. *Flowers* very white, ſweet-ſcented. A native of the Eaſt and Weſt Indies. 87. C. *ſpecioſus*. Linn. Sup. 137. Mart. 26. Willd. 58. (C. nervoſus; Deſr. 87. Lam. 2085. Burm. Ind. tab. 20. Samudra-ſtjogam; Rheed. Mal. 11. 125. tab. 61.) "Leaves heart-ſhaped, tomentous-ſilky underneath; peduncles longer than the petioles, umbelliferous; calyxes acute." Hort. Kew. *Root* perennial. *Stem* woody at the bottom, pubeſcent, branched; branches clothed with a thick white cottony down. *Leaves* alternate, large, acute, quite entire, nerved underneath; petioles and peduncles tomentous. *Flowers* purpliſh, more than two inches long; pedicels five or ſix, very ſhort; bractes elliptical, longer than the calyx; calyxes ſmall, deeply divided into five egg-ſhaped ſegments. A native of the Eaſt Indies. 88. C. *trinervius*. Mart. 27. Deſr. 16. Lam. 2015. Willd. 59. Thunb. Flor. Jap. 85. "Leaves heart-ſhaped, oblong, ſmooth, three-nerved; ſtem cylindrical; peduncles one-flowered." *Stem* filiform, ſimple, ſmooth. *Leaves* about an inch long, oppoſite, acuminate, quite entire, paler underneath; petioles linear, ſmooth, half an inch long. *Flowers* purpliſh; peduncles axillary, ſolitary, or in pairs, very ſhort; ſegments of the calyx almoſt briſtle-ſhaped, ſmooth, half the length of the corolla; ſtigmas capitate, two-lobed. A native of Japan. Deſrouſſeaux obſerves, that the ſingularity of the oppoſite leaves renders the genus dubious. 89. C. *peltatus*. Linn. Sp. Pl. 16. Mart. 28. Deſr. 88. Lam. 2086. Willd. 60. Rumph. Am. 5. tab. 157. "Leaves target-ſhaped; peduncles many-flowered." *Stem*, according to Rumphius, ſometimes as thick as the human thigh, and climbing to the top of the higheſt trees. *Leaves* alternate, large, ſomewhat acute, ſmooth; petioles rather long, zig-zag. *Flowers* white or faint purple, bell-ſhaped, twice the length of the calyx; peduncles axillary, ſolitary; calyx-leaves egg-ſhaped, ſmooth. A native of Amboina. 90. C. *Jalapa*. Linn. Mant. 43. Mart. 29. Deſr. 13. Lam. 2112. Willd. 61. Woodv. Med. Bot. tab. 21. Lam. Ill. tab 104. fig. 2. (Bryonia mechoacana nigricans; Bauh. Pin. 298.) "Leaves egg-

egg-ſhaped, ſomewhat heart-ſhaped, obtuſe, obſoletely repand, villous underneath; peduncles one-flowered." Hort. Kew. *Root* perennial, thick, blackiſh on the outſide, whitiſh within, abounding in a milky juice. *Stems* numerous, herbaceous, ten or twelve feet high. *Leaves* ſmooth, different in ſhape, lower ones triangular, almoſt heart-ſhaped; upper ones more oblong and acute; petioles long. *Flowers* reddiſh on the outſide, dark purple within (yellow in the Kew Garden); peduncles axillary, ſolitary. *Seeds* covered with a very white cottony down. A native of South America, about Xalapa, between La Vera Cruz and Mexico. For its medicinal qualities, ſee JALAP. 91. C. *macroſpermus.* Willd. 62. (Mouroucoa violacea; Aubl. guian. 1. 142. tab. 54. Juſſ. 133.) "Leaves elliptical, acute, ſmooth; corollas flat; capſules two or three-celled, with one ſeed in each cell." *Root* perennial. *Flowers* ſalver-ſhaped. *Seeds* almoſt an inch and half thick. A native of Guiana. 92. C. *tenellus.* Willd. 63. Deſr. 78. Lam. 2076. Pluk. Almag. 114. Phyt. tab. 166. fig. 4. "Leaves oblong-elliptical, obtuſe, mucronate, nearly ſeſſile; peduncles longer than the leaf, generally two-flowered." One of the leaſt ſpecies of the genus. *Stem* filiform, a little villous. *Leaves* alternate, ſcarcely an inch long, and about three lines broad, entire. *Peduncles* axillary, ſolitary; bractes two, awl-ſhaped, at the baſe of the pedicels; corollas ſmall, bell-ſhaped. A native of Carolina and Virginia. 93. C. *Barbudenſis.* (C. glaber Mill. Mart. 68.) "Leaves ovate-oblong, ſmooth; peduncles one-flowered; calyxes ten-cleft." *Root* annual. *Stems* eight or ten feet high. *Flowers* purple, large, on long ſlender peduncles. Sent to Miller from the iſland of Barbuda. 94. C. *ſericeus.* Linn. Mant. 43. Deſr. 77. Lam. 2075. (C. mollis; Burm. Ind. 44. tab. 7.) "Leaves lanceolate-elliptical, tomentous-ſilky underneath; peduncles about three-flowered; calyx ſhort, hairy." *Stems* ſhrubby, ſmooth. *Leaves* alternate, petioled. *Peduncles* axillary, ſolitary, about the length of the petioles. Calyx-leaves egg-ſhaped, whitiſh, ſilky. Tube of the corolla narrow to the top of the calyx, afterwards widened and terminating in a purple border, covered on the outſide with white hairs. *Capſules* downy. A native of the iſland of Java. 95. C. *tomentoſus.* Linn. Sp. Pl. 18. Mart. 31. Deſr. 93. Lam. 2091. Willd. 65. Sloan. Jam. 55. hiſt. 1. 134. tab. 98. fig. 2. Pluk. alm. 115. tab. 167. fig. 4. "Leaves three-lobed, tomentous; ſtem lanuginous." *Stem* twenty feet high, cylindrical, whitiſh. *Leaves* alternate, reſembling the older leaves of ivy; petioles three quarters of an inch long. *Flowers* purple; peduncles axillary, ſolitary, many-flowered, a quarter of an inch long; corollas bell ſhaped. *Capſule* ſpheroidal, acuminate, two-celled. *Seeds* one in each cell, black. A native of Jamaica. 96. C. *quinqueflorus.* Mart. 105. Willd. 66. Vahl. Symb. 3. 31. "Leaves ſagittate-egg-ſhaped, attenuated, ſmooth, crenate, ſomewhat repand; peduncles about five-flowered." *Stem* ſlightly pubeſcent, cylindrical, branched. *Leaves* tender, hoary; petiole ſhorter than the leaf. *Peduncles* the length of the leaves, pubeſcent. Pedicels in threes, umbelled, lateral ones in the greater number bifid, but on the peduncles near the top all ſimple, bractes two, linear, at the baſe of the lateral pedicels; calyx-leaves oblong, obtuſe, mucronate, ſomewhat villous; corolla twice as long as the calyx; lobes bearded at the tip; ſtigma bifid. Suppoſed to be a native of the iſle of Bourbon. 97. C. *crenatus.* Deſr. 74. Lam. 2073. Jacq. ic. rar. 2. tab. 315. (C. Hermanniæ; Willd. 67. L'Herit. ſtirp. 1. 67. tab. 33.) "Tomentous; leaves cordate-oblong, obtuſe, ſomewhat repand; peduncles longer than the petiole; border of the corolla acute." β. eroſus. "Leaves leſs elongated, appearing bitten here and there at the edge, cloathed with a reddiſh down; flowers larger." Whole plant whitiſh, ſoft to the touch. *Root* perennial, ſpindle-ſhaped. *Stems* about three feet long, not much branched. *Leaves* alternate, on ſhort petioles. *Flower* white, ſmall; peduncles long, zig-zag, with two ſmall awl-ſhaped bractes near the top, often two-flowered; border of the corolla ſlightly crenulate, with five acute diviſions. Found in Peru by Dombey. The variety β found at Monte Video by Commerſon. 98. C. *althæoides.* Linn. Sp. Pl. 19. Mart. 32. Def. 97. Lam. 2095. Willd. 69. Flor. Gr. tab. 194. Bauh. Pin. 295. Moris. hiſt. 2. 13. tab. 3. fig. 10. (C. peregrinus, folio betonicæ; Tourn. 85.) "Lower leaves heart-ſhaped, ſinuated; upper ones pinnatifid, ſomewhat palmate; peduncles generally two-flowered." Lam. β. C. Bryoniæfolius; Bot. Mag. 943. *Root* perennial. *Stems* a foot and half or two feet high, ſarmentous, weak, cylindrical. *Leaves* alternate. *Flowers* reddiſh, large, very open, almoſt entire; peduncles longer than the leaves, with two filiform bractes above the middle. The whole plant cloathed with numerous hairs, ſo as to give it a ſilky aſpect. A native of the Levant, Africa, and the South of Europe. The variety β is a much more robuſt plant; its leaves have no ſilkineſs or ſilvery whiteneſs; its flowers are larger and deeper coloured. Raiſed from ſeeds procured from China, by Iſaac Swainſton, eſq. in 1802. 99. C. *tenuiſſimus.* Smith Prod. Flor. Græc. p. 134. Fl. Græc. tab. 195. (C. althæoides β. Linn. γ. Deſr. C. althæoides; Bot. Mag. 359? C. argenteus elegantiſſimus foliis tenuiter inciſis; Tourn. Inſt. 85.) "Leaves pedate, ſilky, remarkably ſhining; linear lobes obtuſe; root-leaves cordate-ſerrated; peduncles one-flowered." Found by Dr. Sibthorp in Candia, about Athens and in the iſland of Zante. 100. C. *alceifolius.* Lam. 2096. "Hirſute; all the leaves deeply divided, ſomewhat palmate; peduncles few-flowered, longer than the leaves." A native of the Cape of Good Hope. 101. C. *cairicus.* Linn. Sp. Pl. 21? Mart. 33. Willd. 70. Bot. Mag. 699. (C. foliis lanceolatus vel quinquefolius; Bauh. Pin. 295. Barrel. icon. 319 and 320. C. ægyptius; Veſling Ægyp. 73. tab. 74. Ipomæa palmata; Forſk. Deſc. 43.) "Stem ſhrubby; leaves palmate-cleft, mucronate, ſmooth, quite entire, but often minutely crenate; hinder leaflets two-lobed: ſtipules palmate; calyxes even-ſurfaced; corollas ribbed underneath; diviſions acute." *Root* perennial. *Stem* with many ſlender branches. *Leaves* alternate; ſegments lanceolate; petioles the length of the leaves, with two leaf-like ſtipules at the baſe. *Flowers* violet-purple, large; peduncles the length of the petioles, axillary, from one to three-flowered; pedicels bracteated about the middle, with two ſmall, egg-ſhaped, acute ſcales; calyx five-leafed; leaves ſhort, egg-ſhaped, acute, concave, ſmooth, very ſhining either ſide; tube of the corolla nearly cylindrical, contracted as far as the calyx; border ſpreading; filaments unequal; anthers ſomewhat arrow-ſhaped: ſtigma divided into furrowed lobes. A common ornamental plant in the gardens of Egypt. 102. C. *quinquelobus.* Mart. 107. Willd. 71. Vahl. Symb. 3. 32. "Leaves palmate-quinquelobed, finely ſerrulated, obtuſe, ſmooth; axils tomentous; peduncles one-flowered; ſtem ſmooth." *Stem* cylindrical. *Leaves* nerved, finely veined, mucronate; middle lobe ſcarcely an inch long, lateral ones ſmaller, and narrower; petioles an inch long, filiform; ſtipules two, axillary, petioled, ſimilar in ſtructure to the leaves. *Flowers* purple; peduncles the length of the petioles, filiform, without bractes; calyx-leaves oblong, obtuſe, ſmooth; ſtigma capitate, two lobed. A native of the iſland of Santa Cruz. 103. C. *copticus.* Linn. Mant. 559. Mart. 34. Willd. 72. (C. ſtipulatus; Deſr. 26. Lam. 2025. C. foliis laciniatis, vel quinquefolius; Bauh. Pin. 295. Barrel. icon. 319.) "Leaves pedate, ſerrated; peduncles enſiform, one

one or two-flowered; calyxes muricated." *Root* annual. *Stem* angular, smooth, and even-surfaced. *Leaves* smooth, deeply divided almost to the base; segments five, lanceolate, serrated or unequally toothed, mucronate by the middle nerve; lateral ones sensibly shorter; two external ones often bifid. Petioles long, channelled, scabrous underneath; stipules similar to the leaves, but smaller. *Flowers* small, white; peduncles axillary, compressed, longer than the petioles, thickened upwards, with two bractes above the middle. A native of the Levant. 104. C. *laciniatus*. Desr. 27. Lam. 2026. "Leaves finely laciniated, somewhat bipinnated; peduncles one or two-flowered; calyx of the fruit nearly naked." About a foot and half high, sometimes perfectly smooth, sometimes cloathed with fine silky hairs. *Stems* slender, cylindrical. *Leaves* alternate, petioled. *Flowers* white; peduncles slender, longer than the petioles, axillary, solitary, thickened upwards; bractes two, about a line and half long, linear, acute, situated near the top of the peduncles; calyx-leaves egg-shaped, obtuse, mucronate, a little scarious, sometimes rather villous, especially at the time of flowering; corollas campanulate, twice the length of the calyxes. *Seeds* black, naked. A native of South America, about Monte Video. Specimen in the herbarium of Commerson. There is a variety in the herbarium of Thouin very villous in all its parts, especially the calyxes, with the lower leaves less deeply divided, than the upper. 105. C. *vitifolius*. Linn. Mant. 203. Mart. 35. Desr. 99. Lam. 2099. Willd. 73. Burm. Ind. 45. tab. 18. fig. 1. Pluk. alm. 135. tab. 25. fig. 3. "Leaves palmate-five-lobed, smooth, toothed; stem hairy; peduncles many-flowered." *Stems* villous. *Leaves* alternate, petioled, divided almost to the middle, hoary underneath. *Peduncles* axillary, solitary, hairy, separating into two principal branches; calyxes villous; corollas campanulate, orange; stigmas two, globular. A native of the East Indies. 106. C. *dissectus*. Linn. Mant. 204. Mart. 36. Desr. 23. Lam. 2022. Willd. 74. Jacq. ob. 2. 4. tab. 28. Hort. 2. tab. 159. "Leaves palmate, seven-cleft, dentate-sinuated, smooth; stem hairy; peduncles one-flowered." *Root* annual. *Stem* much branched, cylindrical. *Leaves* deeply palmate, almost digitate, segments acute; petioles from one to two inches long, hairy. *Flowers* white, open; peduncles shorter than the leaves, axillary, solitary, hairy at the base; calyx oblong, smooth and even-surfaced; stigma capitate, two-lobed. A native of America. 107. C. *mucronatus*. Mart. 75. Willd. 75. Forst. prod. 79. "Leaves palmate-pedate; lobes ciliated, mucronate; peduncles one-flowered." A native of the Isle of Tanna in the south seas. 108. C. *macrocarpus*. Linn. Sp. 20. Mart. 37. Desr. 24. Lam. 2023. Willd. 76. (C. polyphyllus, flore & fructu purpureis maximis; Plum. Cat. 1. MSS. 2. tab. 56. Burm. Amer. 8. 50. tab. 91. fig. 1.) "Leaves palmate, pedate, five-cleft; peduncles one-flowered." *Root* annual, thick, fleshy, milky. *Stems* long, about the thickness of a goose-quill. *Leaves* deeply palmate, almost digitate, two outer segments less deeply divided, thin, smooth, on rather long petioles. *Flowers* purple; peduncles a little longer than the petioles, axillary, thickened upwards, jointed and bent above the middle, longitudinally winged and curled; calyx-leaves concave, roundish; corollas campanulate, large, slightly sinuated. *Capsule* membranous, orbicular, angular, about the size of a walnut. *Seeds* round, black, villous, about the size of a hazel-nut. A native of Martinico, where its root is esteemed purgative. 109. C. *paniculatus*. Linn. Sp. Pl. 23. Mart. 38. Desr. 100. Lam. 2100. Willd. 77. (Pal modecca; Rheed. mal. 11. 101. tab. 49.) "Leaves palmate; lobes seven, egg-shaped, acute, quite entire; peduncled, panicled." *Root* perennial, about a foot and half long, thick, tuberous. *Stems* slender, even-surfaced. *Leaves* alternate, petioled, rarely three or five-lobed. *Flowers* very open, pale red on the outside, purple within, deeper coloured at the bottom; peduncles axillary, solitary, reddish, a little curved; calyx-leaves rounded, appearing blistered, dull-red, connivent after the fall of the flower. A native of the coast of Malabar. 110. C. *palmatus*. Mart. 66. (C. pentaphyllos, folio glabro dentato, viticulis hirsutis, Plum. Cat. C. pentaphyllus β. serpens. Linn. "Leaves palmate; lobes seven, sinuate-pointed; peduncles one-flowered; calyxes very large, spreading." Stem twenty feet high, dividing into several smaller ones. *Flowers* large, purple, on long peduncles. *Capsules* large, roundish, three-celled. *Seeds* one in each cell. A native of La Vera Cruz in New Spain, whence seeds were sent to Miller by Dr. Houston. 111. C. *aggregatus*. Mart. 78. Lour. Cochinch. 109. "Leaves palmate, seven-lobed, hairy; flowers aggregate." *Stem* perennial, cylindrical, extremely hairy, branched. Lobes of the leaves egg-shaped, rather acute, quite entire. *Flowers* white, large, on a long, solitary, axillary peduncle; common calyx (involucre?) twelve-leaved, bell-shaped; leaves ovate-oblong, unequal, hairy, containing about ten sessile florets; proper calyx-leaves lanceolate, hairy, upright; corolla tubular, five-cleft; segments acute, hairy, closed; anthers bifid at the base; style longer than the corolla; stigma capitate. *Capsule* two-celled, two-seeded. Seeds round on one side, angular on the other. A native of Cochinchina. 112. C. *tuberculatus*. Desr. 25. Lam. 2024. "Leaves digitate, somewhat pedate, seven-cleft, smooth; petioles rough with tubercles; peduncles one-flowered." *Stems* several, two or three feet high, slender, cylindrical, sarmentous. *Leaves* alternate; segments egg-shaped, entire, lanceolate, slightly obtuse, mucronate; petioles about two inches long, channelled, tubercled on their convex side, stipules digitate. *Flowers* large, purple; peduncles axillary, thickened upwards; furnished near the bottom with two small glandular points, which rise from a kind of knot; calyxes deeply divided; segments egg-shaped, obtuse, somewhat scarious at the edges; corollas funnel-shaped, almost campanulate, very open; stigma two-lobed. Found in South America, about Monte Video, by Commerson. Cultivated in the Botanic garden at Paris. 113. C. *macrorhizos*. Linn. Sp. Pl. 22. Mart. 39. Desr. 106. Lam. 2107. Willd. 78. (C. coccineus heptaphyllus, radice crassissima; Plum. Cat. 1. MSS. 2. tab. 58. Burm. Amer. 79. tab. 90. fig. 1.) "Leaves digitate in sevens, quite entire; stem smooth; peduncles many-flowered." *Root* very thick, tuberous, sweet-tasted, abounding in a milky juice, esteemed purgative. *Stems* sarmentous, deep green, about the size of a finger, branched, climbing to the top of the highest trees. *Leaves* on long purplish petioles, bright green; segments about three inches long, oval-lanceolate, acute, slightly sinuated, smooth; mid-rib purple underneath. *Flowers* large, scarlet; peduncles axillary, solitary, short, slender; corollas bell-shaped, tubular at the base; border open, slightly crenate; stigma capitate. A native of St. Domingo. 114. C. *pentaphyllus*. Linn. 24. Mart. 41. Desr. 101. Lam. 2101. Willd. 82. (C. pentaphyllos hirsutus; Plum. Cat. 1. MSS. 2. tab. 54. C. americanus pent. & heptaphyllus major; Herm. lugbd 183. tab. 185. Tourn. 84. Ipomæa pentaphylla; Jacq. Col. 2. 297. ic. rar. 2. tab. 319.) "Very hairy; leaves digitate, in fives; leaflets egg-shaped, acuminate; peduncles many-flowered." Stems, petioles, peduncles, and calyxes rough with numerous long, stiff, reddish hairs. *Root* annual, long, slender, fibrous. *Stem* generally single, sometimes thirty-eight feet high, cylindrical, branched, about the size of the human little finger, cinereous brown, woody and smooth at the base, reddish

reddifh above; green near the top. *Leaves* alternate, petioled; fegments quite entire, cloathed on both fides with fine decumbent hairs. *Flowers* yellowifh white; peduncles about four inches long, axillary, folitary, cylindrical, dichotomous, often furnifhed with fmall bractes under the divifions; pedicels very fhort; calyx-leaves acute, two outward ones longer, more hirfute, and of a purplifh colour; corolla campanulate, twice the length of the calyx, flightly five-lobed; ftigma capitate, two-lobed. *Capfule* two-celled. *Seeds* two in each cell. A native of South America, cultivated in the botanic garden at Paris. Miller received feeds from Carthagena in New Spain, which he cultivated under the name of C. pentaphyllus, and which differs from the above in being perennial, and having only two purple flowers on each peduncle. 115. C. *quinquefolius*. Linn. 25? Mart. 40. Defr. 102. Lam. 2102. Willd. 79. Swartz. 63. Pluk. Alm. 116. tab. 167. fig. 6. "Leaves digitate, fmooth, toothed; peduncles even-furfaced." Linn. "Leaves digitate, fmooth, toothed; ftem hifpid; peduncles many-flowered." Lam. *Stems* very long, flender, cylindrical, hifpid, branched. *Leaves* alternate, petioled, fmooth, bright green; fegments lanceolate; middle one largeft, near two inches long, about half an inch broad. *Flowers* white; peduncles longer than the leaves, flender, axillary, folitary, fomewhat villous, dichotomous, from three to fix-flowered, with fmall awl-fhaped bractes at the divifions; calyx fmooth, fegments oblong, the three inner ones larger; corollas campanulate, five-toothed. *Capfule* four-celled. Defr. Two-celled, two-feeded. Swartz. A native of the Weft Indies. The C. quinquefolius of Miller feems a different plant. It was raifed by him from feeds fent from New Spain, and is thus defcribed. *Stems* thirty feet high or more, woody, with a purple bark. *Leaves* deeply divided into five fharp-pointed lobes. *Flowers* large, purple; peduncles long, thick, with a bent joint in the middle. *Capfules* round, as large as a middling apple, three-celled. *Seeds* two in each cell. 116. C. *ciffoides*. Lam. Ill. 2103. "Hirfute; leaves digitate, in fives, toothed; peduncles about three-flowered, fhorter than the leaf; calyx hifpid. A native of Cayenne. 117. C. *venofus*. Mart. 108. Defr. 104. Lam. 2105. Willd. 80. Vahl. 3. 32. "Smooth: leaves digitate, in fives; leaflets petioled, ovate-acuminate; common petioles with tendrils at the bafe." Lam. "Quite fmooth; leaves digitate, in fives, quite entire; peduncles many-flowered." Vahl. *Stems* flender, cylindrical. *Leaves* petioled; leaflets acute at the bafe (rather than petioled), veined; middle one larger than the others, about two inches long; (common petioles with a fhorter tendril at the bafe. Defr. Peduncles with an ovate-heart-fhaped, acuminate, folitary leaf at the bafe. Vahl. Is it not properly a ftipula, which, as the peduncles are axillary, may be thought by one obferver to accompany the petiole: by another, the peduncle?) *Flowers* in a corymb; peduncles folitary, dichotomous near the top, with fmall awl-fhaped bractes; calyxes fhort; fegments egg-fhaped, two larger; corollas funnel-fhaped, tube nearly of the fame diameter throughout, not gradually enlarged to the top; border but little widened; ftigmas capitate, flightly two-lobed. Sent by Commerfon from the Ifles of France and Bourbon. On a ftrict comparifon it appears certain, that Defrouffeaux and Vahl have defcribed the fame plant, and have given it the fame name, without any knowledge of each others fpecimens. 118. C. *glaber*. Defr. 103. Lam. 2104. Willd. 81. Aubl. guian. 138. tab. 53. "Leaves digitate, in fives; leaflets ovate-lanceolate, quite entire, fmooth; peduncles many-flowered." *Stems* numerous, long, cylindrical, flexible. *Leaves* alternate. *Flowers* white; peduncles axillary, folitary; pedicels long; calyx deeply divided; fegments long, firm, fmooth, acute; tube of the corolla rather long; border open, with five rounded lobes; ftigmas two, long, acute. A native of Cayenne. The whole plant is milky. 119. C. *eriofpermus*. Defr. 105. Lam. 2106. "Shrubby; leaves digitate; leaflets about eight, linear, very narrow; feeds very hirfute." Whole plant, except the feeds, fmooth. *Stems* farmentous, woody, cylindrical. *Leaves* about an inch long, including the petioles. *Flowers* purple, axillary, in fmall dichotomous racemes, fhorter than the leaves; calyx-leaves obtufe, not a quarter of the length of the flowers; corollas cylindrical. *Capfules* egg-fhaped, even-furfaced, twice the length of the calyx, four-valved, two-celled. *Seeds* two in each cell; covered on their convex fide with numerous, long, decumbent, whitifh, filky hairs, directed towards the bafe. A native of St. Domingo. 120. C. *tenuifolius*. Willd. 109. Vahl. Symb. 3. 33. "Leaves digitate, in fives; leaflets linear; peduncles four or five-flowered." Whole plant fmooth. *Stem* angular. *Leaves* petioled; leaflets very narrow, entire. *Peduncles* axillary, fhort; upper ones fometimes one-flowered. *Calyx* fmooth, with oblong leaflets; ftigma acute.

** *Stems not twining.*

121. C. *ficulus*. Linn. Sp. Pl. 26. Mart. 44. Defr. 4. Lam. 2003. Willd. 84. Flor. Græc. tab. 194. (C. ficulus minor, flore parvo auriculato; Bocc. Sic. 89. tab. 48. Tourn. Inft. 83.) "Leaves cordate-egg-fhaped; bractes lanceolate; peduncles longer than the petiole." *Root* annual. *Stems* one or two feet high, cylindrical, nearly fimple, fometimes a little twining, but generally not at all. *Leaves* entire, acute. *Flowers* fmall, blueifh; peduncles axillary, curved downwards near the top. A native of Sicily. 122. C. *patens*. Defr. 33. Lam. 2031. "Filiform, fomewhat erect; leaves linear, mucronate; peduncles fpreading horizontally, longer than the leaf." Whole plant flightly villous. *Stems* about a foot and half high, very flender, little or not at all twining, cylindrical, fomewhat branched. *Leaves* about an inch long, fcarcely two lines broad, alternate, almoft feffile, fometimes one or two-toothed. *Flowers* on long, axillary, fimple peduncles, with two egg-fhaped lanceolate bractes a little below the calyx; calyx-leaves egg-fhaped, acute, half the length of the corolla. A native of Carolina. 123. C. *pentapetaloides*. Mart. 45. Willd. 85. Vahl. 2. 36. "Leaves lanceolate, obtufe, naked, linear; branches declining; flowers folitary, five-cleft half way down." Refembling C. tricolor, but fmaller. *Leaves* fomewhat petioled. *Root* annual. *Flowers* axillary, on fhort peduncles: bractes generally two obfcure fcales. *Flowers* blueifh, with a yellow bottom; fegments acute. A native of Majorca, and the iflands of the Archipelago. 124. C. *ciliatus*. Roth. Catal. Bot. 2. 22. Ann. Bot. 2. 12. "Leaves oblong, wedge-fhaped, emarginate, ciliated; ftem proftrate; capfules very hairy." 125. C. *evolvuloides*. Smith Prod. Flor. Græc. 134. Desfont. Atlant. 1. 176. tab. 49. Flor. Græc. tab. 198. "Leaves fpatule-fhaped, obtufe, hairy; upper ones embracing the ftem; ftem declining; flowers folitary, feffile." *Root* annual. A native of Cyprus. 126. C. *lineatus*. Linn. Sp. Pl. 29. Mart. 46. Defr. 53. Lam. 2052. Willd. 86. Flor. Græc. tab. 199. (C. argenteus anguftifolius, umbellatus, partim erectus partim fupinus; Tourn. Cor. 1. C. oleæfolius β; Defr. C. marina repens; Bar. Rar. 3. tab. 1132.) "Leaves lanceolate, filky, linear, petioled; peduncles two-flowered; calyxes filky, fomewhat foliaceous." Linn. "Tomentous-filky; leaves oblong, obtufe, attenuated at the bafe, linear; peduncles two-flowered, fhorter than the leaf." Lam. *Root* perennial, creeping,

ing. *Stems* several, rising among a considerable number of root-leaves, from three to six inches high, weak, zig-zag, slightly angular, villous, a little branched. *Leaves* alternate, sessile, but so much narrowed at their lower extremity as to appear petioled, a little channelled at the base to embrace the stem, nerved; lower ones longer than the others, nearer together, reaching almost to the top of the stem. *Flowers* reddish; peduncles axillary, on the upper part of the stem, solitary, dichotomous near the top, and furnished at the division with two bractes, resembling the leaves in shape and silkiness, and extending a little beyond the calyx; besides these there are sometimes two other small linear bractes, shorter than the calyx; calyxes small; leaflets egg-shaped, acute, silky; corollas middle-sized, half-open, villous on the outside. A native of the south of France, and the Levant. 127. C. *spicæfolius*. Desr. 41. Lam. 2039. Barr. Ic. 311. (C. non convolvulus; Mant. 29. tab. 140.) "Leaves linear-lanceolate, narrowed at the base, nearly simple; peduncles one-flowered, shorter than the leaf." *Stems* decumbent at the base, then ascending, a little zig-zag. *Leaves* alternate, about three lines long, resembling those of lavender; lower ones the same length as the others. *Flower* rather large; peduncles axillary, scarcely half the length of the leaves; bractes two, linear-lanceolate, situated near the calyx, and a little surpassing it; calyx about one-third of the length of the corolla, with five acute segments; stigmas long, filiform. A native of mountains in Spain. Willdenow thinks this and the preceding the same plant; and they are perhaps nothing more than varieties; but as La Marck and Desrousseaux profess to have seen both of them growing in the botanic garden at Paris, in deference to their authority we have kept them distinct. 128. C. *saxatilis*. Mart. 110. Willd. 87. Vahl. Symb. 3. 33. Bar. Ic. 470 Bocc. Mus. 2. 79. tab. 70. (C. lanuginosus; Desr. 47. Lam. 2046. C. argenteus umbellatus supinus; Tourn. Inst. 84. Lychnis sylvestris campanulæ flore; Bauh. Pin. 206.) "Very hirsute; leaves linear; flowers in terminal heads; calyxes acuminate." *Root* perennial. *Stems* scarcely a foot long, cylindrical, a little branched. *Leaves* about an inch long, thinly set, alternate, sessile, satiny on the young shoots. *Flowers* white, with a slight tint of purple, sessile, eight or ten collected into a head at the extremity of the branches, which are commonly without leaves below to the extent of two inches, surrounded with a sort of involucre consisting of five or six rather broad leaves; each flower surrounded with some small linear bractes; calyxes divided to the base into minute segments, half the length of the corolla. 129. C. *Cneorum*. Linn. Sp. Pl. 30. Mart. 47. Willd. 83. Flor. Græc. tab. 200. Bot. Mag. 459. (C. argenteus; Desr. 48. Lam. 2047. C. argenteus umbellatus erectus; Tourn. Inst. 84. Moris. Hist. 2. 11. tab. 3. fig. 1. Cneorum album, folio argenteo molli; Bauh. Pin. 463. Dorycnium; Clus. Hist. 2. 254.) "Leaves lanceolate, tomentous; flowers umbelled; calyxes hirsute; stem somewhat erect." Linn. "Shrubby, silky; leaves oblong, obtuse; flowers in terminal, capitate umbels; calyx short, somewhat retuse." Lam. *Root* perennial. *Stems* about three feet high, cylindrical, firm, upright. *Leaves* numerous, scattered, about an inch and half long, four or five lines broad, sessile, narrowed at the base, soft, clothed with a fine decumbent, silky, brilliant down. *Flowers* white, tinged with a pale red, on short peduncles; bractes resembling the leaves, but smaller; calyxes about a third of the length of the corolla, short, obtuse, deeply divided, villous; corolla silky on the outside; border rather open. A native of Candia and the islands of the Levant. 130. C. *oleæfolius*. Desr. 49. Lam. 2048. "Shrubby, silky; leaves linear-lanceolate; flowers in terminal capitate umbels; calyxes lanceolate." A native of the Levant; nearly allied to the preceding, and scarcely more than a variety 131. C. *linearis*. Willd. 89. Bot. Mag. 289. "Stems erect, shrubby; leaves linear, acute, clothed with silky hairs; flowers terminal, umbellate-panicled; calyxes hairy." Confounded by the English nurserymen with the next species. Most allied to C. cneorum, but differs in having leaves much narrower, more pointed, and less silky. 132. C. *cantabricus*. Linn. Sp. Pl. 31. Mart. 48. Desr. 46. Lam. 2045. Willd. 90. Jacq. Flor. Aust. 3. tab. 296. (C. linariæ folio; Bauh. Pin. 295. C. linariæ folio assurgens; Tourn. Inst. 53, & humilior, 54.) "Leaves linear, acute; stem branched, somewhat dichotomous; calyxes hairy." Linn. "Hairy; leaves linear-lanceolate, acute; stem branched, rather erect; flowers clustered." Lam. β. C. terrestris; Linn. Sp. 27. Whole plant clothed with fine whitish hairs, soft to the touch. *Root* perennial. *Stems* about a foot high, cylindrical. *Leaves* two or three lines broad, alternate, sessile. *Flowers* rose-coloured or white, almost sessile, growing two or three together at the end of the stem and branches; bractes linear, acute, resembling the leaves but smaller; calyxes with five acute segments; corollas middle-sized, open, almost flat; stigmas two, filiform. A native of the south of Europe. 133. C. *suffruticosus*. Smith Prod. Flor. Græc. p. 135. Desfont. Atl. tab. 48. "Leaves linear-lanceolate; stem ascending, villous; peduncles axillary, one-flowered, three times the length of the leaf." *Root* perennial. A native of Barbary and Greece. 134. C. *Ammanii*. Desr. 40. Lam. 2038. (C. ramosus, erectus, argenteus minimus; Amm. Ruth. 5. n. 6.) "Silky; leaves linear; peduncles one flowered; bractes long; calyx acute." Whole plant armed with a short silky silvery down. *Root* perennial. *Stems* from four to six inches high, slender, cylindrical, branched, rather erect. *Leaves* alternate, sessile; root-ones not less than half an inch long, narrowed at the base, obtuse; those on the stem and branches longer, acute. *Flowers* campanulate, pale white, starred with purple lines; peduncles filiform, axillary, solitary, nearly the length of the leaves, furnished a little above the middle with two bractes seven or eight lines long, distinguished from the leaves only by being opposite; calyx short, with egg-shaped acute segments. A native of Siberia. 135. C. *pilosellæfolius*. Desr. 45. Lam. 2044. Willd. 92. (C. orientalis, humifusus, pilosellæ foliis; Tourn. Cor. 1.) "Leaves lanceolate, sessile, entire; peduncles elongated, many-flowered, loosely branched." *Root* perennial. *Stems* cylindrical, slender, slightly hairy, decumbent. *Leaves* alternate, three or four lines broad; beset, especially at the edges, with long separate hairs. *Flowers* small, campanulate; peduncles from four to six-flowered; bractes opposite, small, lanceolate like the leaves, situated at the base of the pedicels; calyx-leaves egg-shaped, acute, villous, half the length of the corolla. A native of the Levant. 136. C. *dorycnium*. Linn. Sp. Pl. 28. Mart. 49. Desr. 38. Lam. 2036. Willd. 93. Flor. Græc. tab. 201. (C. ramosus incanus, foliis pilosellæ; Tourn. Inst. 84.) "Leaves almost linear, silky; stem shrubby, panicled; calyxes almost naked, obtuse." *Root* perennial. *Stems* a foot and half high, cylindrical, almost smooth, a little zig-zag, much branched, with few leaves, especially towards the top. *Leaves* alternate, sessile, narrow. *Flowers* generally solitary, sessile in the forks of the branches or at their summit, commonly accompanied with one or two small leaves; calyxes very small; corollas campanulate, open, villous on the outside, three or four times the length of the calyxes. A native of the Levant. 137. C. *proliferus*. Willd. 34. Vahl. Eclog. 1. 18. "Leaves linear, silky underneath; heads of

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flowers terminal, and in the divifions of the branches; bractes egg-fhaped, very hirfute on the outfide. A native of South America. 138. C. *lanatus*. Mart. 80. Willd. 95. Vahl. Symb. 1. 16. Flor. Græc. tab. 202. (C. orientalis humilis argenteus latifolius erectus & villofus; Tourn. Cor. 1. C. cneorum; Forfk. Ægyp. 63. n. 124. C. fericeus; Burm. Ind. 49. tab. 19. fig. 3?) "Leaves lanceolate-linear, tomentous; old branches fpinous; flowers capitate, involucred." *Stem* fhrubby, erect, branched at the bottom; old branches leaflefs, barren; flowering branches from the bafe of the old ones, quite fimple, feven inches long or more, erect, cylindrical, fpinelefs, rigid, zig-zag towards the end, and covered with a foft fhagginefs. *Leaves* alternate; lower ones lanceolate, attenuated at the bafe, fometimes feveral from the fame point at the foot of the branches, unequal; upper ones lanceolate-linear, feffile, acute; floral ones a little broader than the reft; all thickifh, veinlefs, tomentous, but not filky. *Flowers* campanulate, hairy on the outfide, the colour of C. cneorum; peduncles from almoft all the axils, folitary, half the length of the leaf, from fix to eight-flowered; pedicels none; involucre fix-leaved, the length of the calyx; three outer leaflets egg-fhaped, acute; three inner ones lanceolate; all of them, as well as the peduncles and calyxes, extremely hirfute, with long, very foft, fhining hairs on the outfide, only fomewhat hairy within. *Bractes* two beneath each flower; calyx-fegments linear; ftyle bifid; ftigmas acute. A native of the Lower Egypt and of Mount Sinai. 139. C. *Hyftrix*. Mart. 81. Willd. 96. Vahl. Symb. 1. 16. (C. fpinofus; Forfk. Arab. 106. n. 121.) "Shrubby; leaves oblong; flowers feffile, almoft always folitary; branches fpinefcent." *Stem* rigid, much branched, diffufe, a foot high; branchlets fomewhat filky. *Leaves* feffile, fcattered, filky, entire, fmall. *Flowers* fmall, axillary, hirfute; bractes two, at the bafe of the calyx, oblong, rather acute, a little broader at the end and reflexed; two outer calyx-leaves oblong, rigid, larger than the others; ftigmas two, capillary. A native of Arabia. 140. C. *fpinofus*. Linn. jun. Supp. 137. Defr. 36. Lam. 2035. Willd. 97. (C. fruticofus; Pall. It. 2. 734. tab. m.) "Shrubby, erect; leaves lanceolate, filky; flowering branchlets fpinous." *Root* perennial. *Stem* fhort, much branched. *Leaves* alternate, feffile. *Flowers* vertical, feffile; calyx-leaves egg-fhaped, acuminate, concave, tomentous; three outer ones larger; corollas plaited, five-toothed, tomentous on the outfide of the tube, with a reddifh border. A native of Ruffia. 141. C. *fcoparius*. Linn. jun. Sup. 135. Mart. 50. Defr. 51. Lam. 2050. Willd. 98. "Leaves linear, fomewhat hairy; peduncles about three-flowered; calyxes filky, egg-fhaped, acute; ftem fhrubby; branches rod-like." The habit of a broom. *Root* perennial. *Stems* cylindrical, quite fmooth; branches erect, fimple. *Leaves* alternate, diftant, fhort, thin, upright. *Flowers* white, villous on the outfide; peduncles alternate, folitary, bracteate. A native of Africa and the Canary Iflands. This fpecies and C. floridus produce the true rofe-wood of the fhops. Ventenat fufpects that thefe two may form a feparate genus, having a one-celled capfule, which opens at the bafe and contains a fingle feed. 142. C. *fecundus*. Defr. 41. Lam. 2051. "Tomentous-ferruginous; leaves feffile, lanceolate; heads of flowers thick-fet, unilateral, nearly feffile." *Stems* the fize of a goofe-quill, cylindrical, fomewhat zig-zag, but little branched. *Leaves* about an inch long, alternate, cottony on both fides, unilateral on the branches. *Flowers* five or fix in a denfe head, on very fhort peduncles, without pedicels, intermingled with bractes which refemble the young leaves, corollas a little villous on the outfide. A native of Syria, obferved by La Billardiere. 143. C. *Oenotheroides*. Linn. jun. Supp. 137. Mart. 51. Defr. 34. Lam. 2032. Willd. 99. "Shrubby, erect; leaves linear, fomewhat hoary; peduncles axillary, folitary, erect, one-flowered, bracteate; calyxes lanceolate, fmooth." *Stems* erect, cylindrical, reddifh, and fomewhat glaucous. *Leaves* about three inches long, narrow, lax, flat. *Flowers* tawny; peduncles fhort, angular; bractes two, recurved, awl-fhaped; calyx-leaves quite fmooth, rather fpreading, hoary, membranous at the edges; corolla large, funnel-fhaped. A native of the Cape of Good Hope, obferved by Sparrman. 144. C. *floridus*. Linn. jun. Sup. 136. Mart. 52. Defr. 50. Lam. 2049. Willd. 100. Jacq. ic. 1. tab. 34. "Leaves oblong-lanceolate, attenuated at the bafe, fomewhat hairy; flowering branches and peduncles panicled." *Root* perennial. *Stems* about four feet high, woody, procumbent, fmooth; branches flender, erect, ftiff, hoary. *Leaves* three or four inches long, fcattered, entire, on fhort petioles. *Flowers* pale red or white, numerous, rather fmall; peduncles axillary from the upper leaves, repeatedly branched, fo as to form a large thyrfoid panicle; calyx-leaves egg-fhaped, concave, acute. *Capfules* one-celled, one-feeded, opening from the bottom in ten valves. A native of the Canary Iflands. 145. C. *cuneatus*. Willd. 101. "Stem fhrubby, erect; leaves wedge-fhaped, obtufe, mucronate, fmooth: corymbs axillary, fhorter than the leaves." *Root* perennial. *Stem* cylindrical, fmooth. *Leaves* two inches long, quite entire, befet underneath with a few clofe-preffed hairs; petioles fhort, villous on the infide. *Flowers* purple; calyx-leaves obtufe, hairy; corolla an inch long, tube fwelling. A native of the Eaft Indies. 146. C. *corymbofus*. Linn. Sp. Pl. 33. Mart. 53. Defr. 62. Lam. 2061. Willd. 102. (C. niveus, polyanthus; Plum. Cat. 1. MSS. 2. tab. 50. Burm. Amer. tab. 89. fig. 2.) "Leaves heart-fhaped: peduncles umbellated; ftem creeping." *Stems* numerous, woody, the thicknefs of a goofe-quill, with long branches. *Leaves* two or three inches long, alternate, petioled, fine green. *Flowers* a beautiful white, with ftill whiter rays; peduncles flender, nearly the length of the leaves, with one or two bractes, forming a corymb. *Capfules* membranous, top-fhaped, one-celled. *Seeds* two or three. Defrouffeaux defcribes the ftems as twining, on the authority, as we fuppofe, of Plumier's MSS. A native of the Weft Indies. 147. C. *fpithamæus*. Linn. Sp. 32. Mart. 54. Willd. 103. Gron. Virg. 141. (C. foliis cordatis pubefcentibus incanis; Walt. Car. 93.) "Leaves heart-fhaped, pubefcent; ftem erect; peduncles one-flowered." *Flowers* large, white. A native of Virginia. 148. C. *perficus*. Linn. Sp. Pl. 34. Mart. 55. Defr. 39. Lam. 2037. Willd. 104. Gmel. It. 3. 36. tab. 97. "Leaves egg-fhaped, tomentous; peduncles one-flowered." Whole plant tomentous like the common mullein. *Root* perennial. *Stems* the fize of a goofe-quill, cylindrical. *Leaves* quite entire, obtufe, on very fhort petioles. *Flowers* white; peduncles axillary, folitary, the length of the leaves, with two egg-fhaped bractes near the top; calyx-leaves egg-fhaped; the three inner ones fmaller; corolla campanulate, four times the length of the calyx; germ woolly; ftigmas two, linear, thickifh. A native of Perfia on the fhores of the Cafpian Sea. 149. C. *tricolor*. Linn. Sp. Pl. 35. Mart. 56. Defr. 35. Lam. 2033. Willd. 105. Bot. Mag. 27. (C. peregrinus cæruleus, folio oblongo; Bauh. Pin. 295. C. lufitanicus, flore cæruleo; Tourn. 83.) "Leaves lanceolate, egg-fhaped, feffile; lower ones fomewhat fpatulate; peduncles one-flowered; ftem declining." *Root* annual. *Stems* about a foot long, cylindrical, weak. *Leaves* fometimes fmooth, often hairy, efpecially when young. *Flowers* yellowifh at the bottom, white in the middle and fine fky-

blue

blue on the upper part of the border; peduncles juſt above the leaves on the ſame ſide about two inches long. A native of Spain, Portugal, Sicily, and the coaſt of Barbary. It is generally called C. minus by the Engliſh gardeners. 150. C. *acetoſellæfolius*. Willd. 106. Vahl. eclog. 1. 18. Plum. Amer. 9. tab. 105. "Leaves oblong-lanceolate; ſomewhat haſtate; peduncles elongated, one-flowered; ſtem creeping." *Root* perennial. A native of South America. 151. C. *repens*. Linn. Sp. Pl. 36. Mart. 57. Deſr. 30. Lam. 2029. Willd. 107. (Ipomæa aquatica; Forſk. Arab. 44. Ballel; Rheed. Mal. 11. 107. tab. 52.) "Leaves arrow-ſhaped, obtuſe behind; peduncles one or two-flowered." *Root* perennial. *Stem* creeping, jointed, rooting, angular, compreſſed, ſubdivided. *Leaves* crowded, terminal, emarginate, ſmooth, ſomewhat ſucculent, on longiſh petioles. *Flowers* whitiſh, rather large; peduncles from the axils of the terminal petioles, erect. A native of the Eaſt and Weſt Indies. 152. C. *reptans*. Linn. Sp. Pl. 37. Mart. 58. Deſr. 31. Willd. 108. (Olus vagum; Rumph. amb. 5. 419. tab. 155, fig. 1.) "Leaves haſtate-lanceolate; auricles rounded; ſtem creeping; peduncles one or two-flowered." *Root* perennial. *Stem* filiform, ſmooth and even. *Leaves* ſmooth, acuminate. *Flowers* pale purple; peduncles ſhorter than the petioles; calyx rounded. *Capſule* ſmooth, two-celled, with two ſeeds in each cell. A native of the Eaſt Indies, China, and Cochinchina, where it is uſed as a potherb. 153. C. *edulis*. Mart. 59. Deſr. 54. Lam. 2053. Willd. 109. Thunb. jap. 84. "Leaves heart-ſhaped, entire and three-lobed, ſmooth; ſtem creeping, angular." *Root* perennial, often as big as the human fiſt, tubercled, fleſhy like C. batatas, eſculent, ſoft, and ſapid. Said to be brought to Japan by the Portugueſe. 154. C. *hirtus*. Linn. Sp. Pl. 38. Mart. 60. Deſr. 83. Lam. 2081. "Leaves heart-ſhaped, ſomewhat haſtate, villous; ſtem and petioles hairy; peduncles many-flowered." *Root* annual; *Stem* a little twining. *Leaves* but little hairy. *Flowers* alternate, pedicelled, ſmooth, on peduncles longer than the leaves; involucres to each pedicel, very ſmall, lanceolate. A native of the Eaſt Indies. 155. C. *Soldanella*. Linn. Sp. Pl. 39. Mart. 61. Eng. Bot. 314. (C. maritimus noſtras rotundifolius; Tourn. 83. Soldanella maritima minor; Bauh. Pin. 295.) "Leaves kidney-ſhaped; peduncles one-flowered, with winged angles." Dr. Smith. *Root* perennial, long, creeping. *Stems* five or ſix inches long, procumbent, few-flowered. *Leaves* alternate, petioled, entire or a little angular, ſmooth and even, ſomewhat fleſhy. *Flowers* fleſh-coloured, yellowiſh at the plaits; peduncles axillary, ſolitary, rather erect, thickened near the top, quadrangular; bractes large, egg-ſhaped, cloſe to the flower; calyx-leaves large, egg-ſhaped. *Capſule* three-celled. *Seeds* black, one in each cell. A native of the ſea coaſts of Great Britain, and other parts of Europe. It abounds in a milky juice, which has a bitter, acrid, ſaline taſte, and is eſteemed a good purgative. 156. C. *Imperati*. Mart. 83. Willd. 112. Vahl Symb. 1. 17. (C. Stoloniferus; Deſr. 43. Lam. 2041. Cyril. Pl. rar. faſc. 1. 14. tab. 5. Soldanella vel braſſica maritima major; Bauh. Pin. 295. C. maritimus major italicus; Tourn. Inſt. 83.) "Leaves panduriform, or entire, emarginate, heart-ſhaped; peduncles one-flowered; corolla bell-ſhaped; ſtem creeping." Vahl. "Procumbent; leaves egg-ſhaped, retuſe, emarginate; lower ones undivided; upper ones ſinuate-lobed at the ſide." Lam. Nearly allied to the preceding. *Root* perennial. *Stem* cylindrical, quite ſmooth, a little branched, extending far on the ſand, rooting at the knots. *Leaves* alternate, ſmooth, ſhining, on long petioles. *Flowers* yellowiſh white; peduncles axillary, ſolitary, or in pairs, nearly the length of the petioles, with two ſmall bractes; calyx-leaves egg-ſhaped, obtuſe; ſtigma capitate. A native of the ſea-ſhore in Italy. 157. C. *arenarius*. Mart. 83. Lam. 2042. Willd. 63. Vahl. Symb. 1. 18. "Leaves oblong, emarginate, lobed at the baſe, or entire; peduncles one-flowered; corollas tubular." Whole plant ſmooth. *Stems* decumbent, filiform, zig-zag, purpliſh. *Leaves* cluſtered, veinleſs; petiole longer than the leaf. *Peduncles* in pairs or ſolitary, axillary, the length of the petioles; calyx-leaves equal, oblong, ſomewhat membranous; tube of the corolla enlarged gradually towards the top. A native of the Azores. 158. C. *maritimus*. Deſr. 44. Lam. 2043. Pluk. phyt. tab. 24. fig. 5. "Leaves emarginate, two-lobed, wedge-ſhaped at the baſe; peduncles many-flowered; ſtem decumbent, throwing out roots." Whole plant ſmooth. *Stems* cylindrical. *Leaves* alternate, mucronate by the elongation of the principal nerve, entire, thick, fleſhy; petioles channelled. *Flowers* purple, large, bell-ſhaped; peduncles from three to ſix-flowered, generally longer than the petioles, cylindrical, divided above the middle, and furniſhed at the diviſions with ſmall awl-ſhaped bractes; calyx-leaves egg-ſhaped, ſlightly mucronate. *Capſules* roundiſh. *Seeds* four A native of the Iſle of France, and of the Eaſt Indies. 159. C. *Pes capræ*. Linn. Sp. Pl. 40. Mart. 62. Willd. 113. (C. maritimus β.; Deſr. Lam. Ipomæa biloba; Forſk. C. maritimus zeylanicus; Herm. lugdb. 174. tab. 175. C. marinus; Rumph. Amb. 5. 433. tab. 159. C. maritimus ſive Soldanella è Maderaſpatan; Pluk. phyt. tab. 24. fig. 4. Schovanna-adambœ; Rheed. Mal. 11. 17. tab. 57.) "Leaves deeply emarginate, creſcent-ſhaped, truncate at the baſe; peduncles often one-flowered." *Root* annual. *Stem* ſomewhat ſhrubby, procumbent, creeping, a little villous, red. *Leaves* thick, tomentous. *Flowers* purpliſh. A native of the Eaſt Indies, China, Cochinchina, and the eaſtern coaſt of Africa. 160. C. *braſilienſis*. Linn. Sp. Pl. 41. Mart. 63. Willd. 114. (C. maritimus γ. Deſr. Lam. C. maritimus; Brown. Jam. C. marinus; Plum. Amer. 89. tab. 104. Marcgr. braſ. 51. Piſ. braſ. 258.) "Leaves ſlightly emarginate, roundiſh, egg-ſhaped, often three-flowered." *Stems* perennial, and trailing to a great diſtance. *Leaves* larger than thoſe of the laſt two ſpecies; petioles marked near the leaf with two red ſpots. *Flowers* large, purple; peduncles long. *Capſules* large, three-celled. *Seeds* one in each cell. Whole plant milky and a ſtrong purgative. A native of the coaſt of Brazil, and of the Straits of Magellan. 161. C. *multifidus*. Willd. 115. Thunb. prod. 35. "Leaves palmate; lobes ſeven, linear, entire; peduncles one-flowered; ſtem decumbent." A native of the Cape of Good Hope. 162. C. *ſublobatus*. Linn. jun. Sup. 135. Deſr. 55. Lam. 2054. Willd. 116. "Stem procumbent; upper leaves repand-toothed at the tip; flowers capitate." *Root* annual. *Leaves* a little villous; lower ones heart-ſhaped; upper ones repand and almoſt lobed. *Flowers* aggregate, three together, ſeſſile, parallel, with a ſix-leaved involucrum. *Flowers* large. A native of the Eaſt Indies. 163. C. *capenſis*. Willd. 117. Thunb. prod. 35. "Leaves haſtate; lobes ſemibifid; peduncles about two-flowered; ſtem decumbent, villous." A native of the Cape of Good Hope. 164. C. *ſagittatus*. Willd. 118. Thunb. prod. 35. "Leaves haſtate and arrow-ſhaped; peduncles one-flowered; ſtems proſtrate." A native of the Cape of Good Hope. 165. C. *littoralis*. Linn. Sp. Pl. 42. Mart. 65. Deſr. 28. Lam. 2027. Willd. 119. (C. albus, folio laciniato, maritimus, Plum. Cat. 1. Burm. Amer. 79. tab. 90. fig. 2. Tourn. 84.) "Leaves oblong, lobate-palmate; peduncles one-flowered; ſtem creeping." *Stems* very long, much branched, nearly the thickneſs of a gooſe-quill, white, tender, creeping and taking root. *Leaves* a little larger than the palm of the hand, palmate

palmate in the likenefs of a duck's foot, flefhy, tender, bright green, nerved, on longifh petioles. *Flowers* large, white; peduncles axillary, folitary, rarely two flowered, fhorter than the leaves; corolla campanulate; border fpreading, flightly cut. *Capfule* villous, filky white. A native of the Weft Indies. 166. C. *martinicenfis*. Mart 42. Defr. 29. Lam. 2028. Jacq. Amer. 26, tab. 17. pict. 19. tab. 24. "Leaves elliptical, fmooth; peduncles one-flowered, longer than the leaf; ftem creeping." *Stems* cylindrical, fmooth. *Leaves* alternate, obtufe, mucronate by the projection of the middle nerve, entire, petioled. *Flowers* white; peduncles axillary, folitary, with two fmall bractes near the top; three outer calyx-leaves large, egg-fhaped, acute, lax; two inner ones fmaller, lanceolate, acuminate. A native of Martinico.

Convolvulus *americanus fubrotundis foliis*; Pluk. See Ipomæa *bona nox*.

Convolvulus *americanus madjuccæ folio*; Pluk. See Ipomæa *tuberofa*.

Convolvulus *brafilianus*; Rai. See Cissampelus *Pareira*.

Convolvulus *coccineus*; Plum. See Ipomæa *coccinea*.

Convolvulus *filiformis*; Defr. Lam. See Ipomæa *filiformis*.

Convolvulus *fœtidus*; Rumph. See Pæderia *fœtida*.

Convolvulus *foliis cordatis*; Linn. Hort. Cliff. See Ipomæa *bona nox*.

Convolvulus *herbaceus erectus foliis linearibus*; Brown. See Evolvulus *linifolius*.

Convolvulus *herbaceus erectus foliis linearibus fubhirfutus*; Brown. See Evolvulus *fericeus*.

Convolvulus *indicus villofus*; Herm. See Ipomæa *hepatici folio*.

Convolvulus *linifolius*; Kniph. See Evolvulus *linifolius*.

Convolvulus *major heptaphyllus*; Sloan. See Ipomæa *tuberofa*.

Convolvulus *minor pentaphyllus*; Catefb. See Ipomæa *Carolinus*.

Convolvulus *minor repens nummulariæ folio*; Sloan. See Evolvulus *nummularius*.

Convolvulus *minor femine triangulo*; C. Bauh. See Polygonum *Convolvulus*.

Convolvulus *nigrum*; Dod. See Polygonum *Convolvulus*.

Convolvulus *pinnatus*; Defr. See Ipomæa *pinnata*.

Convolvulus *repandus*; Defr. Lam. See Ipomæa *repanda*.

Convolvulus *ftellatus*; Dill. See Ipomæa *lacunofa*.

Convolvulus *zeylanicus*, *Pes trigrinus*; Herm. See Ipomæa *Pes tigridis*

Obf. It is not eafy, perhaps not poffible, to draw a decifive line of feparation between convolvulus and ipomæa. Tournefort attributed a bell fhaped corolla to the former; and a funnel-fhaped one to the latter, under the name of Quamoclit taken up from Clufius, and of which he knew only one fpecies; but thefe characters were foon abandoned. Linnæus, Schreber, Willdenow, and La Marck, have affigned a two-celled capfule and a bifid ftigma to convolvulus, and a three-celled capfule to ipomæa, but this diftinction has alfo been found inconvenient in practice. Gærtner places under convolvulus all the fpecies which have a proper capfule, whatever be the number of its cells; and confines the genus ipomæa to fuch as have a valvelefs berry, with four, or by abortion, two fingle-feeded cells; a diftinction which excludes all the fpecies of the latter, except bona nox and zeylanica. Unable to come to a fatisfactory determination amidft this difcordance of opinion, and unwilling to increafe a genus already embarraffingly large, we have made no alteration in the general diftribution adopted by Linnæus and his followers: and have attempted to conftruct the genuine and effential characters of convolvulus fo as to include all the prefent received fpecies.

Convolvulus, in *Rural Economy*. See Bind-weed and Weed.

CONVOLUTION, a winding or turning motion, proper to the trunks of fome plants; as the *convolvuli*, or bind-weeds, and the clafpers of vines, and briony.

Dr. Grew thinks, that all thofe plants whofe roots are twifted, have fuch a *convolution*: and he affigns two great efficient caufes of this winding motion, the fun and the moon. It is very eafy to try whether there be any fuch convolution or not in the trunks of plants; which may be done, as he hints, by tying a little bit of paper to any of the branches which are exactly north, fouth, &c. and then feeing whether it will change its pofition or not, in refpect of the point of the compafs.

CONVOY, from the French *convoyer*, *to conduct*, *efcort*; in *Maritime Language*, fignifies one or more veffels of war, entrufted with the conduct of a fleet of merchants; ferving as a watch; and a fhelter from the infults of the enemies of the ftate to which they belong, or of pirates.

Convoy, in *Mechanics*, denotes a brake, gripe, or regulator for moderating the velocity of tram or rail-way waggons on fteep parts of their defcents: in fome inftances waggons heavily laden with coals, lime-ftone, &c. defcend for confiderable diftances on fteep rail-ways, without horfes, and regulated only by a man who rides behind them aftride upon the convoy; as from Whibfey-flack to the Bradford-canal in the Weft-riding of Yorkfhire, and other places. Horfes are ufed to drag the empty waggons up the hill again. See our articles Canal and Rail-way.

On fome rail-ways, where the trade is a defcending one, and the declivity in fome places 12 to 16 inches in a chain, the horfes, in holding back to moderate the velocity of the trams, are very liable to be thrown down and much injured, and even killed by the momentum of the trams; for obviating this evil, Mr. Charles Le Caan contrived a convoy, check, or ftop, a model and defcription of which he prefented to the Society of Arts in 1805, (fee Tranfactions, Soc. Arts, xxiii. 316.) in which the convoy, in form of circular wedges, to act before the front wheels of the trams, is fufpended by chains from the fhafts by which the horfe draws the tram, fo as to caufe no impediment to the motion of the wheels, as long as the horfe is on his legs, and the fhafts nearly in an horizontal pofition; but in cafe of the horfe falling, and the fhafts by that means declining downwards, the convoy inftantly drops and ftops the further progrefs of the wheels on the tram-plates; other kinds of convoys and flippers are defcribed in our article Canal.

In 1805, Mr. F. D. Walker applied a fimilar principle to that of Mr. Le Caan's convoy, to the fhafts of a four-wheeled carriage called a fociable; which convoy, on being let down by means of a pedal acted on by the coachman's foot, checked the motion of the four wheels in defcending fteep hills, and greatly fecured the carriage and paffengers from injury by runaway horfes: for two years this contrivance has been ufed with perfect fuccefs by Mr. Walker, in frequently defcending very fteep hills, without locking the wheels.

Convoy, in *Military Language*, denotes fome fuccour or fupply of men, money, ammunition, provifions, ftores, &c. conveyed in time of war by land or water, to a town or an army. A body of men, that marches to protect any thing, and prevent it from falling into the hands of an enemy,

enemy, is alfo called a *convoy*. An officer, who has the command of a convoy, fhould take all poffible precautions for its fecurity, and fhould endeavour, before it marches, or fets out, to procure good intelligence concerning the enemy's out parties. And as the commanding officer of the place, from which the convoy is to fet out, and thofe of fuch other places, by which it is to pafs, are the moft proper perfons for him to apply to for affiftance, he fhould take fuch meafures as will enable him to keep up a conftant intercourfe with them. The conducting of a convoy is one of the moft important and moft difficult of all military operations. The ftrength of the detachment employed to efcort a convoy fhould have a reference to the importance of the convoy itfelf. For there are cafes when the efcort fhould be commanded by an able and experienced general.

When it may be neceffary to pafs the night in the open fields, the cuftom is to empark, that is, to form a clofe with the waggons, for the troops to fleep in, and this is a good precaution againft any unexpected attempt of the enemy to furprife them. But if they fhould find themfelves on the point of being attacked during the march, urgent neceffity alone fhould conftrain them to adopt this method; and efpecially the confideration of their being very inferior to the enemy, fince they would thus tie up their own hands and render it impoffible for themfelves not to furrender, in cafe it fhould happen that they were not feafonably relieved. When the convoy is confiderable; when it is to pafs between places in the hands of the enemy; and when it runs any rifk of being attacked; it ought to have a large efcort, which is to be difpofed in fuch a manner as to cover the convoy, inftead of being covered by it. And as foon as the commanding officer hears of the enemy's being at hand, he is to leave a few detachments to accompany the waggons, and fave them from fuch of the enemy's parties as might attempt to turn them into a wrong road, or break their chain; and affembling the reft of his troops, infantry as well as cavalry, feize the moft favourable poft within his power, to ftop the enemy, or fight him, if he cannot avoid it. In the mean time, the convoy is to make the beft of its way, and to get as far from the danger as poffible. Should the troops, at any time, think it proper to cover themfelves with the waggons of a convoy, they fhould be made to march in two columns, at a fmall diftance afunder; and if the files fhould prove too long in two columns, they muft be formed into three or four. In this difpofition, which, however, the ground will not always allow of, as foon as the enemy is obferved to be preparing for a ferious attack, the horfes are to be immediately unharneffed, and removed, not only that the waggons may be brought more clofely together, fo as to form a rampart, but to fave the horfes, of which, otherwife, fo many might be loft, as to render it neceffary, even after repulling the enemy, to abandon part of the convoy. This muft alfo be the cafe, if the troops fhould be ftopped, and obliged to fight in their march, as it would be impoffible that feveral horfes fhould not be maimed or killed. It appears, therefore, that, in order to fave a convoy, the troops fhould not think of covering themfelves with it. If at any time a retreat fhould be neceffary with a great number of baggage waggons, the retreating troops fhould not think fo much of the protection they might afford, as the embarraffments they muft create. The 10,000 Greeks rid themfelves of theirs; and, confining themfelves to fome beafts of burden, took the refolution of fighting, uncovered. Moreover, regard fhould be had to the country which the troops are to traverfe, and the kind of enemy with which they have to contend. If the country is an extenfive plain, and the enemy very ftrong in cavalry, like the Turks, the waggons may prove of great fervice; befides thofe for the baggage, which in cafes of neceffity may be ufed for that purpofe, the army fhould provide itfelf with fome of thofe belonging to the inhabitants, to carry the chevaux-de-frife, and the fick and wounded.

CONVOY, *Order of*, in *Naval Tactics*, denotes that which a fleet holds in making a ftraight courfe; the fhips being all in the wake of one another, fteering on the fame point of the compafs, and forming a right line. This order, according to M. Bourdé de Villehuet, is the moft fimple, and the only one a fleet ought to be in at all times, for the following reafons:—it is eafily preferved; it cannot be difcompofed in 20 out of the 32 fhifts of wind, and is eafily reformed in the 12 other changes; and it is eafy to pafs from that order to thofe that are proper for the fecurity of a fleet, in all poffible cafes, either to preferve one's felf, to attack, or to defend. If the fleet be numerous, the fhips are to be arranged parallel to one another, that of the admiral occupying the middle, and fteering all three the fame courfe.

To form the order of convoy in one line. When the fleet is in no particular order of failing, the leading fhip is to veer fufficiently for the others to get in her wake, and fteer the fame courfe fhe holds. The commanding officer generally takes this poft, when the fquadron is not numerous. That the order may be the fooner formed, every fhip of the fleet or fquadron fhould chafe at the fame time that which is to be a-head of her in the line, taking care to manœuvre in fuch a manner as to avoid running foul of thofe which crofs her fore-foot in endeavouring to join their leaders in the line. Therefore, fuch fhips as are to leeward of others fhould take care not to perfift obftinately in weathering them; but they muft back, or go a-ftern if neceffary, by keeping away a little more. Such as fhould already be in the column, and are to be more a-ftern, muft bring to till they are in their pofts, or ftand on under a very eafy fail, that each fhip may contribute to the celerity of forming the order.

To form the order of convoy in three columns. The leaders of each of the three divifions are to place themfelves in a line right a-breaft of one another; and at a proper diftance between themfelves, according to the length of the columns, which will accelerate the difpofition. Then every fhip of each particular fquadron, chafing that which is to be next a-head of her, will come and take their ftation a-ftern of one another at the rear of the leading fhip of the divifion, and fteer directly after her. This order, which in practice is eafily maintained, has the advantage of keeping the fleet clofe and connected, without caufing any delay in its progrefs. The beft failors can regulate their velocity by that of thofe which are inferior to them in failing; and thefe, on the other hand, may, with a little attention, carry as much fail as the weather will admit, by which means all imaginable courfes may, without breaking, be fteered.

To change from the order of convoy, in one line, to the order of battle, continuing on the fame tack. The headmoft fhip is to haul clofe by the wind on the fame tack, and the reft of the fleet are to make the fame movement in fucceffion, fteering the proper diftances from each other.

To change from the order of convoy, in one line, to that of battte on the other tack. The headmoft fhip is to veer and to come to the wind on the other tack; then all the veffels of the fleet are to perform the fame manœuvre in fucceffion. Otherwife, after having formed the order of battle on the fame tack, as before, the van-fhip is to tack; and all the fhips of the fleet are to follow in fucceffion, to form the order of battle on the other tack. Or, if you are fteering a

 courfe

courſe in the order of convoy, 4 points large, the order of battle on the other tack may be formed at once, by all the ſhips veering or ſtaying together.

To change from the order of convoy, in three columns, to the order of battle on the ſame tack. If the fleet has the wind on the beam, or between cloſe-hauled and eight points large, (See *Plate* I. *Naval Tactics, fig.* 1) the ſhips of the lee-column are all to bring to at the ſame time. The other two columns ſtand on. When the leader of the weather-column brings the lee leader to bear on the cloſe-hauled line, he tacks, and is followed in ſucceſſion. The centre-column does the ſame. But as the weather-column has a greater diſtance to run, it muſt make all poſſible ſail, while the centre-column need not make ſo much; becauſe the centre-column is not to begin to haul its wind till the centre-ſhip of the weather-column has got on the cloſe-hauled line. The lee-column is to follow in the ſame manner, when the centre-ſhip of the centre-column is cloſe by the wind.

If the wind be more than eight points, or right aft, (*fig.* 2.); the column which is to form the van-guard in the order of battle is inſtantly to haul its wind in ſucceſſion, with all ſails ſet; while the two others, continuing their courſe, will put themſelves ſucceſſively by the wind, on the cloſe-hauled line upon which the order of battle is to be formed, and conſequently in the wake of the weather-column.

If the columns be cloſe on a wind, it then becomes a caſe within the uſual fifth order of ſailing. See *Order of* Sailing.

To change from the order of convoy, in three columns, to the order of battle on the other tack. The fleet may be put firſt in order of battle, on the ſame tack; then, making the ſhips tack in ſucceſſion, they will be in order of battle on the other tack. But the time of evolution may be diminiſhed, (*fig.* 3.) by making the two weather-columns bring to, when ſailing between cloſe-hauled and eight points large, while the ſhips of the lee-column veer in ſucceſſion, and keep their wind on the other tack. The centre-ſhip of the lee-column having veered, the centre-column is to fill, the leader of which bears away, running exactly with the wind right-aft, and is followed in ſucceſſion by the ſhips of his diviſion, till they are in the wake of the lee-column, then on the other tack; when the leader of the centre-column hauls by the wind, the ſhips of his diviſion hauling in ſucceſſion. When the centre-ſhip of the centre-column has bore away, the weather ſquadron manœuvres in the ſame manner, and thereby completes the order of battle.

To change from the order of convoy to that of retreat. Whether the fleet be the order of convoy in one line or in three columns, they are firſt to form in the order of battle on the ſame tack; and thence they are to paſs to the order of retreat. See *Order of* Sailing.

To change from the order of battle to the order of convoy, in one line, on the ſame tack. The van-ſhip is to bear away as far as the intended courſe, and the reſt are to execute the ſame manœuvre in ſucceſſion; ſo that when the rear-ſhip ſhall have made the ſame movement, the evolution will be completed, and the order of convoy formed on the ſame tack.

To change from the order of battle to the order of convoy, in one line, on the other tack. The van-ſhip is to tack and run one point large, till ſhe can bear away, under the ſtern of the rear-ſhip, as far as the courſe which the fleet is to hold. All the ſhips are to perform the ſame manœuvre at the ſame points, to change the order and get upon the other tack. The van-ſhip, inſtead of tacking, may veer and run a little time before the wind, before getting on the other tack; then ſhe will heave to the wind on the fleet's courſe, without fear of breaking through the rear. This movement is ſhorter and preferable, ſince the order of convoy is never held to keep by the wind.

To change from the order of battle to the order of convoy, in three columns, on the ſame tack. The three leaders of the columns are to bear away together, and ſteer on the intended courſe; then the ſhips of each ſquadron are to execute the ſame manœuvre in ſucceſſion, following the ſame direction; ſo that the three rear-ſhips, veering at the ſame time in the wake of their reſpective columns, will compleat the evolution. The columns will find themſelves too diſtant from each other; but, as there is nothing which diſturbs them, and they have the wind right-aft or very large, it will be eaſy for them to cloſe as much as may be neceſſary.

To change from the line of battle to the order of convoy, in three columns, on the other tack. The three leading ſhips of the columns are to heave in ſtays at the ſame time, and bear away on the perpendicular of the wind on the other tack; then the ſhips of each ſquadron are to perform the ſame manœuvre in ſucceſſion; and when the rear-ſhips ſhall have turned about and be in a line with their reſpective columns, and the leaders of the weather-diviſions ſhall, by crowding all the ſails, have come a-breaſt of the van-ſhip of the lee ſquadron, the evolution will be compleated. If the fleet is to ſteer more large than the perpendicular to the wind, it will be eaſily formed, by making the leaders and their columns bear away in ſucceſſion, then putting afterwards the columns at the neceſſary diſtance from each other.

To change from the order of retreat to the order of convoy, in one line. One of the wings is to haul together cloſe by the wind, on the ſame tack as the line of bearing on which they are formed, in order to bear away in ſucceſſion at the point of the angle, in the wake of the other wing; the ſhips of which are to run with the wind four points large, on their line of bearing; and, when the laſt ſhip of the weather-wing is in the wake of her line, the order of convoy is formed. If it be neceſſary to ſail more large, or if you would not keep away ſo much, the ſame ſhips may keep their wind more, and follow the van-ſhip in ſucceſſion.

To change from the order of retreat to the order of convoy, in three columns. Firſt form the order of battle, and paſs from that to the order of convoy, in three columns.

To reſtore the order of convoy in one line, when the wind comes a-head more than cloſe-hauled. The order of convoy, it is plain, cannot be diſturbed by all the ſhifts of wind as long as it is more abaft than the ſtarboard and larboard lines of bearing; becauſe the ſhips, ſteering large in the wake of each other, can eaſily maintain their poſts, having only their ſails to trim, whether the fleet be in one line or in ſeveral columns. But if the wind draws more a-head than one of the lines above-mentioned, it is evident that the ſhips being obliged to veer, or pay off, all at the ſame time, on the ſame tack, the order will be diſturbed. In order to reſtore it on the ſame tack, when the fleet is in one line in the order of convoy; if we ſuppoſe the fleet ſteering large on the ſtarboard tack, and the wind comes ſuddenly right a-head, which would throw all the ſails flat a-back on their maſts, the van-ſhip is to caſt inſtantly to port, and bring to on the ſtarboard tack, while all the other ſhips of the fleet are to box off, together and at the ſame time, to ſtarboard, and make all ſail, in order to come with celerity cloſe by the wind on the larboard tack, and get into the wake of the van-ſhip, then to tack and take their ſtations ſucceſſively, under an eaſy ſail, and bringing to likewiſe till the rear-ſhip, which has a good way to run, be in her poſt. If you ſhould wiſh to get on the other tack, then the van-ſhip is to caſt to ſtarboard,

ſtarboard, to bring to on the larboard tack by the wind; then the reſt of the fleet would caſt the other way, to tack afterwards ſucceſſively in the wake of the ſhip which lies to, and take their ſtation there, as has been ſaid before, with this difference, that, after the reſtoring of the order, you would find yourſelf on the larboard tack. If the ſudden ſhift of wind be not quite a-head, or if it be ſix points, or between ſix and twelve, the van-ſhip is, nevertheleſs, to bring to on one tack, while the reſt of the fleet, caſting on the ſtarboard, make all ſail to gain her wake, to tack there, and thus regain their ſtations. The order of convoy may be reſtored by a ſhorter and more ſimple method, which, however, will cauſe the fleet to drop to leeward more than the former does. In the ſame caſe as the laſt, when the wind comes right a-head, the whole fleet is to pay off on the ſame tack, if the ſhips are all on one line, and the rear-ſhip muſt bring to, while the reſt of the ſhips running five points large (if the wind has ſhifted ſix points beyond the direction of cloſe-hauled), will come and bring to ſucceſſively a-head of the van-ſhip, on that line of bearing which they are to hold, obſerving that ſuch ſhips are to carry a greater and proportionable preſs of ſail, as, being nearer the van-ſhip, they have conſequently more way to run before they can regain their poſts. To know how many points or degrees the weather-ſhips have to run large to get into their ſtations, add eight points or 90 degrees to the half of the points or degrees the wind has ſhifted beyond one of the two lines of bearing; and, in regaining your poſts, you will have the number of points by which you differ from the firſt courſe you ſteered.

To reſtore the order of convoy, in three columns, when diſturbed by a ſudden ſhift of wind right a-head. In this caſe, the whole fleet muſt caſt the ſame way all together, leaving the three van-ſhips of the columns lying to, cloſe to the wind on the tack on which you purpoſe to continue cloſe-hauled, while the ſhips of the three columns running large all together on a courſe (to leeward of the firſt), which muſt always be determined by half the number of points or degrees the wind has ſhifted beyond the direction of cloſe-hauled, added to eight points or 90 degrees, will bear away with care for their ſtations in the cloſe-hauled line of bearing, which they are to hold to the windward ſide of their rear-ſhip, where they will arrive ſucceſſively, by carrying more ſail according as they may be nearer to the van, becauſe in that caſe they have a greater diſtance to run.

We ſhall cloſe this article with ſome remarks on *the convoy of merchant ſhips, under the protection of men of war.* For the due care of a large fleet, the convoy ſhould have a number of frigates, diſtributed a-head, a-ſtern, and on the wings of the fleet, which is always to be kept in the order of convoy, on three, four, five, or ſix columns, according to the number of which it is compoſed; ſome other frigates are alſo to be ſent on the look-out, to deſcry what paſſes at a diſtance, and to give timely warning of the approach of the enemy. If theſe ſhould diſcover an enemy of ſuperior force, they ſhould make it anſwer by ſignal; and it may be adviſable that they ſhould ſteer a different courſe from that of the fleet, in order to deceive the hoſtile ſhips in ſight. The men of war are to hold themſelves in the order of convoy a little a-head, and to windward of the weather-column of the fleet; becauſe they will then be able readily to attend wherever their preſence may be neceſſary; the frigates will, with alacrity and exactneſs, repeat their ſignals from one to another, that their purport may be expeditiouſly known to the commanding officer, who muſt not neglect to have all ſuſpected and neutral ſhips chaſed, and even ſtopped by the frigates, which are always to be ſupported by one or two line-of-battle ſhips, according to the exigency of circumſtances. The progreſs of the whole fleet will be regulated by that of the worſt going ſhips; which, however, are to be abandoned, when found to cauſe too great loſs of time; for to riſk a ſmall and partial loſs, is better than to expoſe the whole fleet by delay. Between the columns, there ſhould be ſloops of war and other ſwift ſailing light veſſels, to maintain order, and keep the ſhips in their ſtations. Their particular buſineſs will be to make the tardy ſhips to ſail with greater expedition, to oblige thoſe ſhips that are out of their poſt to reſume it, and in the evening to give an account to the frigates, having charge of going the round, of thoſe which have not manœuvred well; and theſe will make their report to the commodore.

During the night, the ſame order will be obſerved, except with reſpect to the look-out frigates, which are to be called in within a certain diſtance of the fleet, and which are to be allowed lights as well as the reſt of the men of war. They are to take ſpecial care to oblige all ſtraggling ſhips to return to the convoy, and to fire, without heſitation, on all ſtrange veſſels coming from the main ſea, in order to give the alarm. Every night they are to be ſupported on the wings by ſome line-of-battle ſhips. Elements and Practice of Rigging and Seamanſhip, vol. ii. pt. 2.

CONUS, in *Conchology*, a genus in the Linnæan ſyſtem, diſtinguiſhed by that writer as having the ſhell univalve, convoluted, and turbinated; aperture effuſe, longitudinal, linear, without teeth, and entire at the baſe; piliar ſmooth. Animal a limax.

Species.

* Section *truncati*, ſpire nearly truncated.

Marmoreus. Shell conic, brown with ovate white ſpots; whorls of the ſpire canaliculated. Linn.

Inhabits the Aſiatic and American ſeas, and comprehends ſeveral diſtinct varieties. The ſhell is finely ſtriated, and varies from fulvous to blackiſh; the ſpots are often of triangular ſhape, and running into bands; whorls emarginate, and armed with ſpinous tubercles.

Imperialis. Shell whitiſh with longitudinal livid bands, and narrow belts compoſed of brown and white. Linn. *Kroonhoorn*, Rumpf. *Corona imperialis*, Argenv.

A ſcarce ſpecies. The ſhell is generally marked with two yellowiſh bands. Suppoſed to be from the Eaſt Indies.

Litteratus. Shell conic, white with brown dots. Linn. *Voluta muſicalis*, Rumpf.

Inhabits the Aſiatic ocean, and varies from white to reddiſh, or yellowiſh; the ſpots or dots are uſually of a ſomewhat quadrangular form diſpoſed in rows, between which are a few pale yellow bands or cheſnut coloured lines; the ſpire is ſtriped with brown.

Generalis. Shell conic, poliſhed, ſpire flat and muricated; whorls canaliculated. Gmel.

A native of India. The colour of this ſhell varies from brown to yellow or orange, and is encircled with two, three, or four bands, marked with elongated ſpots; ſpire whitiſh, varied with undulated ſtripes, and pointed in the middle.

Virgo. Shell conic, with the baſe blueiſh. Linn.

Several varieties of this African ſpecies are deſcribed by Knorr, Liſter, and Chemnitz, from which it appears this ſhell varies from white to yellow, or yellowiſh, and is ſometimes teſſellated with white and red, or white with a ſtraw-coloured band; ſpire blue, or white marked with an ochraceous band.

Capitaneus. Shell conic, glabrous, with the baſe brown; ſpire a little convex. Linn.

 Few

Few diſtinct varieties of this ſpecies are deſcribed by Gualtieri, Bonanni, Favanne, and other writers. It is a native of Africa, and is commonly either of an olive, brown, or cheſnut, or varied with thoſe colours, and marked with one or two white bands, undulated ſpots, and numerous rows of dots; ſpire in general ſtriped. This is an Aſiatic ſhell.

Tribunus. Shell white, with three yellowiſh bands, ſpotted with cheſnut; ſpire a little convex; and the baſe tranverſely ſtriated. Gmel.

Deſcribed on the authority of Martini, who has given a figure of it in his work on Conchology; its native country is unknown. The ſhell is marked with a few waved cheſnut lines.

Miles. Shell conic, rough, with the baſe brown; ſpire convex. Gmel. *Pſeudo-archithalaſſus*, Argenv.

This ſhell is a native of India, and is of a white or yellowiſh colour, with longitudinal undulated lines, the baſe tranſverſely ſtriated, near the ſpire a brown band, the ſpire itſelf ſpotted with brown.

Cingulum. Shell conic, yellowiſh, with a ſingle elevated belt in the middle; ſpire acute. Gmel.

Inhabits the Friendly Iſles.

** Section *Pyriformes*, &c. Pyriform with a rounded baſe, the cylinder half as long again as the ſpire.

Princeps. Shell yellow, with purpliſh-brown longitudinal ramoſe lines. Linn.

Length of this ſhell about two inches and a half; the ſpire is obtuſe and finely ſtriated tranſverſely; the body marked with two white bands which have a few brown ſpots, the reſt of the ſhell ſpotted with cheſnut. Inhabits the Indies.

Ammiralis. Shell with rough punctures at the baſe. Linn.

The varieties of this ſpecies, according to the character aſſigned it by Linnæus, are numerous beyond example in any other ſhell, amounting to nearly forty diſtinct kinds, independently of a much greater number not hitherto well defined. Among the principal varieties the following are moſt intereſting.

Larvatus, faſciis nullis, &c. Without bands, figured by Martini.

Americanus, with irregular bands, and admitting of ſeveral varieties, as thoſe having the ſhell brown, and clouded or ſpotted with white. Shell reticulated and clouded with cheſnut; white, ſpotted, dotted, and clouded with brown; white, having the bands marked with orange lines. Another ſtrong variety *anglicus*, figured in the work of Gualtieri, is of a red colour marked with numerous punctured white belts, and has the ſpire ſpotted with brown. The variety *coronatus*, deſcribed by Argenville, is diſtinguiſhed by a belt of reddiſh dots, and tranſverſe elevated lines, and is ſometimes marked with a yellow band in the middle, and numerous punctured belts; or ſometimes brown with a white band, and an oblique row of whitiſh ſpots. *Regius* has two bands, which are generally of an orange colour with darker lines, the interſtices white; ſhell with orange dots and undulated ſpots. Martini figures a variety of this kind, the ſhell of which is white with waved brown ſpots, and the bands varied white and brown; another has the bands yellowiſh with trifarious brown lines, and the ſhell white ſtriated with brown; and a third variety has the ſhell clouded white and brown, and the bands of a brown colour. In *ordinarius* the ſhell is teſtaceous ſpotted with white, the bands white, and ſomewhat reticulated with an articulated belt in the middle. *Guineenſis* has the ſhell of a ſtraw colour, the middle band marked with angulated lines in a very beautiful manner. The ſhell of the variety *ſurinamenſis* is of a bay colour with numerous dotted belts, the bands ſpotted and the lower one dotted with brown and white. This kind includes ſeveral inferior varieties. The variety *ſummus* has the ſhell of a ferruginous colour with ſcattered white ſpots, and is marked with yellow bands, very finely reticulated; it varies in the number of the regular bands. *Occidentalis* is another ſtrong variety; the ſhell teſtaceous ſpotted with white, and an articulated belt; bands yellow and reticulated. The laſt and principal variety of the conus princeps is the *cedo-nulli*, a ſhell found in the South Seas in amazing variety, ſome kinds of which are however extremely beautiful and rare, and in high eſteem with amateurs. The *geographic* cedo-nulli is a fine and valuable kind, the prevailing colour of which is white, marbled with orange in a map-like manner. Another kind, called the "king of the ſouth," (*Roi du Sud*, Argenv.) is of a fine deep golden orange with a white belt, and ſeveral diſtinct circles compoſed of clear white ſpots, three of which circles are diſpoſed between the belt and the ſpire. Before the revolution in France there were three ſpecimens of this kind known in the cabinets of Paris; one in that of Madame la Preſidente de Banderille, another in that of the king, and the third, ſuperior in perfection to either, in the poſſeſſion of M. le Comte de la Tour d'Auvergne, which laſt was obtained from the Iſle of France, and was known by the title of *Le Cedo-nulli aux iſles*. But the *banded cedo-nulli* bears the higheſt value. This ſhell, called by the French *cedo-nulli a bandes*, or by ſome more emphatically *la reine du midi*, is better known in England by the name of Lyonet's cedo-nulli; it was formerly treaſured in the cabinet of that diſtinguiſhed amateur, and eſtimated at a conſiderable price, the ſum of one hundred pounds ſterling being actually refuſed by its poſſeſſor, who was nevertheleſs diſpoſed to part with it at a fair valuation. Lyonet was an ingenious naturaliſt reſident at the Hague, and, according to popular report, obtained this ſhell from the cabinet of M. de la Faille, auditor of finances to the ſtates general of Holland, at the death of that eminent collector.

A particular account of this curious ſhell is given by Argenville, who pronounces it unique; this author deſcribes it from a drawing made under the immediate inſpection of Lyonet, the original of which we have ſeen, and are ſatisfied in the accuracy of his deſcription. The ſhell from this drawing appears to be very elegant; its ſize is about that of the other varieties of the cedo-nulli, which vary from an inch and an half to an inch and three quarters in length, and meaſure rather more than three quarters of an inch in the wideſt part. The colour is yellow, divided by four diſtinct bands of marbled white, the one of which acroſs the middle of the ſhell, and another next the baſe of the ſpire, are the broadeſt and moſt beautifully variegated: the ſpire itſelf is faſciated longitudinally. At the firſt glance the yellow appears two principal bands of pretty conſiderable breadth, one above and the other below the band of marbled white which encircles the middle of the ſhell. The two laſt-mentioned yellow bands are beſet with four equi-diſtant tranſverſe ſtriæ of little prominent dots, which give the ſhell in this part a ſlightly ſcabrous appearance.

It is only in conformity with popular report, that the ſhell of Lyonet, as before intimated, is preſumed to be the celebrated cedo-nulli of La Faille's cabinet, the truth of which has been conteſted by reſpectable authority. Favanne thinks

thinks it is not the fame, and Gerfaint pofitively declares it is not. The individual fhell of fo much repute in the collection of La Faille, according to the latter writers, was fold at the fame time, with the other articles, at the Hague, about the year 1728, and was bought by a dealer for the king of Portugal's cabinet, at a price exceeding a thoufand French livres. Hence it is imagined that Lyonet procured his famous fhell from fome other fource. If we are not miftaken in our information, there were originally two fhells of this fame kind in the cabinet of La Faille, who prefented Lyonet with one of them, and which, if true, at once refolves the myftery. The fate of Lyonet's fhell is not exactly known; it is believed, at prefent, to enrich one of the Parifian mufeums.

We fhall laftly mention a variety of the cedo-nulli, formerly in the rich cabinet of Madame de Bandeville, called *le cedo-nulli marbré*, from the beautiful variegated or marble-like appearance of its colours, which were blueifh and violet on a ground of white. The fhell was alfo embellifhed with three yellowifh zones, and befet with a number of little roundifh granulations of a white colour encircled with red.

Vicarius. Shell teftaceous, fpotted with white, with four yellow immaculate bands, the fecond divided angularly. Gmel. *Archithalaffus fecundus*, Argenv.

Said to inhabit the fouthern ocean.

Senator. Shell conic, fmooth, glabrous with obtufe fculptured whorls. Martini.

Native place unknown; the fhell is yellow fpotted with white, and marked with very numerous tranfverfe ftriæ, compofed of white and brown dots.

Nobilis. Shell fub-cylindrical, fmooth and glabrous. Linn. *Tigris lutea*, Argenv.

This fpecies is finely polifhed, of a yellow or brown colour, occafionally fhaded with olivaceous, fpotted with white, and marked with very minutely punctured tranfverfe ftriæ.

Genuanus. Shell with linear belts articulated with white and brown. Linn. *Genefefche Toot*, Rumpf. *Jamar*, Adanf.

Found on the fhores of Guinea. The fhell is red, with bands alternately teffelated with brown and red. The "*A la papilionis*" of Argenville, called alfo by Englifh collectors the butterfly cone, is confidered as a variety of this fpecies.

Glaucus. Shell emarginate at the bafe, and ftriated; fpire unarmed, with the whorls contiguous. Linn. Botervegie van Boer. Rumpf.

A native of India and Africa. The fhell is varied with brown, chefnut, and red fpots, fometimes placed in rows, and the fpire, which is tranfverfely ftriated, varies in being more or lefs convex, and marked with fpots, which are fometimes fquare.

Monachus. Shell gibbous, clouded with blueifh brown, acute, and ftriated at the bafe. Linn. *Capucinus f. anicula*, Rumpf.

Suppofed to be a native of India. Shell fometimes marked with dots difpofed in rows.

Minimus. Shell greyifh, furrounded with oblong dots. Linn.

Delineated in the works of Martini and Knorr; the native country unknown.

Rusticus. Shell ovate, rugged, and muricated at the bafe; the fpire conico-convex. Linn.

There are two varieties of this fpecies, one of which, *voluta cinerea* of Rumpfius, is without any band, the other has a band, clouded with whitifh, and is varied with blackifh lines and dots. This fhell inhabits Africa.

Mercator. Shell ovate and white, with reticulate yellow bands. Linn. *Tilin*, Adans.

Inhabits the fhores of Africa. Shell of moderate fize, fometimes yellowifh, with brown or tawny bands.

Betulinus. Shell flightly emarginate at the bafe, and wrinkled; the fpire flattifh and mucronated. Linn.

This is a native of India; the fhell is rather large, and admits of feveral varieties, being either yellow or ochraceous, with teffelated fpotted bands, and intermediate lines of yellow or brown; white, with three rows of violet characters; or white fafciated, fpotted and dotted with brown. The *Conus Medufæ* of Martini is efteemed a variety of this fpecies.

Figulinus. Shell flightly emarginated at the bafe, and wrinkled; fpire acuminated, with flattifh whorls. Linn. *Voluta ficofa*, Rumpf.

Length about three inches; brown, ferruginous, or yellow, and rarely olive, with darker lines; within generally whitifh. A variety defcribed by Knorr is of a more elongated form, the colour orange, with darker lines, and two yellowifh bands; the fpire reddifh, fpotted with black. Inhabits India.

Ebræus. Shell ovate and white, with black bands, compofed of tranfverfe fpots. Linn. *Mufica rufticorum*, Rumpf. *Hebraica*, Argenv. *Coupet*, Adans.

Native of the fame country as the laft. Shell rather fmall, and fometimes reddifh, with parallelogramatic fpots, which are often chefnut. There are feveral varieties of this fpecies. It is known by the name of the Hebrew character cone, among Englifh collectors.

Stercus Muscarum. Shell emarginate at the bafe, and ftriated; whorls of the fpire canaliculated. Linn. *Voluta arcuata*, Rumpf.

Inhabits Afia. This fhell is of a long and narrow form, and white colour, with fcattered black or red fpots, which are fometimes united into bands; whorls of the fpire obtufe, and in fome of its varieties tuberculated.

Varius. Shell elongated and muricated, with the fpire coronated and acute. Linn.

A native of the Indian ocean. The fhell is white, clouded with brown or yellow, and granulated ftriæ difpofed over the whole furface.

Achatinus. Shell elongated, very finely ftriated tranfverfely, and varioufly clouded and fpotted with white; fpire fhort, fpotted with brown, and red at the tip. Gmel.

Several varieties of this fhell are defcribed by Seba and Chemnitz; the fpecies is a native of the American ocean.

Radiatus. Shell radiated and fafciated with white. Gmel.

Native country unknown; the fhell is brown, pale yellow, or cinereous, and is figured by Martini.

Leoninus. Shell with pale yellow or chefnut fpots; commonly marked tranfverfely with white or yellow bands, compofed of grains or fpots. Linn.

Found in the Indian ocean; and is a fpecies comprehending an amazing number of varieties, as may be feen by the works of Knorr, Martini, Seba, Chemnitz, and others; about fourteen diftinct varieties are afcertained.

Jaspideus. Shell light olive, with multifarious white dots, and an oblique band. Martini.

This is a fhell of an oblong form, and fmall fize. The native place is uncertain.

Nebulosus. Shell brown clouded with blue, and white fpots. Gmel. Bonanni, &c. A doubtful fpecies; the country unknown.

Coffeæ. Shell ſhort, brown, with two white bands; that neareſt the ſpire ſpotted with brown. Martini.

Shell of moderate ſize; country undetermined.

Amadis. Shell pale brown, with a broad band, and articulated belts above and beneath; ſpire acute, crowned with tubercles, and very finely ſtriated tranſverſely. Argenv. Zoomorph. Country unknown; ſhell varies in being more or leſs ventricoſe.

Fulmineus. Spire acute, and with the pillar-lip ſpotted with cheſnut; ſhell ſtriped longitudinally with cheſnut; baſe acute, and ſtriated obliquely. Martini.

Arachnoideus. Shell reticulated with cheſnut, with two or three darker bands; ſpire coronated and acute. Argenv. Zoomorph.

Deſcribed as an extremely rare ſhell, and probably not of this tribe. Its native place is unknown.

Costatus. Shell brown, with a white band, undulated with reddiſh, with thick and broad ſtriæ; ſpire nodulous, with a granulated band. Gualt. Country unknown.

Leucostictus. Shell white, clouded, ſtriped, and ſpotted with brown, and marked with numerous rows of white and brown dots; ſpire crowned with tubercles. Gmel.

Inhabits the Indian ocean; and has the ſpire of the ſhell ſometimes acute.

Citrinus. Shell citron colour, with black lines interrupted beneath; ſpire crowned with tubercles, and with the baſe white. Gmel. Inhabits the Caraccas.

Insularis. Shell white, with cheſnut clouds, ſpots, and dots; and ſpire acute. Gmel. Country unknown.

Coronatus. Shell with alternate articulate belts, and teſſellated ſpots; ſpire crowned with tubercles. Gmel.

A ſmall and extremely variable ſpecies, and which is oftentimes marked with a white band. Its country is unknown.

Punctatus. Shell with two yellowiſh-brown bands, and numerous lines of dots; ſpire varied with yellow dots and lines. Knorr.

Zeylanicus. Shell ſnowy, with roſy and brown clouds, and numerous articulated belts, varied with white and cheſnut: ſpire pointed. Martini. The baſe of this ſpecies is grooved obliquely.

Solidus. Shell conic, thick, tranſverſely ſtriated, clouded with white and brown, with a broad white band, and pyramidal ſpire; the whorls canaliculated. Chemn.

*** Section *elongati*, &c. Elongated and rounded at the baſe; the cylinder twice the length of the ſpire.

Clavus. Shell with convex ſmooth ſtriæ; the baſe blueiſh. Gmel.

An extremely rare ſpecies, found in the Indian Ocean. The ſhell is long, yellow, with white ſpots, and two deeper bands ſpotted with white; the ſpire ſpotted, and gradually tapering to an obtuſe point.

Nussatella. Shell ſomewhat cylindrical, red, not crowned with tubercles, rough, with tuberculated ſtriæ. Gmel. *Terebellum granulatum*, Rumpf.

This is a ſcarce ſpecies, and inhabits the iſland Nuſſatello in Aſia. The ſhell is pale, clouded, and ſpotted with red, or rarely entirely white; with yellowiſh-brown, granulated, tranſverſe ſtriæ; and the ſpire ending in an obtuſe point.

Terebellum. Shell white, ſhaded with blue, ſubcylindrical, with annulated ſtriæ, and yellow bands. Gmel. Inhabits the Indian ſeas.

Fusus. Shell fuſiform, white tranſverſely ſtriated. Gmel. Martini, &c.

Coccineus. Shell red, with tranſverſe lines dotted with black, with a white band and ſpire, ſpotted with red. Gmel., Knorr, &c.

Caetus. Shell ſomewhat cylindrical, with annulated ribs, red, with darker clouds, and bars of white; ſpire ſpotted. Gmel.

Figured by Liſter and Knorr, and is ſuppoſed to be a variety only of C. *granulatus*. Its country is unknown.

Granulatus. Shell rough, unarmed; ſtriæ ſmooth and grooved. Linn. *Voluta granulata*, Rumpf.

Inhabits the African ocean. Shell red, with large ſulcations, faſciated with white and purple linear dots.

Ochroleucus. Shell ſub-cylindrical, yellow; the baſe obliquely ſtriated with a contiguous white band; ſpire pointed, and marked with ſtriped ſpots. Gmel.

The native country is unknown. A variety of it is found of a cheſnut colour, varied with decuſſating ſtriæ, dotted with red.

Laevis. Shell rufous, with fulvous ſpots, and tranſverſe ſtriæ; ſpire ſpotted with yellow; baſe obliquely ſtriated. Gmel., Valent. &c.

Affinis. Shell blueiſh-white, with four fulvous linear bands, and intermediate dull purple dots or marks. Martini.

Violaceus. Shell white, clouded and banded with violet: rays pale brown. Martini.

Polyzonias. Shell white within; externally yellowiſh-brown, and rough, with very fine granulated lines; white band at the ſpire, denticulated beneath; another at the baſe paler, and numerous filiform bands. Born.

Bifasciatus. Shell white, with angular cheſnut lines, and two orange bands; ſpire prominent; baſe ſurrounded with orange lines, and intermediate teſſellated ſpots. Born.

Niveus. Shell conic and ſnowy; ſpire prominent and coronated; aperture large. Born.

Arausiacus. Shell not crowned, ſmooth, with whitiſh bands; whorls grooved at the tips. Gmel. *Oranjen admiraal*, Rumpf.

A beautiful and rare ſpecies found in India. The colour is in general whitiſh, with two or three orange bands, and white lines, teſſellated with brown ſpots; ſpire with oblong ſpots of red, white, and brown.

Magus. Shell ſub-cylindrical, with longitudinal bands dotted with white. Linn. *Voluta maculoſa*, Rumpf.

A native of India. Shell white, with dotted lines, and oblong, cheſnut, yellow, and brown ſpots; ſpire acute and ſpotted.

Striatus. Shell ovate-oblong, gibbous, clouded, with very fine parallel brown ſtriæ. Linn. *Voluta tigerina*, Rumpf. *Melar*, Adans.

Common upon the coaſt of Africa. Shell four inches long, ſnowy, with ſometimes reddiſh or yellowiſh ſtriæ; the baſe emarginate and tranſverſely ſtriated.

Textile. Shell reticulated, with yellow veins, and ſpotted with yellow and brown. Linn. *Pannus aureus*, Argenv. *Loman*, Adans.

A native of Aſia. Chemnitz deſcribes a variety of this ſpecies, of a white colour, with three orange bands; and another of a bloom colour, with two darker bands.

Aulicus. Shell white, with brown reticular veins, and interrupted longitudinal bands. Linn. *Nigella*, Argenv.

Nearly allied to the former, and ſuppoſed by ſome to be a variety: it likewiſe inhabits Aſia, and admits of many varieties, ſeveral of which are figured by Martini.

Thomæ. Shell ſmooth, white, with bay characters, and

and rows of dots, and three white belts and ſpots; tip reddiſh; ſpire conic, with grooved whorls. Gmel.

A native of the Indian ſeas.

**** Section. Shell ventricoſe in the middle, and narrow at each end.

Sinensis. Yellow, ocellated with white, and tranſverſely ſtriated at the baſe. Gmel., Regenf., &c.

***** Section. Shell ventricoſe, and tinkling when thrown down on its back.

Spectrum. Shell blueiſh, with yellow clouds, and yellowiſh-white dots and ſtriæ. Linn. *Voluta ſpectrorum*, Rumpf.

Inhabits the Aſiatic ſeas. Four diſtinct varieties are figured by Chemnitz.

Cullatus. Shell yellow, clouded with white. Linn. *Potan*, Adans.

Native country unknown. Shell thin, often ſpotted, clouded, or barred, and more or leſs ventricoſe; aperture large and blueiſh; ſpire ſometimes flat, ſometimes acute.

Tulipa. Shell oblong, gibbous, ſmooth; aperture gaping. Gmel. *Tulipa*, Argenv.

Inhabits India, Africa, and South America. Shell not coronated with tubercles; white, with a few clouds of blueiſh, brown, yellow, or red, and interrupted lines; aperture blueiſh; baſe obſoletely ſtriated obliquely; ſpire acute, ſmooth, ſpotted, and finely ſtriated tranſverſely.

Geographicus. Shell oblong, gibbous, and coronated; aperture gaping. Gmel. *Nubecula*, Rumpf. *Textile ſericum*, Argenv. *Nubecula, tulipa gallorum*, Klein. *Salar*, Adans.

A rare ſpecies found in the Indian and African ſeas. The ſhell is of a ſomewhat cylindrical form, wrinkled at the baſe, and rather narrower, pellucid, white; ſpotted and clouded with brown; aperture white; ſpire ſometimes roſy.

Nubecula. Shell white, clouded and ſpotted with orange, and ſcattered white dots; ſpire prominent and acute. Linn.

Spurius. Shell white, with alternate rows of irregular cheſnut or blackiſh ſpots, and interrupted punctured bands. Gmel., Gnalt.

Vexillum. Shell brown, ſhaded with white, and marked with an interrupted white band. Rumpf., &c.

Ventricosus. Shell brown, barred with white, beneath narrower, ſhaded with blueiſh, and ſmooth; ſpire conic and exſerted. Kaemm. Country unknown.

CONUSANCE, in *Law*, See Cognizance.

CONUSOR. See Cognisor.

CONVULSIONS, in *Pathology*, from *convello*, *I rend* or *tear*, conſiſt in violent, involuntary, and preternatural contraction and motion of the muſcular fibres, in any part of the body.

By modern phyſicians, convulſions have been divided into two claſſes, under the terms of tonic and clonic, or *ſpaſtici* and *agitatorii*, according as the contractions are rigid, not alternating with relaxation, or throw the muſcles into a ſtate of conſtant motion, being immediately ſucceeded by relaxation, and again returning, alternately. Theſe two ſpecies of morbid contraction of the muſcles are generally diſtinguiſhed at preſent by the terms, *ſpaſm*, which denotes the fixed contraction, and *convulſion*, which implies the preternatural motion. The term σπασμὸς, *ſpaſm*, was applied, however, by the Greek phyſicians, to the convulſive motions; and the rigid contraction was denominated τέτανος, *tetanus*. "Frigus modo nervorum diſtentionem, modo rigorem infert; illud σπασμὸς, hoc τέτανος Græcè nominatur." Celſus de Med. lib. ii. cap. 1. The word *nervus* ſignified a tendon, as well as an elongation of the brain and ſpinal marrow, which is now excluſively called a nerve: hence the Roman name for convulſions, which ſignifies diſtention of the tendons. And accordingly, thoſe ſlighter convulſive motions of the muſcles of the arms, which occur in fever, and occaſion a playing of the tendons under the finger of a perſon, feeling the pulſe, are now called a ſtarting of the tendons, *ſubſultus tendinum*. But theſe different forms of ſpaſm and convulſion are frequently mixed, or paſs into each other; and ſimilar cauſes, affecting the brain and nervous ſyſtem, produce both the one and the other.

It were vain to attempt to give an explanation of the nature or proximate cauſe of convulſive motions; ſince we are ignorant of the nature of the nervous power, or of that medium by which the muſcles are connected with the common ſenſorium, and the volition of the mind is communicated to the muſcles. We muſt be content with the obſervation of facts: the minute operations of nature are inſcrutable. The mechanical phyſicians had, indeed, no difficulty in accounting for the morbid, as well as the healthy operations of the nervous ſyſtem: their imagination furniſhed them with a cauſe for every effect. Thus they *ſuppoſed*, like the natural philoſophers, the exiſtence of a ſubtile, ætherial fluid, the motions and vibrations of which produced all the effects which they obſerved. By farther ſuppoſition, different phyſiologiſts explained the mode in which this gratuitous fluid operated. Borelli fancied that there might be oblong veſicles in the fibres of the nerves and muſcles, which were rendered ſpherical by the force of the nervous fluid, and therefore ſhorter. Others imagined that the influx of the nervous fluid ſeparated the parallel fibres of the muſcles from each other, and thus ſhortened the length of the whole. But it were uſeleſs to enumerate the various futile hypotheſes, which originated in an erroneous philoſophy. All that we know on this ſubject is, that ſome of the muſcles of the body contract, in a ſtate of health, by the will of the mind, as thoſe of the trunk and extremities:—others, apparently without the intervention of an act of volition, although ſubject in a great meaſure to the will, in conſequence of a local ſenſation; as the diaphragm, and the other muſcles of reſpiration; the eyelids, in nictitation, &c.:—and others, again, are excited to contraction, altogether independently of the will, by an irritation ſo obſcure, as to excite no perception in the mind; as the heart, which continues its unperceived motions, in conſequence of the irritation or ſtimulus of the diſtending blood, which is returned into its cavities by the veins. The contractions, produced by one or other of theſe cauſes, are regular in force and velocity, according to the degree of excitement; are always ſoon ſucceeded by a ſtate of relaxation; and are not repeated, except when the will or the irritations again operate. In the morbid or convulſive ſtate, the contractions of the muſcles, ordinarily depending on the will, are excited without the concurrence of the will, or in a way contrary to what the will intends; and in the other inſtances, they are excited diſproportionately to the action of the uſual and natural irritations. Hence it may be concluded, without any gratuitous hypotheſis, that when theſe convulſive motions are excited, independent of, or in oppoſition to, the will, ſome change in the condition of the ſeat of volition, the brain, and its elongations, the nerves, has occurred; and, if the convulſions are partial, that ſome great local irritation has been applied.

Now, although it be confeſſed that the actual condition of the brain, which occaſions convulſions of the moving fibres, be unknown, as well as its condition and mode of

operation in health; yet certain conditions of the body, in general, have been obferved to be connected with the occurrence of convulfions, which lead to a knowledge of the ftate of the brain in the grofs, and ferve as valuable guides in our practice in thefe difeafes.

Convulfions have been chiefly obferved to occur, when the body was in a ftate of repletion, inanition, or great irritation. It may feem inexplicable, that the two oppofite conditions of repletion and inanition fhould give rife to fimilar morbid appearances; but the knowledge of the fact, which is eftablifhed beyond a doubt, is fufficient for our practical purpofes. We fhall illuftrate the operation of each of thefe ftates in producing convulfive difeafes.

1. *Repletion* of the fyftem at large, or of the brain in particular, is a ftate in which convulfions frequently occur. Numerous inftances are on record, in which epilepfy has occurred, where a general plethoric ftate of the conftitution was prefent. Epileptic convulfions have fometimes fucceeded apoplexy, which is known to originate in overturgefcence of the brain. Every occafional fulnefs, or unufual impulfe of the blood into the veffels of the brain, fuch as from a fit of anger, the heat of the fun, or of a warm chamber, violent exercife, a furfeit, or a fit of drunkennefs, are frequently the immediate exciting caufes of convulfions. (Cullen. Firft Lines, § 1296.) Hence alfo, in inflammatory fevers, as in the eruptive fever of the fmall-pox, where the blood is carried to the brain more abundantly, and with greater impetus than in health, convulfions are frequently produced; efpecially where the circulation is hurried by a hot regimen. The fuppreffion of accuftomed difcharges, or the omiffion of habitual evacuations, have alfo been the occafion of convulfive affections, in confequence of the general plethora which enfues. But the moft marked and ftriking inftance of convulfions, induced by repletion, occurs in the puerperal ftate. They generally come on in the early ftage of labour, and are attended with fulnefs and diftention of the features, and other obvious marks of determination of blood to the head; they fpeedily ceafe when the delivery is accomplifhed, if they do not prove fatal before that takes place; and copious blood-letting is the only effectual remedy. In all thofe inftances, indeed, which have juft been mentioned, the good effects of evacuating medicines, of a fpare diet, and cool regimen, in removing the difeafes; and the bad confequences which have enfued, under the employment of an oppofite treatment, point out repletion as the caufe of the mifchief. This is, alfo, ftill more clearly afcertained from the diffection of thofe, who have died in confequence of convulfions, occurring under fuch circumftances; marks of a congeftion in the brain having been generally obferved. See Epilepsy.

2. *Inanition* is a frequent caufe of convulfions. It has been obferved from the earlieft ages, that convulfions invariably precede death, when it is occafioned by lofs of blood; and the fact is daily exemplified in flaughter-houfes, when animals are killed by opening the large blood veffels. Hippocrates ftates, in his Aphorifms, Sect. v. Aph. 3, that convulfions, or hiccough (which is, in fact, a convulfion of the diaphragm), fucceeding a great hæmorrhage, are dangerous, and he repeats the obfervation in Sect. vii. Aph. 9. From this caufe convulfions fometimes occur in the puerperal ftate, where great hæmorrhage from the uterus has occurred. But in fuch inftances, the countenance, fo far from being flufhed, with a fulnefs of the features, is pallid, and the features are fharp and funk; there are cold fweats, and other fymptoms of exhauftion, which mark the diftinction between this fort of convulfive diforder, and the proper puerperal convulfions, mentioned under the former head. In thefe convulfions from inanition, the contrary remedies, cordials, and powerful ftimulants, largely and frequently adminiftered, afford the only means of faving life. "Si fluxui muliebri," fays Hippocrates, "animi deliquium et convulfio fupervenit, malum." Sect. v. Aph. 65. Other great evacuations alfo excite convulfions; fuch as great difcharges from the bowels by purging. In the early periods of the hiftory of medicine, when the limited catalogue of the materia medica debarred the phyfician from the choice of expedients, according to the circumftances of the cafe, it would appear that this unfortunate confequence of a violent purgative was by no means uncommon, finee we find it often alluded to by Hippocrates. "Convulfion from Hellebore is fatal." Sect. v. Aph. 1, and again, he obferves, in Sect. vii. Aph. 25; "Convulfions from a purge are fatal." Happily the numerous articles of mild operation, which we now poffefs, render fuch an occurrence unknown to the phyficians of modern times. Convulfions have been, likewife, obferved to occur, in confequence of exhauftion of the animal powers, by other means; fuch as by exceffive fatigue; by want of food; by long continued and fevere mental exertion; &c.

The cure of convulfions, occafioned by inanition, from any of the caufes juft ftated, will obviouflу confift, in the ufe of fuch remedies as will put a ftop to the evacuations; in the adminiftration of cordials and ftimulants, to counteract the prefent failure of the vital powers; and in the frequent fupply of moderate quantities of a cordial and nutritious aliment, to reftore the mafs of circulating fluids, and the ftrength of the body. Reft, food, and relaxation, will be the remedies required in the laft-mentioned inftances.

But 3, *Irritation*, corporeal and mental, is the moft fruitful fource of convulfions. The degree of corporeal irritation, which is fufficient to occafion convulfions, varies greatly; not only according to the peculiarities of age, and conftitution, but according to the part to which it is applied, and fometimes according to circumftances, which are not obvious. Sometimes the irritation amounts to fevere agonizing pain; more commonly to a moderate degree of uneafinefs; and frequently it is fuch as to excite no perception: fometimes it is a titillation, or attended with fenfations on the whole pleafurable. It may excite convulfions of the mufcles in general, when applied to the brain itfelf; or to other parts of the body, as to the bowels, ftomach, kidneys, and other vifcera; to the gums, the fkin, and the organs of fenfe.

Convulfions are among the moft common fymptoms of irritation of the brain itfelf, either from external or internal caufes. Thus they are frequently excited by blows, or wounds, on the head; by fractures of the cranium when a portion of the bone is depreffed, or fragments of it are driven in upon the membranes of the brain; by effufions of blood, lymph, ferum, or pus, in the ventricles or on the furface; by bony excrefcences from the internal furfaces of the fkull; or by tumours, thickening, or abfceffes, in the membranes or fubftance of the brain. Mechanical injuries of the nerves, which are elongations of the brain, have alfo given rife to general convulfions.

Irritations of parts diftant from the feat of fenfation and voluntary motion, produce the fame effects. Thus wounds of the fkin, and of the mufcles and tendons in the extremities, occafion the moft painful and fatal of all convulfive affections, the *tetanus*: and it is remarkable, that it is not a large difcharging wound, which in general excites this difeafe; but a fuperficial injury, or a wound juft healing, when the irritation would feem to be lefs powerful. In this difeafe, all the antagonift mufcles of the body are feized

feized at once with a convulfive action, fo that the trunk and limbs become perfectly rigid, and the jaw is locked. Sometimes the mufcles of the back overpower their antagonifts, the body is then bent backwards like a bow, and the patient refts on the head and the heels; this ftate is termed *opifthotonos*. Sometimes, on the contrary, the action of the abdominal mufcles is moft powerful, and the body is then bent forwards in a fimilar manner; this condition is called *emprofthotonos*. (See thefe articles.)

Several inftances of convulfions are related by authors, in which ftones, of fharp and irregular figures, were found after death in the urinary bladder, or fticking in the pelvis of the kidney, or in the courfe of the ureters. In others, convulfions, which had occurred in confequence of fuch irritations, ceafed upon the difcharge of calculi with the urine.

Irritations in the alimentary canal are very frequently the caufe of general convulfions, more efpecially in young children. In children, indeed, it has been faid that convulfions are not to be confidered fo much a difeafe themfelves, as the indication of difeafe in the bowels, or other parts. (Med. Obf. and Inq. vol. iii. p. 292.) The prefence of worms, of undigefted aliment, of morbid fecretions, or even a retention of the natural fæces, by conftipation, are common caufes of convulfions at an early age. The retention of the meconium is faid to occafion the locked jaw of new-born infants, in warm climates, the *trifmus nafcentium* of authors. Some children, in fact, are fo irritable during the few firft years of their life, as to be thrown into convulfions by very flight caufes of irritation; a difpofition which is only removed, as the conftitution becomes ftrengthened by age. The irritation of the rifing teeth, when the gums do not readily yield to their preffure, has been frequently obferved to excite convulfions in children, which were removed on the appearance of the teeth above the gum, or by the divifion of the gum by means of a lancet. For it is remarkable, that the greater temporary irritation of a cutting inftrument is borne, without any convulfion being excited, while the conftant uneafinefs of the irritating tooth had frequently been productive of the convulfions. In the fame way, when convulfions are occafioned by the irritation of worms, or of undigefted food, in the inteftines, the additional irritation of a cathartic medicine fhall not increafe the convulfive affection, which ceafes, when its operation is completed. In the treatment of the convulfions of children, where the irritating caufe is obvious, but cannot be inftantly removed, the convulfive motions may be frequently fufpended in the mean time, by immerfion in the warm bath, by warm fomentations, or by the ufe of a fmall dofe of an opiate, proportioned to the age and ftrength of the child, and the violence of the difeafe. But fuch meafures are only palliative; the radical cure will depend upon the removal of the caufe of irritation.

In conftitutions of peculiar irritability, certain irritations of the organs of fenfe have given rife to convulfions. Thus in regard to the fenfe of touch, a cafe is related by Van Swieten in which titillation of the foles of the feet of a young girl, excited convulfions: he alfo mentions inftances of the fame effects being produced by a fudden expofure to great light, or great noife; a boy was thrown into convulfions by the unexpected found of trumpets. Certain powerful odours have occafioned convulfive motions when applied to the organ of fmelling. It feems to have been a cuftom formerly, fays the author juft mentioned, for thofe who purchafed flaves, to try them with the fmell of the jet-ftone, in order to difcover whether they were fubject to the epilepfy. Aretæus has remarked that by this odour the epileptic paroxyfm was excited; and Apulius, who was accufed of magic, in pleading his own caufe, made the following obfervation. "But if I wanted to throw down an epileptic perfon in a fit, what need could there be for a charm to do it? feeing the jet-ftone, when it is burnt, as I read in phyfical authors, difcovers this difeafe effectually; and by the fmell of it they commonly try the health of the flaves in the markets." Van Swieten. Com. § 1075.

Many poifons, efpecially the vegetable poifons, by their action on the nervous fyftem, when taken into the ftomach, produce the moft terrible convulfions. The cicuta aquatica, or water-hemlock, is faid by Wepfer to have been eaten by feveral children, who miftook the roots for parfnips; they were all feized with fevere convulfions, which proved fatal to two of them; the reft having been made to vomit, and eject the poifon from the ftomach, fpeedily recovered. Thus vegetable narcotics, even opium itfelf in an over-dofe, have produced fimilar effects.

Mental irritations, or violent emotions of the mind, frequently give rife to general convulfions, efpecially in females, and thofe of hyfterical habits. The influence of the mind on the body is too obvious to require much illuftration. The actions of the heart, the circulation of the blood, and the functions of the vifcera, are varioufly modified by emotions of the mind, and no organ is more fully affected by them in its functions than the brain itfelf. Different emotions feem to affect the fyftem in different and even oppofite ways; fome roufing it to actions of unufual vigour, quickening the circulation, and ftrengthening the powers of volition; others, again, paralyfing its ftrength, and giving languor to all its motions. Hence the paffions have been divided into two claffes, exciting, and depreffing paffions. Now thefe oppofite paffions, which feem to produce the fame effects as *repletion* on the one hand, and *inanition* on the other, alike excite convulfions of the body. This may be exemplified in the leading paffions, anger, and fear, both of which are occafionally the caufes of convulfions. In a man under the influence of the *excitement* of anger, the heart beats with greater force and celerity; the pulfe is fuller, ftronger, and fwifter; every part fwells and grows broader; a greater heat overfpreads the whole body; almoft every mufcle is extended; the eyes are prominent from their fockets, and look fierce and fparkling, being charged with blood. Thefe fymptoms imply a correfponding fulnefs and force in the veffels of the brain, which, when carried to a certain extent, induce convulfions. On the contrary, a man under the *depreffion* of fear, grows pale and cold, and fhrinks in every part of the body; his pulfe is quick, but fmall and unequal; the heart palpitates; the lungs are oppreffed, and fobs and fighings follow; his ftrength fails him; his whole body trembles, and he is fcarcely able to articulate. Thefe phenomena fhew a depreffion, a collapfe of the powers of life, refembling that which occurs from inanition, and, like that, producing fometimes a general convulfion. See Swieten Com. in § 104. Many examples might be quoted of the convulfive attacks occafioned by thefe paffions, and efpecially by fear. We fhall mention one inftance from the latter caufe, for the fake of illuftrating the effects of another principle, the affociation of ideas, in re-exciting convulfions, thus originally produced. A boy was fo much frightened by a large dog jumping upon him, that he prefently fell down attacked with epileptic convulfions: afterwards, the paroxyfm was brought on by the fight of any large dog, or even by hearing him bark. This effect of affociation is frequently obferved in a minor degree; thus, any fubftance ufed as a vehicle for an emetic medicine, will, in fome perfons,

ſons, when taken alone, excite ſickneſs for ſome time afterwards. Van Swieten affirms that he has ſeen a perſon, who, after having frequently taken a nauſeous purging draught, upon ſeeing the cup out of which he took it, not only ſhuddered, and became ſqueamiſh, but likewiſe had ſeveral ſtools; thus the ſole idea of a nauſeous remedy being renewed, ſupplied the place of a purge, and diſturbed the whole body. Comment. in § 1075.

There is another prolific ſource of convulſive affections, which muſt not be overlooked in deſcribing the mental cauſes of theſe formidable diſorders; namely, the principle of *imitation*. This principle ſometimes operates alone; ſometimes its operation is combined with an impreſſion of fear: and ſometimes with various other ſtrong impreſſions made on the imagination. This involuntary imitation is the ſource of almoſt all that is learnt in infancy; and its importance in the formation of character, has been well illuſtrated by Dr. Aikin. See Athenæum, No. xiii. Jan. 1808. In after-life we all experience its operation, in the irreſiſtible propenſities to yawn, to laugh, to weep, with others. Hence much of the effect of theatrical repreſentations, eſpecially crowded audiences: hence alſo the facility with which a *panic* ſpreads among an army of ſoldiers; and hence the power, on the one hand, and the cowardice, on the other, of a *mob*. This tendency to receive impreſſions and emotions involuntarily from others, and more eſpecially, when they are accompanied with corporeal motions, and the tendency to repeat thoſe motions involuntarily ourſelves, are principles rooted in the human conſtitution; and upon them much of the hiſtory of inſurrections, and alſo of the propagation of religious enthuſiaſm, depends, as well as the minor circumſtances of convulſive diſeaſes.

Every phyſician has witneſſed the effect of the ſight of an hyſterical convulſion, on other women prediſpoſed to that diſeaſe. It is not uncommon to find ſeveral women thus convulſed, one after the other, from this cauſe. We have even known the ſcream of one woman, ſeized with an hyſterical paroxyſm, excite convulſions in another, who heard it in a different room. The well-known caſes which occurred in the orphan-hoſpital at Haerlem, under the care of Dr. Boerhaave, ſhew the extenſive operation of this principle, and alſo that theſe imitative attacks may be effectually prevented, by exciting a ſtrong counter-impreſſion in the mind. That celebrated phyſician, finding that epileptic convulſions, which had occurred in one boy, attacked, one after another, all the boys who witneſſed the paroxyſms, by threats of inflicting ſevere bodily pain on the firſt who ſhould be attacked with theſe fits, ſucceeded in preventing the recurrence of the epilepſy.

This principle is ſtill farther exemplified in the epidemical convulſions which have occurred at different times in different countries. In ſeveral diſtricts of Scotland ſuch epidemics have frequently appeared. The Rev. W. Archibald, parochial clergyman of Unſt, the moſt northerly of the Shetlands, gives the following account of epidemic convulſions which occurred in his pariſh. "There is a ſhocking diſtemper, which has of late years prevailed pretty much, eſpecially among young women, and was hardly known thirty or forty years ago. About that period only one perſon was ſubject to it. The inhabitants give it the name of convulſion fits; and indeed, in appearance, it ſomething reſembles an epilepſy. In its firſt riſe, it began with a palpitation of the heart, of which they complained for a conſiderable time; it at length produced ſwooning fits, in which people ſeized with it would lie motionleſs upwards of an hour. At length, as the diſtemper gathered ſtrength, when any violent paſſion ſeized, or on a ſudden ſurpriſe, they would all at once fall down, toſs their arms about, writhe their bodies into many odd ſhapes, crying out all the while moſt diſmally, throwing their heads about from ſide to ſide, with their eyes fixed and ſtaring. At firſt this diſtemper obtained in a private way with one female, but being ſeized in a public way at church, the diſeaſe was communicated to others, but whether by the influence of fear or ſympathy is not eaſy to determine. However this was, our public aſſemblies, eſpecially at church, became greatly diſturbed with their outcries. This diſtemper always prevails moſt violently during the ſummer-time, in which ſeaſon, for many years, we are hardly one ſabbath free." The Rev. Mr. Morriſon, giving an account of a ſimilar epidemic in his pariſh of Delting, ſays, "It moſt commonly attacks them when the church is crowded, and often interrupts the ſervice in this and many other churches in the country. On a ſacramental occaſion, fifty or ſixty are ſometimes carried out of the church, and laid in the church-yard, where they ſtruggle and roar with all their ſtrength for five or ten minutes, and then riſe up without recollecting a ſingle circumſtance that happened to them." Statiſtical Acc. of Scotland, vol. i. p. 385. See Edin. Med. and Surg. Journ. N° xii. In another pariſh, Northmaven, a cure is ſaid to have been effected, as in the hoſpital at Haerlem, by a ſtrong counter-impreſſion upon the mind. "The cure is attributed to a rough fellow of a kirk-officer, who toſſed a woman in that ſtate, with whom he had been frequently troubled, into a ditch of water. She was never known to have the diſeaſe afterwards, and others dreaded the like treatment." Stat. Acc. vol. xii. p. 363.

A ſimilar prevalence of convulſive affections, which occurred on the eſtates of the earl of Uxbridge and Holland Griffith, eſq. in the iſle of Angleſea, was checked by the judicious precautions recommended by Dr. Haygarth, from a knowledge of the principle which we are illuſtrating. He adviſed that all girls and young women ſhould be prevented from any communication with perſons affected with thoſe convulſions, and that thoſe who were ill ſhould be kept ſeparated as much as poſſible. See Treat. on the Imagination as a Cauſe and as a Cure of the Diſorders of the Body. Bath, 1800.

This principle of imitation, eſpecially when the imagination is ſtrongly excited by images of terror or ſuperſtition, has been reſorted to by deſigning men for the purpoſes of impoſing on the public credulity, with a view to their own profit. Upon this was founded the ſucceſs of Meſmer, De Mainauduc, and other empirics, in the diſgraceful practices of animal magnetiſm, as it was called; the nature and impoſition of which were fully detected and expoſed by the commiſſions appointed by the French king for the purpoſe of the inveſtigation. The celebrated Dr. Franklin was one of theſe commiſſioners, and his report has fully developed the myſtery of the magnetizers. By the aid of circumſtances, of ſituation, gloom, &c. and by their own enthuſiaſm, they gradually worked on the minds of their company, who were already pre-diſpoſed to receive any impreſſion, for they did not operate on ſingle individuals, until they brought them, mind and body, to a ſtate of extreme irritability; then, aſſuming extravagant geſtures and violent motions, the ſpectators were led to an involuntary imitation, and as ſoon as one of the party ſhewed any ſymptoms of violent or convulſive exertion, the reſt were ſpeedily affected in the ſame way. This was called the criſis, and the operation was conſidered as complete. Dr. Franklin ſhewed, that, without the aid of local circumſtances, of numbers, &c. the powers of the magnetizer amounted to nothing.

It were unneceſſary to purſue this illuſtration farther, or it

 might

might be shewn that the propagation of religious enthusiasm and fanaticism is effected by the same means; is frequently connected with convulsive motions, or frantic gestures, amounting nearly to convulsions; whence we find jumpers, whirlers, and originally quakers, as the distinguishing appellations of sects; and that it depends much upon the contagion of the principle of imitation among crowded assemblies, for its success.

But to return to the subject of convulsions, more strictly within the sphere of pathology. We have mentioned the indications and means of cure, in most cases, as they occurred. In convulsions, which come under the two first heads, as arising from repletion and inanition, it must be obvious, that an evacuating system must be adopted in the first, and the contrary, or a system of support and nutrition, in the second. The individual expedients to be adopted, on either of these occasions, will readily suggest themselves, according to the peculiar circumstances of the case. In convulsions, which arise from irritation, the discovery and removal of the irritating cause, where t is of a nature to be removed, is not less obviously requisite for the cure. But in the mean time, before any of these intentions can be fulfilled, the violence of the convulsive motions may continue, so as to injure the body, or destroy life. It is desirable, therefore, that some palliative measures should be adopted; and these are chiefly the use of medicines of the antispasmodic class, such as opium, musk, æther, and other powerful stimulants; the use of the warm bath; or of the opposite expedient, the cold bath. Of these remedies, with the exception of the last, little is required to be said; the efficacy of the former being well understood. But as the cold bath is a powerful expedient, and can be often resorted to more speedily than the others, it may be necessary to mention the nature of its powers. Dr. Currie, from an experience of eight years, asserts that the cold bath is very efficacious in removing the convulsions of children, whether the disorder originates in worms or other causes; that it seldom fails in stopping the paroxysms, at least for some time, thereby giving an opportunity of employing the means fitted to remove the particular irritation. Several cases of tetanus have also been cured by the cold bath of late years. In the convulsions of hysteria, the cold bath, or indeed a plentiful affusion of cold water, is an almost infallible remedy. Dr. Currie observes, that the efficacy of the cold bath in convulsive disorders is the greatest, when it is employed during the presence of the convulsion; and also that it is of greater efficacy in general convulsive affections, than in those which are only partial. In chorea sancti Viti, for instance, it has been frequently tried without any success. See Currie, Reports on Water, &c. Append. p. 13. *et seq.*

Where the source of irritation is not discoverable, besides these palliative means, other medicines are commonly employed to give strength and vigour, and to lessen the irritability of the moving fibre, so as to render it less susceptible of being excited to extraordinary action. The various articles of tonic and corroborant medicine have been administered with this view, but most frequently, the metallic salts and oxydes; as the sulphates of zinc, and iron, and copper; the oxyde of zinc; and even the caustic nitrate of silver has been employed in small doses.

CONVULSIVE Diseases, those diseases in which convulsions are the leading symptoms. See Convulsions. These diseases have received different appellations, and also require different methods of treatment, according to the varieties of their form. Some consist of general convulsions of the whole muscular system, as *tetanus*, *epilepsy*, some forms of *hysteria*, &c.; others are distinguished by the convulsions being confined to particular parts; as *trismus*, when the muscles of the jaw are affected with spasm; *chorea*, or St. Vitus' dance. Hiccough, and even cough, may be considered as partial convulsions. See these articles respectively.

Convulsive *Asthma*. See Asthma.

CONWAY, in *Geography*, a river in North Wales, called by Ptolemy and Antoninus *Conovius*. *Kynwy*, in the ancient British language, signifies the *great river*, from which are derived the words *Conwy* and *Conway*. This stream, considered one of the finest in Europe, rises in the mountains of Penmachno, out of Llyn Conwy, and is navigable for small vessels to Llanrwst bridge; erected by Inigo Jones with a centre arch 60 feet wide (see Canal); but receiving many tributary streams in the course of 12 miles, it becomes sufficiently deep to bear ships of considerable bulk, and is nearly a mile in breadth at high water, but not more than 150 feet at low water, and eight feet deep, at the ferry opposite the town of Conway, beyond which it flows into the Irish Sea. The spring-tides vary from 14 to 18 feet; consequently vessels of 400 tons burthen may approach close to the town: nevertheless the shifting sand-banks make the entrance of the port dangerous. The *mya margaritifera* of Linnæus, or pearl muscle, made the river of importance previous to the Roman invasion. Such was its celebrity, that Suetonius acknowledged the pearl-fishery of the Conway to have been one of his inducements for undertaking the subjugation of Wales. According to Pliny, the muscles, called by the natives *kregindiliw*, were sought for with avidity by the Romans, and the pearls found within them highly valued; in proof of which it is asserted, that Julius Cæsar dedicated a breast-plate, set with British pearls, to Venus Genetrix, and placed it in her temple at Rome. A fine specimen from the Conway is said to have been presented to Catharine, consort of Charles II., by sir Richard Wynne of Guedir; and it is further said, that it has since contributed to adorn the regal crown of England. Lady Newborough possesses a good collection of the Conway pearls, which she purchased of those who were fortunate enough to find them, as there is no regular fishery at present. The late sir Robert Vaughan had obtained a sufficient number to appear at court, with a button and loop to his hat, formed of these beautiful productions, about 28 years past.

Conway, or Aberconway, an ancient town of Carnarvonshire, North Wales, is seated on the river Conway, near its confluence with the Irish Sea. This place does not appear to have acquired any consequence till the time of Hugh Lupus, earl of Chester, who fortified the mouth of the river about the year 1098; and it obtained more distinguished importance during the reign of Edward I., who enlarged the fortifications, and erected a very strong castle in 1284. The outline of this venerable and romantic place is triangular, and is still surrounded with embattled walls. These are erected in many places upon solid rocks, and are one mile and an half in circumference; they had four gates, and were defended by 24 bastions; in addition to which, two curtains projected into the river, where they terminated with watch-towers: but these and one of the former have fallen. Edward I. evinced great skill in constructing the defensive works of Conway, and particularly by erecting his superb castle on the base of the triangle next the river, where nature had placed a vast perpendicular rock of slate. He thus protected England from the incursions of the Welsh, who were commanded by Llewelyn; and afforded himself and successors an impregnable post for collecting the means of invasion, when an opportunity offered for entering Wales with any prospect of success. By this castle he had it in his power to

to occupy the neighbouring pafs of Penmaen-Mawr at pleafure, and by that means to cut off all communication with the interior of the principality: and yet this fortrefs had once nearly coft him his crown, in proceeding to it at the head of his army. On this occafion, Edward incautioufly croffed the river Conway with a few attendants, and was feparated from the town by the flowing of the tide. At this critical moment the Welfh attacked the caftle; but although the monarch and his little band of foldiers were deftitute of every refrefhment, except honey and water, they had the bravery and addrefs to refift their opponents, till the ebbing of the tide. Richard II. took refuge in this caftle, on his return from Ireland in 1399, and was delivered into the power of his enemies from it, through the treachery of the duke of Northumberland. During the civil war, Charles I. particularly requefted Williams, archbifhop of York, to put the caftle in a complete ftate of defence, for his ufe; and pledged his honour that the cuftody of it fhould remain with the prelate, or any perfon he thought proper to appoint, till the fum expended was repaid. When the repairs were accomplifhed, Williams placed the caftle under the government of his nephew, William Hooker. The neighbouring gentry, conceiving it a fecure depofitory, fent their moft valuable writings and plate to the keeping of the archbifhop and Hooker; the former giving his receipts, and making himfelf refponfible in cafe of lofs. About a year afterwards, colonel fir John Owen obtained the appointment of governor of Conway caftle from prince Rupert, and, proceeding fuddenly to the place, ejected the prelate and his adherents, who were pofitively denied permiffion to remove the articles, for which receipts had been given. Greatly irritated at this unworthy conduct, Williams vainly applied to the court for redrefs. Yielding at length to the reprefentations of general Mytton, who commanded the parliament's army, he adopted their caufe, and fortified his own houfe, which was garrifoned by Mytton's troops. A conflict foon afterwards occurred, in which the prelate was wounded in the neck. After the ravage of the civil wars, a grant was made of it to Edward, earl of Conway, who, in 1665, dilapidated the buildings. At prefent it is held by a private proprietor under the crown. A little hill is planted and laid out towards the mouth of the river, commanding a fine view of the town and caftle on one fide, and the fea on the other, to which is given the claffical name of Arcadia. The ruins are ftill uncommonly magnificent, and bounded by the river, a creek, and the town. The walls are not greatly injured; and eight vaft towers, furmounted by turrets, are yet ftanding. In one of thefe is an oriel window, richly ornamented, where the toilet of queen Eleanor is faid to have ftood, at the period when her lord made the caftle the fcene of his hofpitality: another of the towers, undermined by the inhabitants of Conway, fplit afunder, and a vaft fragment fell upon the beach, where it lies, a wonderful fpecimen of ancient mafonry. The hall, erected over extenfive vaults, is lighted by fix windows towards the country, and three on the oppofite fide. Six of the eight pointed arches of the roof are yet entire. The length of the hall is 139 feet, and the breadth 32. The caftle is now held from the crown by O. Holland, efq., who pays a rent of 6*s.* 8*d.*, and is bound to furnifh lord Hertford with a difh of fifh, whenever he paffes through Conway. However commanding and beautiful the town appears without the walls, the contraft within is melancholy in the extreme, where ruins and defolation prevail in every direction. Edward I., when he paffed a Chriftmas here with his queen Eleanor and the whole court, erected the place into a free borough, and the mayor was conftituted conftable of the caftle. The prefent government is compofed of an alderman, recorder, coroner, water bailiff, &c. Mr. Evans mentions, in his "Tour through North Wales," an old houfe fituated in Caftle-ftreet, called the college, with a curious window, and feveral coats of arms of the Stanleys; and another of large dimenfions, named *Plas Mawr*, built in 1585, by Robert Wynne, efq. of Guedir, which he fuppofes, from the infcriptions on the front, to have been erected for charitable purpofes, particularly as there are many rude badges within, (probably of contributors); and the fupporters of the arms of Dudley, earl of Leicefter, decorate the walls and ceiling. The only religious ftructure in Conway was an abbey of Ciftertian monks, founded by prince Llewelyn ap Jorwerth, in 1185, who was buried in the abbey church, where his body remained till the diffolution of the monaftery, when it was carried to Llanrwft. Edward I., conceiving the monks improper inmates of his fortrefs, removed them to a new abbey, which he erected near Llanrwft, but did not deprive them of their privileges and endowments. Their old church was then made parochial, and the prefentation granted to the abbot and convent, on condition they provided three chaplains, two of whom were to be Englifhmen, and the third a Welfhman; one of the former received the title and office of vicar, and, after having been named by the convent, was to be prefented by the diocefan. The church of the original foundation is fituated in the centre of the town; but it is more remarkable for its remote antiquity, than any beauty in the form or decorations. Cynan ap Owen Gwynedd was buried in this church, 1220; and there are at prefent feveral modern monuments of the Wynne family: one of the infcriptions within it records the interment of Nicholas Hooker of Conway, gentleman, in 1637, who is faid to have been the 41ft child of his father, by his wife Alice, and the father himfelf of 27 children. The tithes of the church are vefted in three truftees, for the benefit of the poor of the town, and three villages in the neighbourhood: indeed the want of trade and manufactories renders the lower claffes truly wretched, many of whom obtain a miferable fubfiftence by collecting and burning into *barilla*, on the beach, different fpecies of *fuci* or fea-wreck, which is fold for trifling fums to the purchafers, who make a great profit on their labour. The inconfiderable trade now carried on confifts of copper, lead, calamine, and potatoes for exportation; but little or nothing is imported. As Conway has hitherto been the great thoroughfare to Ireland, the inhabitants derived much advantage from the paffengers; but the new road through the Ogwyn mountains will foon rob them even of this fupport. Hills of lime-ftone abound near this town, and fome lead and copper mines, having chert, or a fpecies of black hornftone for a matrix. In a black filicious mountain here maffes of porous chert are found, which, on trial, are found as fit for making our mill-ftones as thofe imported from France. Mr. Richard Bowes, who made this difcovery, and fent fpecimens of the ftones to the Society of Arts, was rewarded by that patriotic body. See their Tranfactions, vol. xviii. p 197. Situated 240 miles N.W. of London. Population in 1801 was 889; the number of houfes 182. Bingley's and Evans's Tour in North Wales.

Conway, a townfhip of America, in the province of New Brunfwick, Sudbury county, on the weftern bank of St. John's river. It has the bay of Fundy on the fouth; and at the weffernmoft point of the townfhip there is a tolerably good harbour, called Mufquafh Cove.—Alfo, a townfhip in the N.E. corner of Strafford county, New Hampfhire, on a bend in Saco river, incorporated in 1765, and containing 574 inhabitants. It was called "Pig-wacket," by the Indians.—Alfo, a thriving townfhip in Hampfhire county, Maffachufetts, incorporated in 1767, and contain-

ing 2092 inhabitants. It lies 13 miles N.W. of Northampton, and 115 N.W. by W. of Boston.

CONWAY, *Cape*, a point of land on the east coast of New Holland, so called by captain Cook in 1770, and lying in S. lat. 20° 36'. W. long. 211° 28'; between which and cape Hillsborough is a bay, which the same navigator called *Repulse bay*. Within this cape there lie two or three small islands, which would serve to shelter that side of the bay from the southerly and south-easterly winds, that seem to prevail here as trade-winds. Among the many islands that lie upon this coast, called by Cook *Cumberland islands*, one is more remarkable than the rest: it is of small circuit, very high, and peaked, and lies E. by S., 10 miles from cape Conway, at the south end of the passage. This passage is from three to seven miles wide, and eight or nine leagues in length, N. by W. ½ W., S. by E. ½ E. It is formed by the main on the west, and by the islands on the east, one of which is at least five leagues in length. The depth of water, in running through it, was from 20 to 25 fathoms, with good anchorage every where; and the whole passage may be considered as one safe harbour, exclusive of the small bays and coves which abound on each side, where ships might lie as in a bason. The land both upon the main and islands is high, and diversified by hill and valley, wood and lawn, with a green and pleasant appearance. This passage, being discovered on Whitsunday, was called *Whitsunday passage*.

CONYA, a river of South America, in Surinam, or Dutch Guiana.

CONYBEARE, John, in *Biography*, a celebrated English prelate, born in the neighbourhood of Exeter, and educated at the free-school in that city, from whence he was admitted at Exeter college, Oxford, where he applied himself so diligently to his studies, that, in 1710, when he was but 19 years of age, he was chosen probationary-fellow upon sir William Petre's foundation. He obtained the several degrees with reputation, and was ordained priest in 1716. During the next year he officiated as curate at Fetcham in Surrey. Upon his return to Oxford, he became tutor to his own college, and gained much celebrity as a preacher. He was afterwards appointed by Dr. Gibson, bishop of London, to the situation of one of his majesty's preachers at Whitehall. In the year 1724, lord chancellor Macclesfield presented him with the rectory of St. Clements, Oxford; and in 1728, he took the degree of bachelor, and in the following year, that of doctor in divinity. In 1730, he was elected to the high and arduous office of master of Exeter college; and in a short time he undertook, at the desire of the bishop of London, and published a very excellent answer to Tindal's "Christianity as old as the Creation," under the title of "A Defence of revealed Religion against the Exceptions of a late Writer, &c." This was published in 1732; and before the end of that year he was raised to the office of dean of Christ-church. He now resigned the headship of his college, and speedily the rectory of St. Clements; and in 1734, he had the honour of entertaining, at his own apartments, the prince and princess of Orange, and of receiving the thanks of queen Caroline for his conduct on that occasion. From this period, to the year 1750, Dr. Conybeare received no additional preferment: he was then appointed to the bishopric of Bristol, which, though it increased his dignity in church preferment, was no addition to his fortune. This high honour was followed by a long train of illness, which terminated his valuable life in the year 1755. The good prelate left behind him a truly estimable character: he fulfilled all the duties of life with honour to himself, and for the advantage of those connected with or dependent upon him. Zealously attached to the church, of which he was a distinguished member, he was, at the same time, candid and liberal towards protestant dissenters, with some of whom he had been educated, and with others he maintained an occasional but friendly correspondence through life. Two years after his decease, were published, for the benefit of his surviving relations, sermons in two volumes, 8vo. The very numerous list of subscribers who patronized this undertaking, shew in what high public estimation Dr. Conybeare was held by his contemporaries. Biog. Brit.

CONYZA, in *Botany*, (derivation uncertain.) Linn. Gen. 950. Schreb. 1286. Willd. 1480. Gært. 971. Juss. 180. Vent. 2. 511. Conise; Encyc.

Gen. Ch. *Common calyx* either imbricated, or in several nearly equal ranks. *Cor.* Florets of the disk hermaphrodite, numerous, tubular, funnel-shaped; border five-cleft, patulous; florets of the circumference female, either apetalous or funnel-shaped, not composing a ray; border generally three-cleft. *Stam.* Filaments five, very short, capillary; anthers united into a hollow cylinder. *Pist.* in the *disk*. Germ oblong; style filiform, length of the stamens; stigma two-cleft: in the circumference styles and stigma more slender. *Seeds* oblong; down simple. *Recep.* naked, flat.

Eff. Ch. Seeds of the calyx imbricated, or in several nearly equal ranks. Florets of the circumference female, apetalous, or funnel-shaped, with a three-cleft border, not composing a ray. Down simple. Receptacle naked.

* *Leaves not decurrent.*

* *Herbaceous.*

1. C. *squarrosa*. Linn. Sp. Pl. 1. Mart. 1. Lam. 1. Willd. 1. Lam. Ill. Pl. 697. fig. 1. Gært. tab. 166. Eng. Bot. 1195. Flor. Dan. tab. 622. (C. major vulgaris; Bauh. Pin. 265. Tourn. 454. C. Matthioli, baccaris Monspelensium; Clus. Hist. 2. 21. Lob. ic. 574. Blackw. tab. 102.) Great fleabane, or Plowman's spikenard. "Leaves ovate-lanceolate, downy; stem corymbous; calyx-scales foliaceous, recurved, and prominent." *Root* biennial, branched, and fleshy. Whole herb soft and downy, in flavour bitter, and somewhat aromatic. *Stem* two or three feet high, erect, angular, leafy, but little branched, many-flowered. *Leaves* alternate, somewhat crenate, upper ones often entire. *Flowers* yellowish; calyx egg-shaped; outer scales green, recurved; inner ones reddish, erect, ciliated. *Seeds* angular; down scabrous. *Receptacle* tubercled. A native of England, and other parts of Europe, on a dry calcareous soil. 2. C. *linifolia*. Linn. Sp. Pl. 2. Mart. 2. (After dracunculoides; Lam. After solidaginoides; Willd. After americanus albus, mezerei arabum exasperatis foliis; Pluk. alm. 56. tab. 79. fig. 2.) "Leaves linear-lanceolate, quite entire; corollas rayed." *Stems* a foot or a foot and half high, erect, hardish, green. *Leaves* resembling those of mezereon or hyssop, only more obtuse, smooth, and stiff. *Flowers* on short terminal peduncles; florets white, slender, reflexed. Its radiate flower certainly excludes it from this genus; but as it is not inserted in our work under After, we have retained it here. A native of North America. 3. C. *scabra*. Linn. Mant. 113. Mart. 7. Willd. 2. "Leaves oblong, somewhat toothed, sessile, scabrous; peduncles one-flowered, elongated." *Leaves* rugged on both surfaces, four or five teeth on each side. *Peduncles* axillary, at the top of the branches, becoming finally six times the length of the leaves. A native of the East Indies. 4. C. *symphytifolia*. Mart. 35. Houston MSS. "Leaves oblong-egg-shaped, scabrous; flowers in terminal racemes." *Root* perennial. *Stem* three feet high. *Leaves* four or five inches long, one inch and a half broad in the middle, rough, like

like thofe of comfrey. *Flowers* yellow; on branched peduncles. Sent by Dr. Houfton to Miller from La Vera Cruz. 5. C. *foliolofa*. Willd. 3. "Leaves oblong, nearly entire, half embracing the ftem, downy; peduncles one-flowered, finally much elongated." *Stem* much branched, diffufe, downy; branches thick fet with leaves. *Leaves* alternate, downy on both furfaces. A native of the Eaft Indies. 6. C. *patula*. Mart. 30. Willd. 4. Hort. Kew. 3. 184. "Leaves elliptical, ferrated, villous underneath; calyxes fomewhat globular; fcales lanceolate, awl-fhaped; branches fpreading." *Root* annual. *Stem* a foot and half high, taper, flightly covered with a mealy down. *Leaves* about four inches long, and two broad in the middle, diminifhing gradually in fize on the upper part of the ftem and branches. *Flowers* purple; peduncles at the end of the branches generally three-flowered; calyxes foft and fwollen in the middle; fcales fmall and acute. A native of the northern parts of China, producing a fucceffion of flowers from July to the end of autumn. 7. C. *paniculata*. Willd. 5. "Leaves oblong, feffile, downy on both furfaces; lower ones petioled; toothed; teeth reflexed; ftem panicled; corymbs peduncled, axillary." *Stem* four feet high, about the thicknefs of a fwan's quill, erect, cylindrical, hollow, ftriated; branches alternate, erect, fimple. *Leaves* on the ftem petioled, on the branches feffile. *Calyx-fcales* linear-awl-fhaped, fpreading, reflexed. A native of the Eaft Indies. 8. C. *bifrons*. Linn. Sp. Pl. 7. Mart. 9. Willd. 6. (Eupatoria conyzoides maxima canadenfis; Pluk. alm. 141. tab. 87. fig. 4.) "Leaves ovate-oblong, embracing the ftem, ferrated, wrinkled." *Root* thick, fibrous. *Stems* feveral, erect. *Leaves* rough. *Flowers* yellow, in round terminal bunches. A native of Canada, flowering in July. Diftinct from Inula bifrons. 9. C. *bifoliata*. Linn. Sp. Pl. 9. Mart. 10. Willd. 7. (Eupatoria conyzoides integro jacobææ folio; Pluk. alm. 140. tab. 177. fig. 1. C. axillaris; Lam.?) "Leaves oval, toothed; peduncles two-leaved; bractes oppofite;" Linn. "Leaves cufpidate-toothed; lower ones petioled, roundifh egg-fhaped; upper ones feffile, oblong, wedge-fhaped at the bafe; racemes axillary, leafy at the bafe, peduncled;" Willd. "Leaves inverfely egg-fhaped, unequally and finely toothed, petioled; racemes axillary, leafy at the bafe, forming a terminal panicle;" Lam. *Stem* a foot and half or two feet high, fimple, flightly ftriated, downy. *Leaves* alternate, foft, green, and almoft fmooth above, cinereous and downy underneath. *Flowers* fmall; bractes truly alternate, though fome feem oppofite; calyxes villous, reddifh; Lam. Defcribed from a dried fpecimen in the Herbarium of Commerfon. In fmaller fpecimens, probably the growth of a poor foil, the peduncles are one-flowered, with oppofite bractes. In larger fpecimens the racemes are from three to fix-flowered; peduncled, furnifhed with two, either oppofite or alternate bractes, and fometimes with four alternate ones; bractes oblong, feffile, generally entire; Willd. A native of the Eaft Indies and the Ifle of France. 12. C. *pubigera*. Linn. Mant. 113. Mart. 11. Lam. 9. Willd. 8. Lour. Cochinchin. 495. (Sonchus volubilis; Rumph. Amb. 5. 299. tab. 103. fig. 2.) "Leaves oblong, fomewhat toothed, nearly feffile; peduncles woolly, about two-flowered." *Branches* with a few fcattered hairs. *Leaves* alternate, wedge-fhaped at the bafe, green on both furfaces, with a few fcattered hairs, not fcabrous; Linn. *Stem* fomewhat fhrubby, eight feet high, cylindrical, climbing, branched. *Leaves* broad-lanceolate, fomewhat pubefcent, fcattered, petioled. All the florets immerfed in a fimple down; Lour. A native of the Eaft Indies and China. 11. C. *ftricta*. Willd. 13. "Leaves linear-lanceolate, attenuated at the bafe, quite entire, hairy; flowers in corymbs; ftem panicled, ftiff." *Root* annual. *Stem* a foot and half high, erect; branches fhort, erect, clofe to the ftem. *Leaves* alternate, numerous, an inch long, obtufe, with a point, narrowed at the bafe. *Corymbs* fmall, faftigiate at the tops of the branches. *Flowers* fmall; down reddifh. A native of the Eaft Indies. 14. C. *canefcens*. Linn. jun. Sup. 367. Mart. 5. Willd. 18. Thunb. prod. 153. (C. pinifolia; Lam. 18. Elichryfum peregrinum anguftifolium flofculis fpadiceis in apices crinitos definentibus; Seb. Muf. 1. 38.) "Leaves linear, ftiff, folded back at the edges; downy underneath; panicle faftigiate." Whole plant hoary. *Stem* from twelve to fifteen inches high, nearly fimple, cylindrical, ftiff, lateral branches fhort. *Leaves* three inches long, a line broad. *Flowers* purple; calyx fhort; fcales imbricated, lanceolate, villous, only half the length of the flowers; down intermixed with the florets; giving the flowers a feathered appearance. 15. C. *oleæfolia*. Lam. 20. Willd. 15. (C. orientalis pumila incana oleæfolio; Tourn. cor. 33.) "Leaves lanceolate, attenuated at the bafe, obtufe, downy; corymb terminal; ftem fimple." *Root* perennial. *Stem* feven or eight inches high, erect. *Leaves* not an inch long, three or four lines broad, fcattered. *Flowers* in a clofe faftigiate corymb; peduncles fcaly; calyx oblong; fcales clofely imbricated, egg-fhaped, obtufe; down reddifh, longer than the calyx. A native of America. 16. C. *vifcofa*. Mart. 34. Houft. MSS. "Leaves egg-fhaped, ferrated, villous; flowers axillary and terminal." *Root* annual. Whole herb vifcid. *Stem* a foot high, branched. *Leaves* one at each joint, feffile. *Flowers* white; peduncles flender; generally three-flowered. *Seeds* chaffy. A native of La Vera Cruz. 17. C. *mollis*. Willd. 19. "Leaves rhomboid-egg-fhaped, nearly feffile, toothed, pubefcent, tomentous underneath; ftem naked upwards; flowers in a corymb." *Branches* cylindrical, ftriated. *Leaves* an inch long, very white underneath. *Corymb* terminal; branches alternate, few-flowered, divaricated; peduncles one-flowered; calyx-fcales linear-lanceolate; down long, fnow-white. 18. C. *chenopodifolia*. Lam. 12. Willd 20. "Leaves ovate-deltoid, unequally ferrated, foft; racemes fhort, terminating the ftem and branches." *Stem* tomentous upwards. *Leaves* alternate, petioled, tomentous when young, afterwards nearly fmooth. *Flowers* whitifh, feffile, four or five together at the top of the ftem and branches; calyx-leaves linear, very narrow, tomentous, almoft equal; bractes cloathed with fine filky decumbent hairs. A native of the Ifle of Bourbon. There is a variety with broader, roundifh-egg-fhaped leaves, a little cut at the bafe. 19. C. *cinerea*. Linn. Sp. Pl. 14. Mart. 16. Lam. 3. Willd. 21. (Senecio indica, foliis ternis crenatis; Burm. Zeyl. 211. tab. 96. fig. 1. S. indicus atriplicis folio; Mor. Hift. 106. tab. 17. fig. 7. Olus fcrophinum; Rumph. 6. tab. 14. fig. 1.) "Leaves egg-fhaped, flightly crenate; lower ones obtufe, upper ones acute; panicles naked, terminal;" Lam. *Root* annual. *Stem* about a foot high, flender, pubefcent. *Leaves* fmall, rather diftant, narrowed into a petiole, cinereous-green, whitifh underneath. *Flowers* purple, fmall; peduncles branched, almoft capillary; calyx-fcales acute; down white, longer than the calyx. A native of the Eaft Indies. 20. C. *prolifera*. Lam. 7. Willd. 22. (Sonchus volubilis Javanus; Rumph. 5. 299. tab. 104. 1?) "Branches proliferous at the top; leaves egg-fhaped, toothed-angular, narrowed into a petiole; corymbs clofe, terminal." *Branches* finely ftriated, full of pith, fcabrous, producing near the top fome fmaller villous branches, and giving the plant a proliferous appearance. *Leaves* fmall, acute, green, and almoft fmooth above, hoary, and cloathed with fhort hairs underneath. *Corymb* almoft feffile; calyx-fcales awl-fhaped, down white, the length of the calyx. A native of the ifland of Java. 21. C. *heterophylla*. Lam. 8. "Some of the leaves a little heart-fhaped; others

others rounder; flowers panicled." *Stem* about a foot and half high, branched, finely ftriated, cloathed with very fhort hairs. *Leaves* rather fmall, petioled, cinereous underneath. *Flowers* fmall; calyx-fcales acute, purplifh at the tip; down white, a little longer than the calyx. A native of the Eaft Indies. 22. C. *lacera*. Lam. 5. Burm. Ind. 180. tab. 59. fig. 1. "Leaves fomewhat lyrate, appearing torn, downy; flowers nodding." *Stem* about a foot and half high, fimple, cylindrical, cottony. *Leaves* alternate, obtufe; lower ones petioled. *Flowers* in a fmall terminal panicle or raceme; peduncles axillary, very fhort, often in pairs; calyxes villous; fcales imbricated, very narrow, awl-fhaped; down whitifh, not longer than the calyx. A native of Java. 23. C. *hirfuta*. Linn. Sp. Pl. 19. Mart. 19. Willd. 24. Burm. Ind. 180. Lour. Cochinchin. 496. "Leaves oval, quite entire, fcabrous, hirfute underneath." *Stem* a foot high, upright, fimple, cylindrical, hairy. *Leaves* fcattered, fomewhat acute, fometimes edged with very minute teeth. *Flowers* yellow, crowded, terminal; calyx fhort, hairy. A native of Java, China, and Cochinchina. 24. C. *pauciflora*. Willd. 25. "Leaves lanceolate-obovate, attenuated above and below, fmooth, fcabrous underneath, ferrated; branches one-flowered." *Root* annual. *Stem* from half a foot to a foot and half high, erect, ftriated, a little branched towards the top. *Leaves* an inch and half long, green. *Flowers* large, folitary, terminating the branches; calyx-fcales awl-fhaped; down fcabrous. A native of Africa, about the river Senegal. 25. C. *ægyptiaca*. Mart. 27. Willd. 26. Hort. Kew. 3. 183. (Erigeron ægyptiacum; Linn. Mant. 112. E. ferratum. Forfk. ægyp. 148. C. capitata five globofa; Bocc. Sic. 13. tab. 7. fig. B. Morif. hift. 3. 114. tab. 20. fig. 14. Jacobæa ægyp. fol. glauco coronopi; Boerh. lugdb. 99.) "Leaves oblong-fpatulate, toothed, hairy; flowers in fomewhat globular panicles; calyx-fcales awl-fhaped, foft." *Root* annual. *Stem* a foot and half high, erect, fomewhat ftriated, green, pubefcent, a little vifcid. *Leaves* alternate, feffile, fcarcely half embracing the ftem, rather obtufe. *Flowers* yellow, terminal, four or five together, on purplifh peduncles; calyx roundifh; fcales awl-fhaped; florets minute; thofe of the circumference numerous; piftils yellow, quickly vanifhing, furrounding the difk with a broad downy ring. A native of Sicily and Egypt. 26. C. *Gouani*. Linn. Mant. 469. Willd. 27. (Erigeron Gouani; Jacq. Hort. 3. 43. tab. 79.) "Leaves lanceolate, ferrated near the top, fcabrous at the edges; lower ones inverfely egg-fhaped; flowers cluftered; calyx-fcales lanceolate, membranous at the margin." *Stem* a foot high, fimple, with a few erect hairs. *Leaves* alternate, half embracing the ftem, even-furfaced. *Flowers* panicled; calyx roundifh, imbricated; fcales fmooth, convex, clofe; florets of the circumference apetalous, more numerous than thofe of the difk; ftigma bifid, oblong. A native of the Canary Iflands. 27. C. *fenegalenfis*. Willd. 28. "Leaves oblong, inverfely egg-fhaped, toothed; teeth near the bafe; deeper flowers in fomewhat of a clofe corymb." *Stem* ftriated, hairy, hifpid. *Leaves* feffile, fcabrous on both furfaces with callous points; lower ones an inch long. *Flowers* at the top of the ftem; calyx-fcales linear-lanceolate, fcabrous. A native of Africa, about the river Senegal. 28. C. *dentata*. Willd. 29. "Leaves lanceolate, embracing the ftem, dilated at the bafe, pubefcent, toothed; branchlets one-flowered; peduncles elongated; ftem hairy." *Stem* cylindrical, branched. *Leaves* an inch long. *Flowers* on long peduncles; calyx-fcales linear-awl-fhaped, fcabrous; lower ones ciliated. A native of Africa about the river Senegal. 29. C. *villofa*. Willd. 30. "Leaves lanceolate, embracing the ftem, dilated at the bafe, villous, ferrated; branchlets one-flowered; ftem villous." But little different from the preceding. 30. C *aurita*. Linn. jun. Sup. 367. Mart 24. Lam. 17. Willd. 31. "Leaves toothed; root-ones fmoothifh, inverfely egg-fhaped; ftem ones oblong, pubefcent, fomewhat pinnatifid at the bafe; ftem panicled; calyx-fcales awl-fhaped; outer ones hairy." *Root* annual. *Stem* a foot high, erect, red, hairy; branches erect, fimple. *Root-leaves* marked with red veins, widely ferrated, and crenated between the ferratures; ftem-leaves fomewhat lanceolate, foft; ferrated near the top; finuated in the middle; fomewhat pinnated at the bottom; ferrate-toothed along the whole margin; pinnæ two or three on each fide, fpreading. *Flowers* white, fmall; thofe of the circumference linear; piftils longer, erect. A native of the Eaft Indies. 31. C. *guineenfis*. Willd. 32. "Leaves toothed; root-ones fcabrous, inverfely egg-fhaped; thofe of the ftem lanceolate, villous, fomewhat pinnatifid at the bafe; ftem panicled; flowers in corymbs; calyx-fcales lanceolate; outer ones villous." *Root* annual. *Stem* a foot and half or two feet high, erect, villous. *Root-leaves* an inch and half or two inches long, obtufe, remotely ferrated; lower ftem-leaves inverfely egg-fhaped, an inch long, widely-toothed, deeply auriculate-toothed at the bafe; thofe of the branches half an inch long, lanceolate, villous, toothed, fomewhat pinnatifid at the bafe; teeth profound; teeth of the bafe quite entire, not ferrated as in the preceding. *Flowers* in a terminal corymb; calyx-fcales lanceolate, acute; outer ones fhorter, villous. Nearly allied to the preceding, but differs in the form of the calyx, and the teeth of the lower leaves. A native of Guinea. 32. C. *amplecicaulis*. Lam. 10. Willd. 35. "Leaves lanceolate, nearly embracing the ftem, fomewhat toothed, hairy; ftem branched, divaricated; peduncles one-flowered." *Root* annual. *Stem* from half a foot to a foot high. *Root leaves* inverfely egg-fhaped, toothed; thofe of the ftem oblong or lanceolate, remotely toothed, almoft entire towards the top of the branches. *Flowers* refembling thofe of C. aurita; peduncles axillary, folitary, an inch or an inch and half long. A native of the Eaft Indies. 33. C. *obliqua*. Willd. 34. (Erigeron obliquum; Linn. Mant. 572.) "Leaves egg-fhaped, nearly embracing the ftem, finely toothed, oblique; ftem much branched: peduncles one-flowered." *Root* annual. *Stem* three inches long, erect, cylindrical, hairy. *Leaves* alternate, veined, not wrinkled, fragil, befet with a few fcattered hairs. *Flowers* yellow, folitary, numerous; calyx cylindrical, pubefcent; fcales numerous, equal, awl-fhaped, approximate; florets of the circumference fcarcely confpicuous, numerous; ftigmas of the difk erect, of the circumference fpreading. A native of the Eaft Indies. 34. C. *orientalis*. Willd. 35. (C. orientalis Afteris attici folio; Tourn. Cor. 35.) "Leaves fcabrous, ferrated; lower ones inverfely egg-fhaped, petioled; upper ones lanceolate, feffile; flowers terminal, cluftered." *Root* perennial. *Stem* cylindrical, ftriated, hifpid-fcabrous, branched at the upper part; branches fhort, fimple. *Flowers* yellow, crowded, in a fort of corymb at the top of the ftem and branches; calyx-fcales awl-fhaped. A native of Armenia. 35. C. *ficula*. Willd. 36. (Erigeron ficulum; Linn. C. ficula annua, foliis atro-virentibus; Boc. Sic. 62. tab. 31. fig. 4. Morif. hift. 3. 115. tab. 20. fig. 28. Pluk. phyt. 168. fig. 2.) "Leaves linear-lanceolate, fcabrous, nearly entire, revolute at the edges; ftem panicled; peduncles one-flowered, leafy; lower calyx-fcales lax." *Root* annual. *Stems* red. *Flowers* fmall; peduncles covered with minute linear, recurved leaves. In other refpects refembling erigeron graveolens, but without a ray. Allied alfo to inula pulicaris. A native of Sicily and the fouth of France. 36. C. *fœtida*. Willd. 37. (Erigeron fœtidum. Linn. Senecio africanus

africanus perennis; Pluk. alm. 343. tab. 223. fig. 3.) "Leaves linear, attenuated at the base, mucronate; corymbs peduncled, close, terminal." *Root* perennial, too nearly allied to inula fœtida, but has no ray. A native of Africa. 37. C. *pungens*. Lam. 21. Willd 38. (C. memphitica; Vaill. act. 1719. p. 301.) "Leaves tricuspidate, awl shaped, pungent; stem panicled, angular, smooth." *Stem* a foot high, branched. *Leaves* alternate, distant; two lateral segments very short. *Flowers* yellow, large, solitary, terminal; calyx top-shaped or oblong, imbricated; scales egg-shaped, smooth; inner ones mucronate; down reddish, the length of the calyx. A native of Egypt, about Grand Cairo.

*** Stems shrubby.*

38. C. *saxatilis*. Linn. Sp. Pl. 3. Mart. 4. Lam. 23. Willd. 40. (Helichryso sylvestri similis; Bauh. Prod. 123. Elichrysum sylvestre latifolium; Tourn. 452. Helichrysum capitulis singularibus brevibus; Mor. hist. 3. 87. H. saxatile; Bocc. Mus. 142. tab. 104. Chrysocome latifolia major; Barrel. Ic. 425.) "Leaves linear, somewhat toothed; peduncles very long, one-flowered." *Root* perennial. *Stems* about a foot high, slender, branched, cottony, a little procumbent when young. *Leaves* an inch and half long, two lines broad, green above, whitish underneath. *Flowers* yellow, solitary, on long peduncles; calyx-scales oblong, somewhat scarious at the tip, lax. A native of Spain, Italy, the South of France, Palestine, &c. 39. C. *rupestris*. Linn. Mant. 113. Mart. 6. Willd. 41. (C. saxatilis β. Lam. C. tomentosa; Forsk. Ægyp. 75.) "Leaves spatulate, somewhat toothed, downy; peduncles elongated, one-flowered." Very like the preceding, but the flowering stems have axillary branches of smaller leaves. *Leaves* broader, shorter, more obtuse, all except the lowermost white on both sides. *Flowers* yellow; peduncles shorter and thicker, with one or two lanceolate, not bristle-shaped, bractes; calyx-scales not acute and patulous, but rather obtuse and closely imbricated; outer ones egg-shaped, brown at the tip; middle ones linear, obtuse, with a brown line on the back. A native of Arabia. 40. C. *sordida*. Linn. Mant. 466. Mart. 3. Lam. 22. Willd. 39. (Gnaphalium sordidum; Linn. Sp. Pl. Elichrysum sylvestre angustifolium, capitulis conglobatis; Bauh. Pin. 264. Stæchus citrina spuria, longioribus foliis; Bar. Ic. 368. & 277.) "Leaves linear, quite entire; peduncles long, three-flowered." Nearly allied to C. saxatilis. *Stem* resembling that of lavender, about a foot high, slender, cottony. *Leaves* very narrow, soft, cottony, whitish. *Flowers* small; peduncles long, slender, cottony; calyxes conic; scales imbricated, a little scarious at the tip. A native of the South of France and Italy. 41. C. *ericoides*. Lam. 51. Willd. 43. "Leaves linear, revolute, downy underneath; flowers globular, solitary, terminating the branches." *Stem* much branched; branches downy near the top. *Leaves* resembling those of phylica ericoides, small, numerous, approximate, scattered, spreading. *Flowers* at the top of the lateral branches, which are so disposed as to give the stems the appearance of being covered with flowers; calyx-scales linear, scarcely imbricated; outer ones downy on the back; down reddish. A native of Peru. 42. C. *thyoides*. Lam. 42. Illus. Pl. 697. fig. 5. Willd. 44. "Leaves embracing the stem, egg-shaped, acute, keeled, compressed, imbricated in two rows; flowers solitary, sessile, lateral." A very singular plant in the form and disposition of its leaves, with somewhat of the habit of a Thuia. *Stem* a foot and half high, cylindrical, cottony towards the summit; branches in two rows, gradually diminishing in length from the bottom of the stem to the top. *Leaves* small, numerous, concave, villous on the inside. *Flowers* axillary; calyx-scales few, oblong, smooth and even; down reddish. A native of Peru, found by Joseph Jussieu. 43. C. *cupressiformis*. Lam. 43. Ill. Pl. 697. fig. 3. Willd. 45. "Whole plant smooth; leaves minute, inversely egg-shaped, keeled, imbricated in four rows; flowers solitary, terminal." A plant as singular as the preceding, with the habit and foliage of a cypress, and the flowers of an Athanasia. *Stem* rather thick, stiff, slender branched. *Leaves* thickly covering the branches. *Flowers* yellow, solitary, sessile; calyx cylindrical; scales imbricated, obtuse, inner ones the longest. Found by Commerson in the Straits of Magellan. 44. C. *lycopodioides*. Lam. 44. Ill. Pl. 697. fig. 2. Willd. 46. "Leaves awl-shaped, imbricated, pressed close to the branches; flowers solitary, terminal." A shrub six or seven inches high. *Stem* stiff; branches erect, generally fasciculated so as to resemble lycopodium selago. *Leaves* three lines long, smooth, convex at the back, with two lateral furrows. *Flowers* white or lemon-coloured, sessile; calyx-scales imbricated, similar to the leaves but smaller; down white, twisted and appearing curled. Found by Commerson in the Isle of Bourbon. 45. C. *bryoides*. Lam. 45. Willd. 47. "Prostrate; leaves linear, crowded, hoary underneath; branchlets terminated with a sessile flower." A small shrub. *Stem* divided into numerous, short, procumbent branches, throwing out fibrous roots; branches erect, in close tufts somewhat in the manner of a Bryum. *Leaves* small, numerous, placed very near each other, green above, whitish and cottony underneath. *Flowers* yellow, solitary; calyx almost cylindrical, containing from six to eight florets; scales imbricated, oblong; down the length of the calyx. Found by Commerson in the Straits of Magellan. 46. C. *linearifolia*. Lam. 49. Willd. 48. "Smooth; leaves linear, nearly entire, narrowed towards the base; racemes short, leafy, terminal." A small much-branched shrub; branches slender, leafy towards the top, slightly striated. *Leaves* an inch long, two lines broad. *Flowers* sessile or nearly so; calyx oblong, imbricated; inner scales linear-lanceolate, white and scarious at the edges; down reddish, the length of the calyx. A native of the Isle of Bourbon. 47. C. *punctata*. Willd. 49. "Leaves linear, acuminate, attenuated at the base, slightly marked with concave dots; peduncles very long, one flowered." *Branches* cylindrical, striated, smooth. *Leaves* an inch and half long, alternate, crowded, somewhat fleshy, rather scabrous, quite entire and scabrous at the edges. *Peduncles* at least half a foot long, solitary or in pairs, beset with awl-shaped distant scales; calyx-scales lanceolate, acute; down reddish. A native of Chili. 48. C. *canariensis*. Willd. 50. "Leaves linear, attenuated at the base, rather obtuse, serrated; corymbus terminal." *Branches* cylindrical; younger ones pubescent. *Leaves* alternate, crowded, spreading, green on both surfaces, somewhat scabrous. *Flowers* yellow; peduncles scaly; calyx-scales oblong, closely imbricated. A native of the Canaries. 49. C. *incana*. Willd. 51. (Erigeron incanum; Vahl. Symb. 1. 72.) "Leaves linear, attenuated at the base, somewhat toothed, downy; corymbus terminal." *Branches* downy. *Leaves* sessile, approximate, rather acute, a little revolute at the margin. *Corymbs* many-flowered; calyx-scales linear, somewhat villous; down ferruginous, longer than the calyx. A native of Arabia Felix. 50. C. *inuloides*. Mart. 25. Willd. 52. Hort. Kew. 3. 182. (Chrysocoma dichotoma; Linn. jun. Supp. 359. Jacq. Ic. Rar. 1. tab. 171.) "Leaves wedge-shaped-linear, obtuse, crenate-toothed, smooth; anthers two-bristled." *Stem* smooth, proliferous, dichotomously branched. *Leaves* rather short, a little obtuse, somewhat scabrous, with minute points.

Flowers

Flowers yellow, in terminal ſimple corymbs; peduncles hirſute; bractes awl-ſhaped; calyx purpliſh. A native of rocky ground in the iſland of Teneriffe. 51. C. *tomentoſa.* Mart. 31. Mill. Dict. Houſt. MSS. "Leaves oblong-egg-ſhaped, downy, cinereous underneath, flowers terminal, on branching peduncles." *Stem* ten or twelve feet high, much branched. *Leaves* alternate, on ſhort petioles. *Flowers* white, in looſe unilateral ſpikes. A native of La Vera Cruz in New Spain. 52. C. *chryſocomoides.* Willd. 53. Desfont. Atl. 2. 269. tab. 232. "Leaves linear, quite entire, villous; hairs preſſed cloſe; peduncles leafy, one-flowered." Whole plant cinereous green, cloathed with ſhort ſoft hairs preſſed cloſe to the ſurface. *Stems* a foot and half high, ſlender, branched. *Leaves* ſpreading. *Flowers* in looſe panicles, on filiform peduncles; calyx ovate-cylindrical, ſcales linear, awl-ſhaped, imbricated, pubeſcent, membranous at the edges; florets of the circumference very ſmall, ſcarcely conſpicuous, without teeth. A native of Barbary. 53. C. *coronopus.* Lam. 35. Willd. 54. "Viſcid leaves linear-lanceolate, ſerrated ſerratures oblong, turned upwards; flowers globular in terminal corymbs." 54. C. *glutinoſa.* Lam. 32. "Leaves lanceolate, ſerrated, green on both ſurfaces; viſcid when young." A ſhrub four or five feet high, ſmooth. *Branches* lax, cylindrical, ſlightly ſtriated, leafy towards the ſummit. *Leaves* ever-green, petioled, acute, ſhining. *Flowers* yellow, numerous, ſmall, in a compound terminal corymb; calyx roundiſh, imbricated with egg-ſhaped ſcales; florets of the circumference very ſmall; down white, ſhort. A native of the Iſle of France. 55. C. *appendiculata.* Lam. 31. Willd. 66. "Leaves lanceolate, ſerrated, downy underneath, appendicled at the baſe." *Branches* tubercled, cottony towards the ſummit. *Leaves* near four inches long, about an inch broad, green above, cottony and whitiſh underneath, furniſhed at the baſe with ſome narrow appendages which are decurrent along the petiole. *Flowers* yellow, numerous, in a compound terminal corymb; peduncles and calyx cottony; bractes at the diviſions of the peduncles linear. Found by Commerſon in the Iſle of Bourbon. 56. C. *ſalicifolia.* Mart. 32. Lam. 33. Willd. 55. "Leaves linear-lanceolate, quite entire, revolute at the edges, attenuated upwards and downwards, downy underneath, corymb terminal, compound." *Branches* cylindrical, tubercled; younger ones downy. *Leaves* reſembling thoſe of Salix viminalis, two inches long, alternate, petioled. *Corymb* divaricated; peduncles downy; calyxes cylindrical, imbricated; outer ſcales egg-ſhaped, pubeſcent; inner ones longer, linear, ſmooth. There is a variety with very narrow, almoſt filiform leaves. 57. C. *laurifolia.* Lam. 34. Willd. 56. "Leaves oblong-lanceolate, narrowed at the baſe into a petiole, nearly entire; corymb terminal, compound, ſpreading." A very large ſhrub. *Branches* cylindrical, almoſt ſmooth, leafy on their upper part. *Leaves* about ſix inches long, rather more than an inch broad, ſcattered, ſlightly pubeſcent, ſometimes ſlightly crenulate. *Flowers* numerous, globular; peduncles cloathed with ſhort, woolly hairs; calyx-ſcales ovate-lanceolate, almoſt ſmooth; down reddiſh. Found by Commerſon in the Iſle of Bourbon. It ſeems to have ſome affinity with Baccharis arborea of Linnæus. There is a variety with ſmooth leaves broader at the top, ſmaller flowers and longer down, which perhaps may prove a diſtinct ſpecies. 58. C. *uniflora.* Mart. 38. Mill. Houſt. MSS. "Leaves lanceolate, acute, ſeſſile; flowers ſolitary, lateral, calyxes coloured." *Stem* eight or ten feet high, with numerous, long, ſlender branches. *Leaves* three inches long, three quarters of an inch broad in the middle. *Leaves* growing cloſe to the ſtems of the ſmaller branches. *Flowers* white, with a purple calyx, ſitting cloſe to the baſe of the leaves, one at each joint of the branch. A native of Carthagena in New Spain. 59. C. *purpuraſcens.* Mart. 42. Willd. 9. Swartz. prod. 112. (C. odorata minor; Brown. Jam. 318. C. major odorata; Sloan. Hiſt. 1. 258. tab. 158. fig. 1.) "Leaves ovate-lanceolate, ſerrated, ſomewhat downy; ſtem ſomewhat herbaceous, ſimple below, corymbous above; flowers egg-ſhaped." *Stem* four or five feet high (ſixteen or twenty inches; Brown.) *Leaves* on the ſtem and lower branches four inches long, one inch broad in the middle, on ſhort petioles; on the upper branches much narrower, acute. *Flowers* purple, in round terminal bunches. A native of Jamaica. 60. C. *trinervis.* Mart. 37. Lam. 13. Willd. 10. "Leaves egg-ſhaped, ſmooth, three-nerved, quite entire, ſeſſile; flowers in terminal ſpikes; ſtem ſhrubby." Mill. "Leaves ovate-lanceolate, quite entire, ſmooth, three-nerved; ſtem-leaves alternate, thoſe of the branches nearly oppoſite." Lam. *Stem* ſix or ſeven feet high, dividing into ſeveral woody branches. *Flowers* white. Sent by Robert Millar from Carthagena in New Spain. Miller. *Stem* ſmooth, leafy, full of pith, with numerous lateral and axillary branches. *Leaves* acute, on very ſhort petioles. *Flowers* in a naked, moderate ſized, panicle at the ſummit of the ſtem and branches; calyx ſmooth, imbricated with egg-ſhaped ſcales; down reddiſh, longer than the calyx. Found by Commerſon in Brazil. It perhaps may be doubted whether Millar's be the ſame plant. 61. C. *ferrulata.* Lam. 14. Willd. 11. "Leaves ovate-lanceolate, broader at the baſe, acutely ſerrated, petioled, nearly ſmooth; corymbs branched, terminal." *Stem* two or three feet high, hard, full of pith, cylindrical, almoſt ſmooth, branched. *Leaves* alternate, acute, three-nerved. *Calyx* ſmooth, imbricated; down reddiſh. A native of Brazil. 62. C. *madagaſcarienſis.* Lam. 15. Willd. 12. "Leaves lanceolate-linear, diſtantly ſerrated, ſmooth; panicle cymous, lax, terminal." *Leaves* three or four inches long, four or five lines broad, erect, quite ſmooth, on ſhort petioles. *Flowers* ſmall; calyx ſhort, ſmooth, imbricated; down reddiſh. A native of Madagaſcar. 63. C. *candida.* Linn. Sp. Pl. 12. Mart. 13. Lam. 19. Willd. 16. (C. cretica fruticoſa, folio molli candidiſſimo; Tourn. Cor. 33. C. ſaxatilis folio filaginis; Buxb. Cent. 2. 23. tab. 17. Jacobæa cretica Incana; Barr. Ic. 217.) "Leaves egg-ſhaped, downy; flowers crowded; peduncles lateral and terminal." Whole plant white and cottony. *Stem* ſomewhat ſhrubby, ſix inches high or more, rather ſlender, erect, cylindrical. *Leaves* on long petioles, entire, ſoft. *Flowers* purple; peduncles one, two, or three-flowered; bractes oblong, ſeſſile, ſituated juſt below the calyx; calyx ſhort, imbricated; ſcales oblong, lanceolate, lax. A native of the iſland of Candia. Linnæus mentions a rayed variety. 64. C. *verbaſcifolia.* Willd. 17. (C. verbaſci foliis ſerratis; Tourn. Inſt. 455. After tomentoſus luteus verbaſci folio; Bocc. Sic. 60. tab 31. fig. 2. After raguſinus; Zann. Hiſt. 33.) "Leaves egg-ſhaped, petioled, crenate, obtuſe, downy, wrinkled with veins; peduncles one-flowered, ſolitary, terminal and axillary, thickened upwards." *Stems* like thoſe of C. candida. *Leaves* an inch, or an inch and half long, on long petioles. *Flowers* yellow. In other reſpects ſimilar to the preceding. A native of Sicily, Greece, and Armenia. 65. C. *balſamifera.* Linn. Sp. Pl. 13. Mart. 15. Lam. 11. Willd. 18. (C. odorata; Rumph. Amb. 6. tab. 24. fig. 1.) "Leaves oblong-lanceolate, doubly toothed, acute, downy underneath, wrinkled with veins; petioles toothed; corymb terminal, divaricated." *Stem* from four to ſix feet high, branched. *Leaves* large, profoundly toothed at the baſe, where they appear pinnatifid,

tifid,

tifid, very foft; upper ones entire. *Flowers* in terminal panicled racemes; peduncles and calyx cloathed with a fine, whitifh cottony down; calyx-fcales narrow, awl-fhaped; down reddifh, longer than the calyx. A native of the Eaft Indies. It has an aromatic fmell, refembling that of fage. 66. C. *chinenfis.* Linn Sp. Pl. 16. Mart. 18. Lam. 4. Willd. 23. Lour. Cochin. 496. Burm. Ind. 179. (Senecio amboinicus; Rumph. Amb. 6. 36. tab. 14. fig. 2.) "Leaves lanceolate-egg-fhaped, reflex-ferrated, downy underneath; flowers terminal, cluftered." *Stem* fomewhat fhrubby, four feet high, erect, cylindrical, fmooth, branched at the top. *Leaves* hardifh, petioled, alternate. *Flowers* yellow, peduncled, terminal. *Receptacle* fomewhat villous. Lour. *Flowers* feldom more than three together. Linn. The plant defcribed by La Marck, which is cultivated in the Paris garden, has a ftem only a foot high, and blueifh purple flowers. In other refpects it correfponds with the above defcription. 67. C. *corymbofa.* Mart. 33. Mill. Houft. MSS. "Arborefcent; leaves lanceolate; flowers in terminal corymbs, on branching peduncles." *Stem* fourteen or fixteen feet high, divided at the top into many woody branches. *Leaves* alternate, on fhort petioles. *Flowers* white. Sent by Dr. Houfton from La Vera Cruz in New Spain. 68. C. *baccharis.* Mart. 41. "Leaves ovate-oblong, obtufe, ferrated, half embracing the ftem; flowers in terminal corymbs." *Stem* ten or twelve feet high, fending out many ftrong woody branches. *Flowers* purple. A native of Campeachy. 69. C. *tortuofa.* Linn. Hort. Clif. 405. Mart. 12. Willd. 57. "Stem crooked; leaves ovate-oblong, quite entire; racemes reflexed." *Branches* fomewhat hirfute, ftriated, fimple. *Leaves* veined, fcabrous on both furfaces, on very fhort petioles. *Flowers* in fimple, fhort, terminal, and axillary racemes, alternate, feffile, turned upwards; calyx roundifh, imbricated; fcales egg-fhaped, inner ones lanceolate; down fetaceous, faftigiate. A native of La Vera Cruz. 70. C. *fcandens.* Mart. 36. Mill. Houft. MSS. "Leaves lanceolate, fcabrous, nerved, feffile; racemes recurved; flowers afcending; peduncles lateral; ftem climbing." *Stem* fourteen or fixteen feet high, much-branched. *Leaves* the fize of thofe of the bay tree, and full as thick in their texture. *Flowers* white, in long unilateral racemes. A native of La Vera Cruz. 71. C. *rigida.* Mart. 43. Willd. 58. Swartz. Prod. 113. "Leaves petioled, inverfely egg-fhaped, entire, fcabrous, veined underneath; fpikes zig-zag; flowers unilateral, in pairs." A native of Jamaica. 72. C. *amygdalina.* Lam. 38. "Leaves petioled, ovate-lanceolate, ferrated, fomewhat downy; flowers in a terminal corymb." *Leaves* refembling thofe of the almond-tree, much veined underneath. *Calyx* almoft fmooth, fhort, imbricated; fcales lanceolate, a little fcarious at the edges; down reddifh. Found by Commerfon in the Ifle of Bourbon. There is a variety with nearly feffile leaves, cloathed on both furfaces with a whitifh almoft filky down. 73. C. *pedunculata.* Mart. 40. "Leaves ovate-lanceolate, three-nerved; peduncles very long, terminal; flowers in a corymb." *Stem* fix or feven feet high, branched. *Leaves* fmooth, alternate, on fhort petioles. *Flowers* purple; calyx-fcales fhort, chaffy. A native of Campeachy. 74. C. *melaftomoides.* Lam. 40. "Leaves egg-fhaped, feffile, toothed, three-nerved, naked and wrinkled above, clothed with a filky down underneath." *Leaves* alternate, fometimes five-nerved, an inch and half long. *Flowers* collected into a denfe terminal corymb; calyx-fcales linear-acute, almoft equal, a little fcarious at the edges; down reddifh, a little longer than the calyx. Found by Commerfon in the Ifle of Bourbon. 75. C. *lithofpermifolia.* Lam. 41. Willd. 62. "Leaves lanceolate, toothed at the tip, hairy on both furfaces, crowded; inner calyx-fcales dry." A humble fhrub, not more than four or five inches high. *Stem* branched; branches leafy at the fummit. *Leaves* narrowed towards the bafe, almoft three-nerved, near an inch and half long. *Flowers* in a terminal corymb; peduncles villous, with narrow bractes; calyx-fcales linear-acute; outer ones villous. Found by Commerfon in the Ifle of France. 76. C. *heliotropifolia.* Lam. 37. Willd. 63. "Leaves feffile, oblong, quite entire, fomewhat downy; corymb terminal, villous; flowers cluftered." *Leaves* four or five inches long, one inch broad, growing near each other at the top of the branches, clothed on both furfaces with a cottony reddifh down. *Flowers* from four to fix in a corymb; peduncles villous; calyx-fcales linear, villous; down reddifh, longer than the calyx. Found by Commerfon in the Ifle of Bourbon. 77. C. *panamenfis.* Willd. 64. "Leaves feffile, ovate-lanceolate, fcabrous, quite entire, triply-nerved; panicle terminal." *Stem* cylindrical, ftriated, fmooth. *Leaves* an inch and half long, reticularly veined. *Peduncles* long, one or two-flowered; calyx-fcales oblong, adpreffed; down reddifh. 78. C. *pyrifolia.* Lam. 36. Willd. 65. "Leaves egg-fhaped, acuminate, fomewhat toothed, fmooth; corymb panicled, lax." *Branches* fmooth. *Leaves* alternate, petioled. *Flowers* whitifh; calyx fhort, fmooth, imbricated; down reddifh, longer than the calyx. Found by Commerfon in the ifland of Java. 79. C. *argentea.* Lam. 24. Willd. 67. "Leaves egg-fhaped, tomentous-filky, half embracing the ftem; flowers feffile, terminal, cluftered." Abundantly clothed, like a gnaphalium, with a filvery filky down. *Stem* cylindrical, fimple. *Leaves* fcattered, numerous. *Flowers* yellow, two or three together; florets fhorter than the calyx; calyx-fcales narrow, erect, bearded." Found by Commerfon in the Ifle of Bourbon. 80. C. *populifolia.* Lam. 25. Willd. 68. "Leaves heart-fhaped, petioled, downy, quite entire; calyxes hemifpherical." *Branches* fhort, thick, ftiff, knotty, cottony, ftriated, leafy towards the fummit. *Leaves* acute. *Flowers* large, from five to feven in a terminal corymb; peduncles an inch long, fimple, thickened under the calyx, angular; calyx cottony, imbricated; florets numerous; down reddifh, longer than the calyx, ftiffifh. Found by Commerfon in the Ifle of France. 81. C. *carolinenfis.* Willd. 69. Jacq. Ic. rar. 3. tab. 585. "Leaves ovate-lanceolate, quite entire, hoary, downy underneath; corymb terminal, compound." *Stem* five feet high. *Branches* cylindrical, downy. *Leaves* at leaft two inches long, petioled. *Flowers* violet, fmall; calyx-fcales oblong, downy. A native of Carolina, Florida, and the Bahama Iflands. 82. C. *odorata.* Linn. 15. Mart. 17. Lam. 26. Willd. 70. (C. verbafci folio undulato; Plum. Sp. 9. Burm. Amer. tab. 97. Tourn. Inft. 455. C. major odorata, five baccharis: Sloan. Jam. Hift. 1. 258. tab. 152. fig. 1. β C. folio verbafci dentato; Plum. Sp. 9. Burm. Amer. tab. 97. Tourn. 455.) "Leaves egg-fhaped, petioled, fomewhat toothed, downy; flowers aggregate, in a corymb; calyxes hemifpherical." An odoriferous fhrub, from four to fix feet high. *Stem* erect, branched. *Leaves* four or five inches long, more than two inches broad, fome entire, others flightly toothed. *Flowers* purple: peduncles fhort, cottony; calyx imbricated, cottony; fcales fhort, rather obtufe. A native of South America. 83. C. *arborefcens.* Linn. Sp. Pl. 18. Mart. 20. Lam. 27. Willd. 71. Plum. Sp. 10. Burm. Amer. tab. 132. fig. 2. (C. fruticofa flore pallido purpureo; Sloan. Jam. 124. Hift. 1. 257. Eupatorium erectum hirfutum, foliis oblongis rugofis Brown. Jam. 313.) "Leaves egg-fhaped, quite entire, acute, downy underneath; fpikes recurved, unilateral,

bractes

bractes reflexed." Four or five feet high. *Stem* erect, branched towards the top; branches divaricated, sub-divided, bending down, diverging, villous, with a blackish shagginess. *Leaves* two inches long, alternate, on short petioles, wrinkled, green above; pale, pubescent, and nerved underneath. *Flowers* pale purple, in a unilateral spike, or rather raceme. A native of South America. 84. C. *scorpioides*. Lam. 28. "Leaves ovate-lanceolate, petioled, entire, even-surfaced; spikes unilateral, revolute, naked." Nearly allied to the preceding, and perhaps only a variety, but its leaves are even-surfaced above, and almost smooth underneath. *Flowers* in linear racemes, recurved like the tail of a scorpion; calyx-scales lanceolate; inner ones a little villous at the tip; down white. Found by Commerson in Brazil. 85. C. *fruticosa*. Linn. Sp. Pl. 17. Mart. 21. Lam. 29. Willd. 72. (C. frutescens, cydoniæ folio; Plum. Sp. 9. Burm. Amer. tab. 95. fig. 1. Tourn. 455.) "Leaves egg-shaped, quite entire, obtuse; flowers sessile, alternate; branchlets zig-zag." A petty shrub, resembling rosemary, but with longer and more slender branches. *Leaves* numerous, alternate, petioled, white with down. *Flowers* purple, axillary, solitary. A native of South America. 86. C. *incisa*. Mart. 29. Willd. 43. Hort. Kew. 3. 184. "Leaves egg-shaped, somewhat heart-shaped, hairy viscid, toothed, auricled at the base; receptacle honey-combed." Whole plant clothed with viscid hairs. *Stem* three feet high. *Leaves* an inch long, petioled, deeply cut. *Corymbs* terminal, few-flowered, on long peduncles. A native of the Cape of Good Hope, found by Francis Masson. 87. C. *arbutifolia* Lam. 52. Willd. 74. "Leaves egg-shaped, veined, sharply toothed, crowded; flowers sessile, terminal, globular." A smooth shrub, a foot and half high, or more. *Branches* erect, generally fasciculated, leafy on their upper part, naked towards the base, and marked with the scars of fallen leaves, with a decurrent line on each side. *Leaves* scattered, sessile, approximate, narrowed at the base. *Flowers* rather large, clustered; calyx imbricated; scales ovate-lanceolate; down reddish. Found by Joseph Jussieu in Peru. 88. C. *myrsinites*. Lam. 48. Willd. 75. "Leaves lanceolate, two-toothed; flowers globular, somewhat clustered, terminal." *Branches* slender, leafy on the upper part, somewhat angular. *Leaves* small. *Flowers* very small, almost sessile; calyx imbricated; scales egg-shaped, acute, slightly ciliated on the upper edge. A native of St. Domingo. 89. C. *magellanica*. Lam. 47. Willd. 76. "Smooth; leaves very small, ovate-wedge-shaped, obsoletely three-toothed; flowers lateral, solitary, terminating the branchlets." A low, much-branched, spreading shrub. *Leaves* numerous, approximate, obtuse. *Flowers* oval, sessile; calyx-scales egg-shaped. Found by Commerson in the straits of Magellan. 90. C. *cuneifolia*. Lam. 46. Willd. 77. (Erigeron tricuneatum; Linn. jun. Supp. ?) "Smooth; leaves wedge-shaped, toothed towards the tip; flowers axillary and terminal, somewhat clustered." Much-branched, viscid. *Leaves* sessile. *Flowers* nearly sessile; calyx egg-shaped, imbricated; scales ovate-acute, a little scarious, fringed towards the tip; down reddish, longer than the calyx. Found by Commerson near Monte Video, and at the straits of Magellan. The younger Linnæus's plant was found by Mutis in New Mexico. 91. C. *retusa*. Lam. 39. Willd. 78. "Leaves ovate-wedge-shaped, retuse, crenated near the tip, pubescent; flowers globular, terminal, and axillary, forming a corymb." *Stem* a foot and half or two feet high; branches numerous, cylindrical, naked, and knotty below, leafy near the summit. *Leaves* scattered, thickish, succulent, with three or five longitudinal nerves. *Flowers* whitish; peduncles branched, pubescent; calyx hemispherical, imbricated; scales egg-shaped, inner ones somewhat scarious and lacerated at the edges; hermaphrodite florets of the disk numerous; female ones of the circumference in two or three ranks. Found by Commerson in the Isle of Bourbon. 92. C. *buxifolia*. Lam. 50. Willd. 79. "Smooth; branches stiff; leaves oblong-egg-shaped, quite entire; flowers lateral, sessile." About four or five feet high. *Branches* erect, close, somewhat filiform, angular, tubercled, leafy towards the summit. *Leaves* six or seven lines long, scattered, approximate, almost sessile, narrowed towards the base. *Flowers* axillary, solitary; calyx imbricated; scales ovate-oblong, slightly ciliated near the tip; down whitish. Found in Peru by Joseph Jussieu. 93. C. *carthagenensis*. (C. spicata; Mart. 39.) "Leaves egg-shaped, three-nerved; flowers in axillary spikes." *Stem* ten or twelve feet high, dividing at the top into many woody branches. *Leaves* an inch long, alternate, sitting close to the branches, acuminate. *Flowers* white. A native of Carthagena in New Spain.

** *Leaves decurrent.*

Herbaceous or Shrubby.

94. C. *genistelloides*. Lam. 56. Willd. 80. (Canambaya; Marg. Bras. 78.) "Stems somewhat shrubby, without leaves, nearly smooth; rings interrupted by joints, terminated by a short scale; flowers sessile, lateral, alternate." *Stems* from a foot to three feet long. *Wings* between each joint, broader on one side than on the other, decussated, green. *Flowers* yellow, situated at the joints in the upper part of the plant, solitary in the axil of the scale; calyx round, almost smooth, imbricated; scales ovate-acute; down reddish. A native of Peru. 95. C. *articulata*. Lam. 57. Ill. Pl. 697. fig. 4. Willd. 81. "Stem much branched, interruptedly winged; leaves oblong-elliptical, shorter than the joints; flowers panicled." *Stem* a foot and half high; branches compound, smooth, viscid towards the summit. *Flowers* pale yellow, sessile, almost globular, often clustered together in a kind of terminal spike or panicle; calyx imbricated, scales obtuse. Found by Commerson at Monte Video. 96. C. *sagittalis*. Lam. 58. Willd. 82. "Leaves decurrent, lanceolate, finely toothed, a little scabrous, green on both surfaces; flowers clustered together at the top of the branches." *Stem* winged as in the two preceding. *Leaves* alternate, two or three inches long. *Flowers* from three to five in a cluster; calyx short; scales egg-shaped, somewhat pubescent; florets numerous; down longer than the calyx. Found by Commerson at Monte Video. 97. C. *crispata*. Willd. 83. Vahl. 1. 71. Forsk. Arab. 119. n. 495. "Leaves lanceolate, serrate-toothed, naked; peduncles one-flowered; stem shrubby." Whole plant smooth. *Stem* erect, striated; branches and peduncles with curled tooth-sinuated wings. *Leaves* an inch and half long, remote. *Flowers* two or three at the top of the branches; peduncles half an inch long; calyx-scales linear-lanceolate, the length of the florets in the circumference. A native of Arabia Felix. 98. C. *arabica*. Willd. 84. (Erigeron decurrens; Vahl. Symb. 1. 72.) "Leaves linear, quite entire, downy; flowers panicled." *Stem* erect, striated, pubescent, downy near the top; branches woody. *Leaves* an inch and half long. *Pedicels* capillary, with two minute bractes near the top; calyxes villous; scales bristle-shaped, shorter than the down. A native of Arabia Felix. 99. C. *thapsoides*. Willd. 85. Marsch. de Biberst. Fl. Caucas. "Leaves egg-shaped, mucronate, downy; lower ones serrated; flowers in corymbs." *Root* perennial. A native of Mount Caucasus, near the shores of the Caspian sea. 100. C. *virgata*. Linn. Sp. Pl. 5. Mart. 22. Lam. 53. Willd. 86. (C. helenii folio; Pl. Sp. 9. Burm.

Burm. Amer. tab. 98. fig. 2. C. anguftifolia fubincana; Brown. Jam. 318. Helichryfum caule alato; Sloan. Jam. 125. Hift. 1. 206. tab. 152. fig. 5.) "Leaves linear-lanceolate, finely ferrated, downy underneath; fpikes terminal, elongated, interrupted." *Root* perennial, woody. *Stem* about two feet high, erect. *Leaves* five or fix inches long, alternate, green and fmooth above, whitifh and downy underneath. *Flowers* pale purple, feffile, lower ones three together, upper ones folitary; calyx oblong, imbricated; fcales acute, rather hairy. A native of St. Domingo, Jamaica, and Carolina. 101. C. *rugofa*. Willd. 87. Vahl. Symb. 1. 71. "Leaves elliptical, crenated, downy underneath; flowers in a head." *Branches* woody; wings quite entire, fmooth on one fide, very downy on the other. *Leaves* an inch and half long, wrinkled, fmooth above, downy underneath. *Peduncles* the length of the leaves, from the axils of the upper leaves. A native of Brazil. 102. C. *alopecurioides*. Lam. 54. Willd. 88. Plum. Sp. 9. Burm. Amer. tab. 98. fig. 1. "Leaves egg-fhaped, finely ferrated, downy underneath; fpike terminal, denfe, interrupted at the bafe." *Root* perennial, fpindle-fhaped, woody. *Stems* about two feet high; wings green on one fide, white and downy on the other. *Leaves* alternate; green, fmooth, fomewhat wrinkled above, whitifh and downy underneath. *Flowers* feffile; calyx imbricated, downy at the bafe; inner fcales longer and fmooth towards the tip; down rather long. A native of Martinico and Brazil. 103. C. *fpicata*. Lam. 55. Willd. 89. Cav. Ic. 1. 8. tab. 12. "Stem fomewhat fhrubby, fimple; leaves ovate-lanceolate, finely ferrated, downy underneath; fpike terminal, denfe, entire." *Stem* a foot and half high, erect, ftriated with green and white. *Leaves* from three to four inches long, fix or eight lines broad, alternate, green and fmooth above, white and downy underneath. *Flowers* feffile; calyx clothed with a thick down, imbricated; fcales narrow-lanceolate, inner ones longer. Female florets intermingled with the hermaphrodites. A native of South America. Obf. As the genera baccharis and conyza now ftand, this fpecies belongs to the former. 104. C. *redolens*. Willd. 90. (Gnaphalium redolens; Forft. Prod. n. 535.) "Leaves lanceolate, quite entire, downy underneath; fpikes terminal, glomerated." *Stem* woody, branched. *Leaves* half an inch long, obtufe. *Spikes* half an inch long; calyxes villous. A native of New Caledonia. 105. C. *decurrens*. Linn. Sp. Pl. 6. Mart. 23. Willd. 91. (C. alopecuroides, β. Lam.?) "Leaves lanceolate, finely ferrated; ftem fomewhat dichotomous; flowers axillary, feffile, glomerated." *Root* annual. Whole plant downy. *Stem* about three inches long, erect. A native of the Eaft Indies.

Obf. The only effential diftinction between baccharis and conyza confifts in the former having the hermaphrodite and female florets intermingled with each other; whereas, in the latter, the female florets are all collected in the circumference, but without rendering the compound flower properly radiate. In dried fpecimens, it is not always poffible to determine thefe characters with certainty; fo that, as La Marck obferves, fome of the foregoing fpecies may belong to baccharis. Juffieu, Gærtner, and La Marck, are of opinion, that the two genera are fcarcely diftinct. The latter, however, fuggefts that two genera might be formed out of them, diftinguifhed by the form of the calyx: one of them with the calyx of erigeron, *i. e.* not properly imbricated, having linear, nearly equal fcales in feveral ranks; the other with the calyx of eupatorium, *i. e.* ftrictly imbricated. If any of the fpecies fhould be found to have all the florets hermaphrodite, they muft be referred to eupatorium. Erigeron differs in having a radiate flower.

Willdenow, in the third part of his third volume, publifhed fince our article baccharis went to the prefs, has added the following fpecies to that genus. 1. B. *vifcofa*, 4. Lam. "Leaves elliptical, rather acute, three-nerved, quite entire, peticled; younger ones vifcid." *Flowers* in terminal, compound, peduncled corymbs. A native of the Ifles Mauritius and Bourbon. 2. B. *arbutifolia*, 6. Vahl. Symb. 3. 97. "Leaves oblong, feffile, rigid, acutely ferrated, reticularly veined; corymb terminal; flowers cluftered." A fmooth fhrub. A native of Peru. 3. B. *feffiliflora*, 7. Vahl. 3. 97. "Leaves oblong, feffile, toothed, and entire; flowers terminal, feffile." *Flowers* twice as large as thofe of B. halimifolia. A native of Brazil. 4. C. *villofa*, 9. Vahl. 3. 98. "Leaves lanceolate, petioled, ferrated on the upper part, villous-downy underneath." *Branches, peduncles,* and *pedicels*, villous-downy. *Corymbs* long, peduncled, faftigiate; calyx-fcales briftle-fhaped. A native of Arabia Felix. 5. C. *tridentata*, 12. Vahl. 3. 98. "Leaves feffile, wedge-fhaped, even-furfaced, three-toothed at the tip." *Flowers* in terminal and axillary corymbs. A native of Brazil. 6. B. *dioica*, 13. Vahl. 3. 98. tab. 74. "Leaves wedge-fhaped, fomewhat retufe, quite entire, even-furfaced, three-nerved; flowers dioicous." *Flowers* from four to feven, feffile, cluftered. A native of Montferrat and Dominica.

Conyza afteroides of Linnæus and Martyn is after conyzoides of Willdenow. It is excluded from the prefent genus by its radiate flower.

Conyza *ægyptiaca juniperifolia*; Vaill. See Staehelina *fpinofa*.

Conyza *æthiopica, flore bullato aureo*; Pluk. See Chrysocoma *comaurea*.

Conyza *africana frutefcens, foliis ericæ hamatis*. See Stoebe *æthiopica*.

Conyza *africana frutefcens, folio falviæ*; Tourn. See Tarchonanthus *camphoratus*.

Conyza *africana latifolia fœtida*; Pluk. Moris. See Gnaphalium *fœtidum*.

Conyza *africana tenuifolia fubfrutefcens*; Dill. See Chrysocoma *fcabra*.

Conyza *americana frutefcens fœtidiffima*; Dill. See Baccharis *fœtida*.

Conyza *americana fcandens, foliis fubrotundis*; Amm. Herb. See Mikania *houftonis*. *Eupatorium*; Houft. Linn.

Conyza *anthelmintica*; Linn. See Vernonia *anthelmintica*.

Conyza *aquatica, afteris flore aureo*; C. Bauh. See Inula *britannica* β.

Conyza *arborefcens lutea, folio trifido*; Plum. See Calea *lobata*.

Conyza *aromatica frutefcens mauritanica*; Pluk. See Pteronia *camphorata*.

Conyza *cærulea acris*; C. Bauh. See Erigeron *acre*.

Conyza *cærulea alpina major*; C. Bauh. See Erigeron *uniflorum*.

Conyza *cærulea alpina minor*; C. Bauh. See Erigeron *alpinum*.

Conyza *capitata, feu globofa*; Bocc. See Inula *vifcofa*.

Conyza *Diofcoridis*; Raw. See Baccharis *Diofcoridis*.

Conyza *fœmina Theophrafti*; C. Bauh. See Erigeron *graveolens*.

Conyza *fœtida*; Lam. See Baccharis *fœtida*.

Conyza *frutefcens, foliis anguftioribus*; Few. Peruv. See Baccharis *ivæfolia*.

Conyza *fruticosa cisti odore;* Sloan. See Eupatorium *villosum.*

Conyza *fruticosa cisti odore, floribus pallide purpureis;* Sloan. See Calea *jamaicensis.*

Conyza *helenitis mellita incana;* Lob. See Cineraria *campestris.*

Conyza *incana;* C. Bauh. See Cineraria *campestris.*

Conyza *lini foliis asperis;* Amm. Ruth. See Chrysocoma *biflora.*

Conyza *lobata;* Linn. See Calea *lobata.*

Conyza *major altera;* C. Bauh. See Baccharis *Dioscoridis.*

Conyza *major altera;* Thal. See Buphthalmum *salicifolium.*

Conyza *major;* Dod. See Inula *viscosa.*

Conyza *major, flore globoso;* C. Bauh. See Inula *pulicaris.*

Conyza *marina;* Magnol. Moris. See Erigeron *tuberosum.*

Conyza *mas Theophrasti;* C. Bauh. See Inula *viscosa.*

Conyza *media asteris flore luteo;* C. Bauh. See Inula *dysenterica.*

Conyza *media crispa;* Rai. See Inula *pulicaris β.*

Conyza *media, monspeliensi affinis;* J. Bauh. See Inula *spiraeafolia.*

Conyza *melitensis;* Bocc. See Inula *fœtida.*

Conyza *minima;* Dod. See Inula *pulicaris.*

Conyza *minor exotica;* C. Bauh. See Inula *pulicaris β.*

Conyza *minor hispanica;* Pluk. See Inula *pulicaris β.*

Conyza *minor vera;* Lob. Barr. See Erigeron *graveolens.*

Conyza *palustris serratifolia;* C. Bauh. See Senecio *paludosus.*

Conyza *pannonica lanuginosa;* C. Bauh. Morif. See Inula *oculus christi.*

Conyza *praealta;* Bocc. See Inula *bifrons.*

Conyza *rugosa;* Hort. Kew. See Erigeron *rugosum.*

Conyza *scandens, solaris folio, angulosa;* Plum. See Mikania *scandens.*

Conyza *sericea;* Willd. See Chrysocoma *sericea.*

Conyza 3. *austriaca;* Clus. See Inula *oculus christi.*

Conyza *syriae;* J. Bauh. Rai. Gron. See Baccharis *Dioscoridis.*

Conyza *tomentosa & incana;* Amm. Ruth. See Chrysocoma *villosa.*

CONYZIS Affinis; C. Bauh. See Inula *britanica.*

CONYZOIDES; Dill. See Erigeron *acre.*

CONZ. See Consarbruck.

CONZA, in *Geography,* a town of Naples, in the province of Principato Ultra, considered as the capital of the province; situated at the foot of the Apennines, near the head of the Ofauto; the see of an archbishop. The chief article of its commerce is marble. Distant 48 miles E. of Naples. N. lat. 40° 50′. E. long. 15° 10′.

COOCH Bahar, or Coos-Bayhar, a district of Bahar, in the province of Bengal, separated from that of Rungpore, by the river Durlah. In this district, an usage of a very singular kind has prevailed from remote antiquity, and actually exists at this day. If a reiut, or peasant, owes a sum of money, and cannot satisfy his creditor, he is compelled to give up his wife as a pledge, and possession of her is kept till the debt is discharged. It sometimes happens, according to report, that the wife of a debtor is not redeemed for the space of one, two, or three years; and then, if during her residence and connection with the creditor, a family shall have been the consequence, half of it is considered as the property of the person with whom she lived, and half that of her real husband. This country has a most wretched appearance, and its inhabitants are a miserable and puny race. Those of the lower ranks, without scruple, dispose of their children for slaves, to any purchaser, and for a very trifling consideration. Nothing is more common, in this unnatural traffic, than to see a mother dress up her child, and bring it to market, with no other view or hope, than to enhance the price she may procure for it. Indeed the extreme poverty and wretchedness of these people will sufficiently appear, when we reflect that the value of the peasant's subsistence amounts to no more than one penny a day, even allowing him to make his meal of two pounds of boiled rice, with a due proportion of salt, oil, vegetable, fish, and chili, the latter of which is a kind of red pepper, in universal use, made from the "capsicum annuum" of Linnæus. The situation of the district exhibits an union of facts, not unfrequently observed, *viz.* the great facility of obtaining food, and at the same time the wretched indolence of the lower order of inhabitants. Turner's Thibet, p. 11, &c.

COOGHEN, Leonard Van, in *Biography,* a painter, born at Haarlem in 1610, and scholar of Jac. Jordaens. He also amused himself with etching, and published two or three sets of prints, in which the style of Salvator Rosa was imitated with the most happy success. These etchings, several of which represent groups of military figures, are dated from 1664 to 1666. He died in 1681. Heinecken.

COOK, James, one of the most eminent navigators and discoverers of unknown territories and seas, recorded either in ancient or modern history, was descended from an obscure family in Northumberland: his father, James Cook, having occupied the humble station of a servant in husbandry, and his mother, whose Christian name was Grace, being a person of the same rank and condition. The subject of this article claims a more distinguished notice, and a more extended detail of particulars, than we have been accustomed to introduce in those biographical sketches that occur in this work. Independently of the singular merit of captain Cook himself, to which a peculiar tribute is due, his voyages and discoveries are so immediately connected with science, both geographical and nautical, as to entitle them to a conspicuous place in a general Dictionary of the Arts and Sciences. The parents of captain Cook, who were noted in their lowly station for honesty, sobriety, and diligence, were settled for some time before his birth at Marton, a village in the North Riding of Yorkshire; and in this place their son James, destined to give celebrity to their name and family, was born on the 27th of October, in the year 1728. Having received the first rudiments of education at his native place, he was further instructed in writing, and the first five rules of arithmetic at Ayton, near which place his father was settled in the service of Thomas Skottow, esq.; and, at the age of 13 years, he was apprenticed to a shop-keeper, at Staiths, a fishing town about 10 miles from Whitby. The sea, however, was the object towards which he manifested an early inclination; and, in consequence of some disagreement with his master, he obtained his discharge, and determining to indulge his natural propensity, he bound himself for seven years to Messrs. Walkers of Whitby, quakers by religious profession, who employed two ships in the coal trade. At the expiration of his apprenticeship, he continued in vessels of this description, as a common sailor, till at length he was appointed mate in one of Mr. John Walker's ships. At this time, he was not distinguished by

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any peculiar traits of character, though without doubt he must have acquired a considerable degree of knowledge in practical navigation. In the spring of the year 1755, when hostilities commenced between England and France, Mr. Cook, and the ship to which he belonged, happened to be in the river Thames; and after concealing himself for some time, to avoid being impressed, he determined to enter voluntarily into the British navy. His first situation in his majesty's service, was on board the Eagle man of war, to the command of which, captain (afterwards sir Hugh) Pallifer was appointed in October 1755. As an active diligent seaman, he recommended himself to the captain's notice; and in consequence of his own acknowledged merit, as well as some private interference, he obtained on the 16th of May, 1759, a master's warrant for the Grampus sloop; but this appointment not taking effect, he was made master of the Garland, a ship which had sailed before he could join her; and therefore, on the 19th of May, he was appointed to the Mercury. This ship was destined to North America, where she joined the fleet under the command of sir Charles Saunders, which, in conjunction with the land forces under general Wolfe, was engaged in the famous siege of Quebec. As it was necessary to take the soundings in the river St. Lawrence, between the island of Orleans and the north shore, directly in the front of the French fortified camp at Montmorency and Beauport, Mr. Cook was recommended by captain Pallifer, who well knew his sagacity and resolution, to this difficult and hazardous service. He performed it, with great personal risk, to the satisfaction of his employers; and furnished the admiral with a complete and correct draught of the channel and soundings. Before this time, it is thought that he had scarcely ever used a pencil, and that he had no knowledge of drawing. He afterwards surveyed those parts of the river, below Quebec, which navigators had found to be attended with difficulty and danger; this business was executed with his customary diligence and skill; and when his undertaking was finished, his chart of the river St. Lawrence was published, with the necessary soundings and directions for navigating that river. This chart has superseded the necessity of any other. After the expedition to Quebec, Mr. Cook was appointed, by warrant from lord Colvill, master of the Northumberland man of war; and in this station, his conduct was such, as to gain him the esteem and friendship of his commander. During the station of his ship at Halifax, he read Euclid, and devoted his leisure hours to the study of astronomy, and other branches of science. In September 1762, the Northumberland came to Newfoundland, to assist in the recapture of the island from the French; and after this service was accomplished, Mr. Cook surveyed the harbour of Placentia, and the heights of the place, with a diligence which engaged the notice of captain (afterwards admiral) Greaves, the governor of Newfoundland. The governor formed a very high opinion of his abilities and character; and this opinion was amply confirmed by the concurring testimony of all the officers under whom he had served. Upon Mr. Cook's return to England, towards the close of the year 1762, he married an amiable woman, who deserved and enjoyed his tenderest affection and regard. Early in the year 1763, he accompanied captain Greaves to Newfoundland, as surveyor of its coasts; and having executed the business that had been assigned him, he returned to England. In April 1764, he was appointed, under the orders of commodore Pallifer, marine surveyor of Newfoundland and Labradore; and of the satisfactory manner in which he executed this office, the charts which he afterwards published, afford sufficient evidence. These services were continued till the year 1767; and whilst he was employed in them, he transmitted to the Royal Society an observation of the eclipse of the sun at Newfoundland, with the longitude deduced from it, (see Phil. Transf. vol. 57.) from which our navigator appears to have already acquired the character of an able mathematician. But a new and more interesting scene opens upon us in the prosecution of these memoirs. A spirit of discovery had been excited towards the latter end of the 15th century, and in the following century it was very vigorous and active; but soon after the commencement of the 17th century, it began to decline: at a subsequent period, during the reign of king George II., it again began to revive; and two voyages were performed for the purpose of discovering a north-west passage through Hudson's Bay. But the noblest displays of this spirit were exhibited during the present reign: and it was reserved for Mr. Cook to furnish the most illustrious example of its influence. Soon after the peace of 1763, two voyages round the world were undertaken by captains Byron, Wallis, and Carteret, to whom we are indebted for several discoveries, which served to extend the knowledge of geography and navigation; but before the return of the two last of these commanders, another voyage was projected; on a more extensive scale than either of the former. The transit of Venus in 1769, which was likely to be observed with the greatest advantage in some of the islands of the South Sea, afforded a peculiar inducement to this expedition; and after a variety of preliminary consultations and debates, Mr. Cook, who was strongly recommended by Mr. Stephens, secretary to the admiralty, and by sir Hugh Pallifer, who had long known his abilities and character, was appointed to the command of it, with the rank of a lieutenant in the royal navy, to which he was promoted on the 25th of May 1768. A vessel of 370 tons, called the Endeavour, was prepared for this purpose; but before the necessary arrangements were compleated captain Wallis returned, and upon being consulted he recommended Port Royal Harbour in George's island, now known by the name of Otaheite, as the most proper place for the proposed observation of the transit. Lieutenant Cook was accompanied by Mr. Charles Green, who had been assistant to Dr. Bradley at the Royal Observatory at Greenwich, and also by Joseph Banks, esq. now sir Joseph Banks, bart. and president of the Royal Society, and Dr. Solander, gentlemen whose zeal for the promotion of science have been uniform and ardent. Lieutenant Cook had further views in this voyage than the mere observation of the transit, and accordingly, when that business was accomplished, he was directed to pursue further discoveries in the great Southern Ocean. The complement of Cook's ship consisted of 84 persons, besides the commander; she was victualled for 18 months; and furnished with 10 carriage and 12 swivel guns, together with an ample store of ammunition and other necessaries. On the 26th of August our navigators set sail from Plymouth Sound; and on the 13th of September anchored in Funchiale road, in the island of Madeira. Here they were hospitably entertained; and having laid in a fresh stock of beef, water, and wine, they left the island in the night of the 18th of September. In their way to Rio de Janeiro, they had an opportunity of accounting for that luminous appearance of the sea, which had been often noticed by navigators, and ascribed to various causes. They determined by experiment, fully to their satisfaction, that the flashes which they had observed proceeded from some luminous animal. Their reception at Rio de Janeiro was very different from that which they had met with at Madeira; and it was through mere necessity that they were detained there from the 13th of November to the 7th of the

following month, when they proceeded on their voyage. On the 14th of January 1769, lieutenant Cook entered the ſtrait of Le Maire, and having contended for ſome time with a violent tide, he anchored on the next day, firſt before a ſmall cove, which was underſtood to be Port Maurice, and afterwards in the bay of Good Succeſs During the continuance of the Endeavour in this ſtation, Mr. Banks, Dr. Solander, Mr. Monkhouſe the ſurgeon, and Mr. Green the aſtronomer, with their attendants and ſervants, and two ſeamen, aſcended the mountains in ſearch of plants. This excurſion has been often related, and the effect of the cold of the climate is well known. (See COLD. For an account of the inhabitants of the deſolate regions adjacent to this ſtrait; ſee LE MAIRE.) It has been a queſtion among former navigators which is the beſt paſſage from the Atlantic to the Pacific ocean; and the doubling of Cape Horn has been ſo much dreaded, that it has been thought more eligible to paſs through the ſtrait of Magalhaens or Magellan. Lieutenant Cook has ſettled this point; for he was no more than 33 days in coming round the land of Terra del Fuego, from the E. entrance of the ſtrait of Le Maire till he had advanced about 12 degrees to the weſtward and 3½ to the northward of the ſtraits of Magalhaens, and during this time the ſhip received ſcarcely any damage; whereas it would have required three months to reach the Pacific ocean through this ſtrait, and in paſſing it his people would have been much fatigued, and the anchors, cables, ſails, and rigging of the veſſel would have been much injured. In ſhort, lieutenant Cook, by ſetting the example of doubling Cape Horn, and by accurately aſcertaining the latitude and longitude of different places, as well as by his inſtructions to future voyagers, has performed the moſt eſſential ſervice to this part of navigation. In the proſecution of the voyage from Cape Horn to Otaheite, ſeveral iſlands were diſcovered, to which were given the names of Lagoon iſland, S. lat. 18° 47′. W. long. 139° 28′, Thrumb-cap, S. lat. 18° 35′. W. long. 139° 48′, Bow iſland, S. lat. 18° 23′. W. long. 141° 12′, the Groups, the eaſternmoſt in S. lat. 18° 12′. W. long. 142° 42′, Bird iſland, S. lat. 17° 48′. W. long. 143° 35′, and Chain iſland, S. lat. 17° 23′. W. long. 145° 54′. Moſt of theſe iſlands were inhabited; and the verdure, or groves of palm-trees, which were viſible in ſome of them, gave them the appearance of a terreſtrial paradiſe to perſons who had ſo lately witneſſed the dreary coaſts of Terra del Fuego.

On the 13th of April the Endeavour anchored in Port Royal bay, called by the natives "Matavai," in the iſland of Otaheite. Having fixed upon a place proper for accompliſhing the grand object of their commiſſion, they erected an obſervatory, S. lat. 17° 29′ 15″. W. long. 149° 32′ 30″, and carried their aſtronomical quadrant, and ſome other inſtruments, on ſhore. On the following day, very much to their ſurpriſe and grief, the quadrant was not to be found. By the judicious and ſpirited exertions of Mr. Banks, the inſtrument was reſtored. The tranſit was obſerved with great advantage. A particular account of the obſervation may be ſeen in the Phil. Tranſ. vol. lxi. p. 397. See VENUS. As we ſhall have occaſion to mention ſome of the leading circumſtances that occurred on this and other viſits to Otaheite, under that article, we ſhall attend lieutenant Cook in his departure from the iſland. Previouſly to their ſetting ſail, Tupia, one of the natives, the prime miniſter of Oberea, when ſhe was in the height of her power, and chief prieſt of the country, who had been a conſtant companion of the Engliſh during their abode on the iſland, came on board the ſhip, with a boy thirteen years of age, and intreated that they might be permitted to proceed with them on their voyage. Lieutenant Cook gladly accepted the propoſal. On the 13th of July the Engliſh weighed anchor, and whilſt they were proceeding on their voyage, Tupia informed lieutenant Cook that at four of the neighbouring iſlands, which he diſtinguiſhed by the names of *Huaheine*, *Ulietea*, *Otaha*, and *Bolabola*, they might procure hogs, fowls, and other refreſhments, in great abundance. Accordingly, having paſſed *Tethuroa*, they approached the N.W. part of Huaheine on the 16th of July, and in the afternoon anchored in a ſmall but excellent harbour on the W. ſide of the iſland, called Owharre; and having procured a variety of neceſſary articles of refreſhment, they ſailed on the 19th for Ulietea, in a good harbour of which the ſhip anchored on the next day.

The lieutenant hoiſted an Engliſh jack on this iſland, and, in the name of his Britannic majeſty, took poſſeſſion of this, and the three neighbouring iſlands, Huaheine, Otaha, and Bolabola, all of which were in ſight. The harbour or bay in which the Endeavour had anchored was called by the native Oopoa, and extends almoſt the whole length of the eaſt ſide of the iſland. In its greateſt extent it is capable of accommodating any number of ſhips. After having ſurveyed the northern and ſouthern parts of this iſland, they ſet ſail on the 24th; but after encountering conſiderable danger and diſcovering ſeveral ſmall iſlands, they returned to Ulietea, and caſt anchor on the 1ſt of Auguſt in a harbour on the weſt ſide of the iſland. Tupia had previouſly apprized them of the formidable character of the inhabitants of Bolabola, but on intercourſe with them, and particularly with Opoony, they found there was no foundation for the terrors which Tupia had endeavoured to excite. Having finiſhed their neceſſary repairs, and obtained a freſh ſtock of proviſions, they prepared for leaving the iſland. The principal iſlands, about which the Engliſh had now ſpent ſomewhat more than three weeks, were ſix in number; viz. *Ulietea*, *Otaha*, *Bolabola*, *Huaheine*, *Tubai*, and *Maurua*; which ſee reſpectively. Our voyagers purſued their courſe till the 13th, when land was diſcovered bearing S.E., and which Tupia informed them was an iſland called *Oheteroa*. As the inhabitants manifeſted a hoſtile diſpoſition, lieutenant Cook, with equal wiſdom and humanity, made no attempt for landing. By Tupia our navigators were informed, that various iſlands lay at different diſtances, and in different directions from Oheteroa, between the ſouth and the north-weſt; and that to the north-eaſt there was an iſland called Manua, or Bird iſland. He alſo deſcribed ſeveral iſlands towards the weſt; probably Boſcawen and Keppel's iſlands, which had been diſcovered by Captain Wallis. The fartheſt iſland towards the ſouth, of which Tupia had any knowledge, was called *Moutou*, about three days ſail from Oheteroa. But his father, he ſaid, had informed him, that there were other iſlands farther to the ſouth. Lieutenant Cook determined, all circumſtances duly conſidered, to ſtand ſouthward in ſearch of a continent. On the 15th of Auguſt, our voyagers ſailed from Oheteroa, and on the 30th, in lat. 38° 20′. W. long. 147° 6′, they obſerved a comet, the tail of which ſubtended an angle of 42 degrees. On the 6th of October they diſcovered an extenſive tract of land, which they at firſt conceived to be the "Terra Auſtralis incognita," but which proved, in the event, to be a part of New Zealand. Lieutenant Cook, having anchored, on the 8th, in a bay, at the entrance of a ſmall river, went on ſhore, accompanied by Mr. Banks and Dr. Solander, and attended with a party of men, in order to have ſome intercourſe with the natives. They aſſumed a very hoſtile appearance; and made attempts for running away with the pinnace, which had been left at the entrance of the river. On the next day they exhibited the ſame formidable aſpect, brandiſhing their pikes

pikes and lances. Tupia addreffed them in a language, which was a dialect of their own and which they underftood; informing them that our voyagers only wanted provifions and water, in exchange for iron, the properties of which he explained as far as he was able. Their intentions, however, appeared to be unfriendly; and on the iron and beads, which were prefented to them, they feemed to fet little value. Tupia told them at length, that if they proceeded to any farther violence, fome of them muft fall victims to the juft retaliation of the Englifh. This falutary counfel, however, produced no effect; and fome were killed, and feveral wounded in the conflict that enfued. The feverity exercifed on this occafion, was very different from the conduct which Mr. Cook's prudence and humanity fuggefted in other cafes; and, on a calm review, it was not approved by himfelf; but he pleaded the nature of the fervice in which he was employed and the neceffity of obtaining a knowledge of the country, which he had previoufly attempted to acquire by kind treatment, and with a view to which he was at length obliged to recur to hoftile and fatal meafures. The lieutenant finding all his efforts to eftablifh an intercourfe with the natives unavailing, determined to re-embark, and on the 11th of the month he left this inhofpitable place, which, as it had fupplied him with no article except wood, he denominated *Poverty-bay*, called by the natives *Taoneróa*, or Long Sand, and fituated in S. lat. 38° 42′, and W. long. 181° 36′. In this courfe he spent nearly fix months, and made large additions to the knowledge of geography and navigation. By making the whole circuit of New Zealand, he afcertained it to confift of two iflands. While the fhip was hauling to the fouth end of a fmall ifland, called *Teahcwary* by the natives, and by the lieutenant "Portland ifland," it fuddenly fell into fhoal water and broken ground. The inhabitants, perceiving its diftrefs, put off in five canoes, and affumed a very formidable and menacing afpect, and feemed to be prepared for action; and it was to little purpofe that guns were fired in order to intimidate them. Whilft fome kind of traffic was carrying on with one of the canoes, Tupia's boy, who was ftanding on the fide of the fhip, was feized by one of the New Zealanders, and carried off. Upon this atrocious act the marines were ordered to fire; and during the confufion that enfued, the boy made his efcape and fwam to the fhip; though he was purfued by the largeft of the canoes. To the cape where this unhappy tranfaction occurred, Mr. Cook gave the name of "Cape Kidnappers;" it lies in S. lat. 39° 43′. W. long. 182° 24′. Between this cape and the ifland Portland is a bay, which, in honour of fir Edward Hawke, the lieutenant called "Hawke's bay." While, on the 18th, the Endeavour lay a-breaft of a peninfula within Portland ifland, called *Terakako*, two of the natives, fuppofed to be their chiefs, confided fo far in Mr. Cook, as to venture on board the fhip, and remained there all night, their canoe being hoifted into the fhip. On the 23d, while the fhip was in *Tegadoo* bay, lieutenant Cook went on fhore to examine the watering places, and found the water excellent and conveniently fituated, and the difpofition of the people much more favourable than he expected. This lay in S. lat. 38° 22′ 24″, and W. long. 180° 47′. Here they fupplied themfelves with as much wood and water as they wanted. On the 28th, fome gentlemen of the Endeavour went on fhore on an ifland which lies to the left hand of the entrance of Tolaga bay; and there faw the largeft canoe which they had yet obferved; her length being 68½ feet, her breadth 5 feet, and her height 3 feet 6 inches. While the fhip was in Hicks's bay, the inhabitants of the adjoining coaft were found to be very hoftile. Early on the 1ft of November, they counted 45 canoes coming from the fhore towards the Endeavour, and feveral others following them from another place. Some of the Indians traded fairly; others added derifion and infolence to fraud; and though feveral fmall fhot were fired at them, the canoes merely dropped a-ftern, and fet up their fong of defiance as they departed from the fhip. In ftanding weftward from a fmall ifland called *Mowtohora*, the Endeavour encountered fome danger amidft the adjacent rocks, but at length it efcaped without injury near an ifland called by the lieutenant the *Mayor;* the inhabitants of the neighbouring coaft difplayed in many inftances their hoftility, and, in their traffic with our navigators, committed various acts of fraud and robbery. Here, *viz.* in S. lat. 36° 48′ 5½″, lieutenant Cook and Mr. Green made an obfervation of the tranfit of Mercury. In the mean while the fhip was vifited by two large canoes, one of which indicated hoftile intentions on the part of its crew. In the courfe of their traffic, they were guilty of an act of fraud, accompanied with menaces and defiance, which induced Mr. Gore to fire at the offender and to kill him. At length, however, in confequence of fmall fhot fired over their heads, they all fled with the utmoft precipitation. On the 10th, our commander, accompanied by Mr. Banks, and the other gentlemen, examined a large river that empties itfelf into the head of Mercury bay, and found the fituation abounding with conveniences, capable of an eafy defence, and furnifhing beds of excellent oyfters; this river Mr. Cook called Oyfter river. On the 15th he failed out of "Mercury bay," fo called in confequence of the obferved tranfit of Mercury over the fun, and lying in S. lat. 36° 47′. W. long. 184° 4′. Another river lies at the head of the bay, which is the beft or fafeft place for a fhip that wants to ftay for any length of time. This the lieutenant, obferving a number of Mangroves about it, called "Mangrove river." Before the Endeavour left the bay, Mr. Cook, having difplayed the Englifh colours, took formal poffeffion of the place in the name of his Britannic majefty, king George III. In the range from Mercury bay feveral canoes appeared apparently for hoftile purpofes; but their occupiers were inftantly difperfed by a mufket ball, fired through one of their boats; although Tupia's oratory had proved ineffectual. While Mr. Cook remained in the "Bay of iflands," he took occafion to examine the interior part of the country and its produce. Some circumftances occurred which produced difagreement between the navigators and the inhabitants, and it required fingular exertions of prudence, as well as of humanity on the part of Mr. Cook, to bring them to a termination. The number of inhabitants in the Bay of iflands was found to be much greater than in any other part of New Zealand which the commander had hitherto vifited; and though they did not appear to be united under one head, and though their towns were fortified, they feemed to live together in perfect amity. The Endeavour on the 9th of December, lying becalmed in "Doubtlefs bay," an opportunity offered for making inquiries among the natives concerning their country; and Tupia enabled the lieutenant to learn, that at fome diftance, at a place called "Moore-whennua," the land would take a fhort turn to the fouthward, and thence extend no more to the weft. This place the Englifh gentlemen concluded to be the land difcovered by Tafman, and which he had named "Cape Maria Van Diemen." The inhabitants, who feemed to be intelligent, farther informed them, that there was a country of great extent, to the N.W. by N. or N.N.W., called *Ulimaroa,* where it was underftood that the people eat hogs. Our navigators, on the 30th of December, faw the land, which they judged to be "Cape Maria Van Diemen," and which correfponded with the account given of it by the Indians. The next day, they had demonftrative evidence, from the appearance

ance of mount Carmel, that, where they now were, the breadth of New Zealand could not be more than two or three miles from fea to fea. During this part of the navigation, they encountered, in S. lat. 35°, and in the midft of fummer, a long-continued and violent gale of wind; but as they were at a confiderable diftance from the land, they efcaped the danger that alarmed them. The fhore at "Queen Charlotte's Sound," where the Englifh had arrived on the 14th of January, 1770, feemed to form feveral bays, into one of which lieutenant Cook propofed to take the fhip for neceffary repairs, and for obtaining a recruit of wood and water, of which they were fupplied with great plenty. On landing they found an Indian family, in which they found horrid and indifputable proofs of the cuftom of eating human flefh. Evidences of the fame cuftom appeared likewife on feveral other occafions. Whilft they were near this part of the country, they were entertained with the moft enchanting melody of birds, who began their fong about two hours after midnight and continued it till fun-rife; thus refembling the nightingales of our own country. Lieutenant Cook, upon afcending one of the hills of the country, had a view of the fea on the eaftern fide of it, and of a paffage leading from it to that of the weft, a little eaft of the inlet where the fhip lay. The main land, S.E of this inlet, appeared to be a narrow ridge of very high hills, forming part of the S.W. fide of the ftrait. On the oppofite fide, the land trended away E. as far as the eye could reach; and to the S.E. was difcovered an opening to the fea, which wafhed the eaftern coaft. The lieutenant faw, alfo, on the E. fide of the inlet, fome iflands which he had before taken to be part of the main land. In returning to the fhip, he examined the harbour and coves that lie behind the iflands which he had feen from the hills; and he employed the next day in farther furveys and difcoveries:—the gentlemen of the fhip alfo accompanied him in vifiting a town, which was built upon a fmall ifland or rock, very difficult of accefs, and which confifted of between 80 and 100 houfes; the inhabitants of which were very friendly and attentive, and furnifhed them with a large quantity of dried fifh. From a hill of confiderable height, which afforded a view of the coaft to the N.W., the fartheft land that appeared was an ifland at the diftance of about 10 leagues, lying not far from the main; between this ifland and the place where the commander ftood, he difcovered, clofe under the fhore, feveral other iflands, forming many bays, in which there appeared to be good anchorage for fhipping. On the 30th of January the inlet where our voyagers now lay was named "Queen Charlotte's Sound," and a memorial was erected of their vifit to this place. At the fame time Mr. Cook took formal poffeffion of this and the adjacent country in the name of king George III.; thus precluding the claims of future navigators, but referving to the original inhabitants their natural rights. On Monday, the 5th of February, the Endeavour, after encountering a violent ftorm, got under fail; but was foon obliged to come to an anchor a little above Motuara. Upon inquiring he learnt that there was a diftant country, towards the north, called *Ulimaroa*; but he could obtain no farther particulars. Lieutenant Cook, on the 6th of February, got out of the Sound, and in the evening faw two fmall iflands, lying off "Cape Koamaroo," at the S.E. head of Queen Charlotte's Sound, and bearing E. at the diftance of about four miles. The rapidity of the ftream, occafioned by the tide of ebb, endangered the fhip, and it was refcued by fome favourable incidents; the narroweft part of the ftrait through which it was rapidly driven, lies between "Cape Tieravite," on the coaft of the ifland of *Eakeinomauwe*, and "Cape Koamaroo;" the diftance between them being eftimated at four or five leagues. During Mr. Cook's long and minute examination of the coaft of New Zealand, he gave names to the bays, capes, promontories, iflands, and rivers, and other places which he faw or vifited; excepting in inftances where their original appellations were learned from the natives. After having afcertained New Zealand to be an ifland, Mr. Cook wifhed to extend his acquaintance with the country. He completed his circumnavigation, by ranging from "Cape Turnagain," fouthward along the eaftern coaft of *Poenammoo*, round "Cape South," and back to the weftern entrance of the ftrait which he had paffed, and which has been very properly called Cook's *Strait*; which fee. In this range an ifland, lying about five leagues from the coaft of *Tovy-Poenammoo*, was difcovered, and it was named "Banks's ifland." Lieutenant Cook, purfuing his courfe to the fouthward, wifhed to afcertain, whether Poenammoo was an ifland or a continent. In the profecution of this object he paffed fome dangerous rocks on the 9th of March, and on the fame day reached a point of land called "South Cape," in S. lat. 47° 19'. W. long. 192° 12', which proved to be the fouthern extremity of the country. On the 14th the Endeavour paffed a fmall narrow opening in the land, where was a fafe and convenient harbour, formed by an ifland, which lay eaftward in the middle of the opening. On the land behind this opening are mountains, the fummits of which were covered with fnow, that had recently fallen. The land on each fide of the entrance of the opening, rifes almoft perpendicularly from the fea to a ftupendous height: and, on this account lieutenant Cook did not chufe to take the fhip into the harbour. Before the 27th of March the commander had circumnavigated the whole country of Tovy-Poenammoo, and arrived within fight of the ifland before mentioned, lying nine leagues from the entrance into Queen Charlotte's Sound. With a view of obtaining a fupply of water, he hauled round the ifland, and entered a bay, fituated between that and Queen Charlotte's Sound, to which was given the name of *Admiralty bay*; which fee. Lieutenant Cook now directed his views towards Europe; and it was determined to return by the Eaft Indies. In purfuance of this refolution, it was propofed that they fhould fteer eaftward till they fhould fall in with the eaft coaft of New Holland, and then follow the direction of that coaft towards the north, till they fhould arrive at its northern extremity. If that fhould be found impracticable, it was farther refolved that they fhould endeavour to fall in with the land, or iflands, faid to have been difcovered by Quiros. For a farther account of *New* Zealand; fee that article.

On the 31ft of March our commander failed from "Cape Farewell" in New Zealand, S. lat. 40° 53'. W. long. 18°, and purfued his voyage towards the weft. On the 19th of April "New Holland," or as it is now called, "New South Wales," came in fight; and on the 28th, the fhip anchored in *Botany-bay*; which fee. During Mr. Cook's ftay at this place, he caufed the Englifh colours to be difplayed every day on fhore, and took care that the fhip's name, and the date of the year, fhould be infcribed on one of the trees near the watering-place. On the 6th of May our navigators failed from this bay; and in their farther progrefs lieutenant Cook gave the names marked upon the map to the bays, capes, points, and remarkable hills that appeared fucceffively in fight. On the 14th, as the Endeavour advanced to the northward, being then in S. lat. 30° 22'. W. long. 206° 39', the land gradually rofe in height, fo

that it may be called a hilly country. Between this latitude and Botany-bay, it exhibits a pleafing variety of ridges, hills, valleys, and plains, clothed with wood. On the 17th our navigators were in a bay called "Moreton's bay," S. lat. 26° 56'. W. long. 206° 28'; and from appearances they concluded that this bay opened into a river; but they had not then leifure to afcertain the fact. On the 22d, as they were purfuing their voyage from "Harvey's bay," they difcovered that the land was covered with palm nut-trees, which they had not feen from the time of their leaving the iflands within the tropic. Early in the next day they went on fhore, in order to examine the country, and found a channel leading into a large lagoon. Here they difcovered a fmall river of frefh water, and room for a few fhips to lie in great fecurity. Near the lagoon grows the true Mangrove, fuch as exifts in the Weft India iflands, and the firft of the kind that had been met with by our navigators. Among the iflands and fhoals they faw many large birds, which they judged to be pelicans, and on the fhore a fpecies of buftard of a confiderable fize and excellent food; fo that in honour of it they called the inlet *Buftard bay*. S. lat. 24° 4'. W. long. 208° 18'. Here they found a number of fmall pearl-oyfters, among others of various kinds; fo that Mr. Cook was of opinion, that an advantageous pearl-fifhery might be eftablifhed in this place. On the 25th our voyagers, at the diftance of one mile from the land, were-a-breaft of the point which Mr. Cook found to lie directly under the tropic of Capricorn, in W. long. 208° 58', and he therefore called it "Cape Capricorn." On the 26th the fhip, being under fail, was furrounded with iflands, which lay at different diftances from the main land; and here Mr. Banks, in fifhing, took two forts of crabs, fuch as had not been feen before; one of them was adorned with a moft beautiful blue, equal to the ultramarine, which tinged all his claws and joints, while the under part was white and highly polifhed; the other was marked with ultramarine, more fparingly, on his joints and toes, and on his back were three brown fpots of a fingular appearance. Lieutenant Cook finding a paffage between the iflands, failed to the northward, and anchored at about two miles diftance from the main. A great number of iflands were within fight. Here Mr. Cook obferving that the tide ebbed and flowed confiderably, when the fhip had anchored within the inlet, concluded that it was a river that might run pretty far up into the land. Our voyagers having gratified their curiofity with a variety of objects, but being difappointed in their wifhes of obtaining frefh water, determined to make a fhort ftay in this place. Before they left it, however, they were defirous of more particularly examining the inlet, in which the fhip lay; its breadth was found to be from two to five miles, upon a direction S. W. by S.; but here it opened every way, and formed a large lake, which to the N.W. communicated with the fea. On the fouth fide of the lake was a ridge of hills; and various appearances indicated that the country was inhabited. The country, in general, in this part of New South Wales, appeared fandy and barren, and deftitute of the accommodations which would fit it for being poffeffed by fettled inhabitants. This inlet, from its want of frefh water, was called by Mr. Cook "Thirfty Sound." S. lat. 22° 20'. W. long. 210° 18'. On the 31ft our voyagers left the place and proceeded, till on the 7th of June they perceived on one of the iflands, which they were paffing, the appearance of cocoa-nut trees; but upon examination, thefe were miftaken for a fmall kind of cabbage-palm. On the 8th, when the Endeavour was in the midft of a clufter of fmall iflands, our navigators difcerned, with their glaffes, upon one of the neareft of them, about 30 of the natives, men, women, and children, ftanding together and attentively looking at the fhip. This was the firft inftance of curiofity that had been obferved among the people of the country. They were wholly naked; their hair was fhort, and their complexion refembled that of the other inhabitants that had been before obferved. In navigating the coaft of New South Wales, for an extent of 22 degrees of latitude, or more than 1300 miles, lieutenant Cook had conducted his veffel in fafety; but on the 10th of June, as he was purfuing his courfe from a bay, which he had called "Trinity bay," the Endeavour fell into a fituation peculiarly critical and dangerous; having been lifted over a ledge of rock, and lying in a hollow within it. Her fheathing boards were obferved by the light of the moon to be floating away from her, and at laft her falfe keel, fo that every moment it was expected the whole company would be fwallowed up by the rufhing in of the fea. The fhip was expeditioufly lightened as much as poffible, and every exertion was made without murmur and with the greateft alacrity to efcape the imminent peril to which their lives were expofed. So fenfible were the failors of the awfulnefs of their fituation, that not an oath was heard among them. When morning dawned upon them they had a clearer view of their danger. Providentially, however, it became a dead calm, and high water came on at eleven in the morning: but it was neceffary ftill further to lighten the fhip, and two pumps were inftantly worked to difcharge the water that rufhed in. For the tide at midnight they waited with anxious and awful expectation: in the mean while the leak increafed to a very alarming degree; and though the fhip righted, it was expected that fhe muft go to the bottom as foon as fhe ceafed to be fupported by the rock. The floating of the fhip, which in other circumftances, would have been the means of their falvation, was in their fituation, a ground of ferious alarm; becaufe it might precipitate their deftruction. Their poffibility of efcape was precarious, if the fhip funk; and the coaft on which they were to be thrown, if any of them efcaped, was inhabited by naked favages, from whofe compaffion they might derive no relief. The decifive moment at length arrived; and the fhip was heaved into deep water, without admitting more water than when fhe lay upon the rock. The men had experienced long anxiety and were finking with fatigue, and in an exhaufted ftate they threw themfelves upon the deck, and after fhort intervals and paufes of reft, renewed their laborious and almoft fruitlefs exertion; for the leak gained upon the pumps. In this ftate of anxiety and labour, an accident occurred, which had almoft terminated, at once, all their efforts. The planking which lines the fhip's bottom is called the cieling; between which and the outfide planking there is a fpace of about eighteen inches. From this cieling only, the man who had attended the well had taken the depth of the water, and had given the meafure accordingly. But the perfon, who relieved him, meafured the depth to the outfide planking, which had the appearance of the leak's having gained upon the pumps eighteen inches in a few minutes. The miftake, however, was foon detected; and this accident, at firft fo alarming, became, in the event, highly advantageous. New hopes, from a difcovery that their fituation was not fo dangerous as they apprehended, infpired new vigour; and before eight in the morning the pumps gained confiderably on the leak. At eleven o'clock the Endeavour was once more under fail, and ftood for the land. They wifhed, however, to ftop the leak; and Mr. Monkhoufe, one of the midfhipmen, propofed to the commander an expedient which had preferved a merchant fhip, which had fprung a leak that admitted more than four feet water in

in an hour. This was called *fothering* the ship. (See FOTHERING.)

The expedient succeeded; and it was owing partly to a fragment of rock, which had filled up one of the holes of the ship, that she did not sink and involve her whole company in inevitable destruction. In consequence of the distress experienced by the whole crew on this occasion, lieutenant Cook called a point in sight, which lay to the northward, in S. lat. 16° 6′. W. long. 214° 39′, "Cape Tribulation." On the 14th a small harbour was discovered, excellently adapted for repairing the damage which the ship had sustained. Another alarming circumstance, which occurred at this time, was the access of the scurvy, that began to make its appearance among the ship's company, and that rendered it still more necessary to get on shore. On the 17th the ship put in for the harbour, the entrance of which was a narrow channel. Tents were erected for the accommodation of the sick; and all of them, except Mr. Green, manifested symptoms of recovery. On the 29th of June an emersion of Jupiter's first satellite was observed, from which they obtained the longitude of the place 214° 42′ 30″ W., its latitude being 15° 26′ S. A plan of the harbour was taken; and Mr. Cook ascended a hill, from which he observed, to his great concern, innumerable sand-banks and shoals, lying in every direction of the coast. To the northward there was the appearance of a passage, by which lieutenant Cook had the only chance of getting clear, in the prosecution of his voyage. By a large supply of fish, he was able to distribute 2½ pounds to each man; a quantity of greens, being procured, were boiled with the peas: and by these means the ship's company obtained a very considerable refreshment. On the 2d of July our lieutenant sent the master out of the harbour, to sound about the shores, and to search for a passage to the northward. In a subsequent investigation, a passage to the sea was discovered between the shoals, which consisted of coral rocks, and which had furnished cockles of an enormous size, insomuch that one of them was more than sufficient for two men. Other shell-fish were also found in great abundance. At high water the ship floated; but a leak having been discovered, it was necessary to lay her ashore a second time. The several damages being repaired, the ship was again floated at high water, and preparations were made for proceeding on the voyage. To this harbour Mr. Cook gave the name of "Endeavour river." The master, having been dispatched to re-examine the passage, which he had before discovered, reported that he had been mistaken. In the mean while, the inhabitants of the country, who had been very reserved in holding any intercourse with the navigators, became more familiar, in consequence of the commander's prudent management. Here they discovered an animal, called by the natives *kanguroo*, which, being dressed, proved to be excellent meat; and they were also furnished with great plenty of turtle, superior to any which the gentlemen ever tasted in England. The turtle was of the species called green turtle, and they weighed from two to three hundred pounds. The inland country was agreeably diversified by hills, valleys, and large plains, which in many places were richly covered with wood. The longitude of their station, determined by an observation of the emersion of Jupiter's first satellite, July the 16th, was 214° 53′ 45″; that on the 29th of June had given 214° 48′ 30″, the mean of which was 214° 48′ 7½″ W. The Indians were very hostile and fraudulent; and so daring and insolent, that nothing would disperse them but small shot repeatedly fired from the muskets. In order to incommode our navigators, they set fire to the grass, which blazed in various directions. On the 4th of August, after frequent unsuccessful attempts to disengage the ship from the harbour, she got under sail; but many difficulties occurred; and on the 5th, the lieutenant had not kept his course long before shoals were discovered in every quarter, which obliged him, at the approach of night, to come to an anchor. On the morning of the 10th, the weather, which had been boisterous, became more moderate, and the commander weighed anchor, and stood in for the land; determining to seek a passage along the shore to the northward. In pursuance of this resolution, the Endeavour proceeded in her course, and at noon came between the farthermost head-land that lay in sight, and three islands which were four or five leagues to the north of it, out at sea. Here they thought there was a clear opening before them, and began to hope that they were once more out of danger. In this hope, however, they were soon disappointed, and therefore the lieutenant gave to the head-land, in S. lat. 14° 56′. W. long. 214° 43′, the name of "Cape Flattery." After steering for some time along the shore, for what was believed to be the open channel, an officer at the mast-head cried aloud that he saw land a-head, which extended quite round to the three islands; and that between the ship and them there was a large reef. Mr. Cook himself discerned the reef, but was of opinion that the supposed land was a cluster of small islands. In this state of uncertainty, however, he thought it most prudent to come to anchor, under a high point, from which he could have an extensive view of the sea and country. This eminence he called "Point Look-out." In the process of investigating the shoals and channel between them, the lieutenant, accompanied by Mr. Banks, discovered an island on which were no animals except lizards; and he therefore called it "Lizard island." In their return to the ship, they landed on a low sandy island, abounding with an incredible number of birds; and as they here found the nest of an eagle, they called it "Eagle island." At length, after much deliberation, it was resolved to quit the coast entirely, till they could approach it with less danger; and in pursuance of this resolution, the Endeavour, on the 13th, got under sail, and successfully passed through one of the channels or openings in the outer reef, which Mr. Cook had previously observed. The situation of our navigators was now happily changed; and after three months' anxiety and suspence, they found themselves in an open sea, with deep water. The passage or channel, through which the Endeavour passed into the open sea beyond the reef, lies in S. lat. 14° 32′. It is distinguished by the three high islands within it, to which, on account of the use they may be of in guiding the way of future voyagers, our commander gave the appellation of "Islands of Direction." New dangers, which created alarm and required fresh exertions, occurred; but every man did his duty with as much calmness and regularity as if no danger had been near. It was indeed the high and magnanimous spirit of the commander, which inspired his people with such resolution and vigour. On the coast of a new and unknown country he braved all perils, and determined to ascertain whether this country did, or did not, join to New Guinea: a question which he had fixed upon resolving, from the first moment that he had come within sight of land. To the opening, through which he had passed with so much hazard, the commander, under a proper sense of gratitude to the Supreme Being, gave the name of "Providential channel." In the prosecution of the voyage, the navigators, on the 19th, were encompassed on every side with rocks and shoals; but they were little moved, as perils had been familiar to them. On the 21st, as no land could be seen, they conceived hopes of having at last found a passage into the Indian sea; but to

determine

determine this matter with greater certainty, lieutenant Cook resolved to land upon an island, which lies in the S.E. point of the passage. Accordingly he, accompanied by Mr. Banks and Dr. Solander, ascended a high hill, from which no land could be seen between the S.W. and W.S.W.; so that Mr. Cook had not the least doubt of finding a channel, through which he might pass to New Guinea. As he was now about to quit the coast of New Holland, which he had traced from lat. 38° to this place, and where he was certain no European had ever been before, he once more hoisted English colours, taking possession of the whole eastern coast, with all the bays, harbours, rivers, and islands situated upon it, from lat. 38° to lat. 10½° S. in right of his majesty king George III., and by the name of *New South Wales*. Having performed this ceremony upon the island, hence called "Possession island," they reimbarked in their boat; and on the 23d Mr. Cook was confirmed by several circumstances in his opinion, that he had arrived to the northern extremity of New Holland, and that to the westward he had an open sea. These circumstances afforded him peculiar satisfaction, not only because the dangers and fatigues of the voyage were drawing to a conclusion, but because it could no longer be doubted whether New Holland or New Guinea were two separate islands. The N.E. entrance of the third lies in S. lat. 10° 39′. W. long. 218° 36′; and the passage is formed by the main land, and by a congeries of islands to the N.W., called by Mr. Cook the "Prince of Wales's islands," and which may probably extend as far as to New Guinea. To the channel through which he passed, he gave the name of "Endeavour straits."

From the coast of New South Wales, the lieutenant steered, on the 23d of August, for the coast of New Guinea; but in the prosecution of his voyage he fell upon a dangerous shoal, which exposed him to great danger; but he fortunately escaped; and on the 3d of September arrived within sight of New Guinea, and brought to within three or four miles of land. Some of the ship's company went on shore, but they were suddenly attacked by the natives, who had for some time concealed themselves in the woods. See New Guinea. Our voyagers leaving this coast, hastened to the westward; and pursuing their course, they discovered on the 6th of September a small island N.N.W.; and another low island, extending from that quarter to N.N.E. Unless these two islands belong to the "Arrou islands," they have no place in the charts; and if they do belong to these, they are laid down at too great a distance from New Guinea. Mr. Cook found the E. part of them in S. lat. 7° 6′. W. long. 225°. On the 7th, when the ship was in S. lat. 9° 30′, and W. long. 229° 34′, our navigators ought to have been in the sight of the Weasel isles, which are laid down in the charts at the distance of 20 or 25 leagues from the coast of New Holland; but Mr. Cook, as he did not see them, concluded that they must have been laid down erroneously. In pursuing their course, our navigators passed the islands of Timor, Timor-lavet, Rotle, and Seman. When they were near these two latter islands they observed a phenomenon in the heavens, in some respects resembling, but in others differing from, the Aurora Borealis. Having passed all the islands between Timor and Java, lieutenant Cook did not expect to meet with any other in that quarter; but on the 17th he observed an island bearing W.S.W., which he thought to be a new discovery. When they came to the N. side of it, they saw houses and cocoa-nut trees, and numerous flocks of sheep. Here they landed; the commander thinking he might thus supply the necessities of the ship's company, and remove both the sickness and the discontent which had spread among them. This proved to be the island of Savu; which see. On the 21st of September our navigators left Savu, and on the 1st of October came within sight of the island of Java; and on the 9th they stood in for Batavia road, where the Endeavour was secured from a stroke of lightning by the chain that was attached to it. The injurious effects of this climate were felt by our voyagers within nine days after their arrival; and Mr. Monkhouse, the surgeon of the ship, fell, on the 5th of November, the first sacrifice to this fatal country. Tayeto, Tupia's boy, died the 9th, and Tupia survived him only a few days. The repair of the Endeavour, which had been very much damaged, and which appeared to be in a very alarming state, was an object to which Mr. Cook, though himself affected by the climate, directed his particular attention, and it was performed much to his satisfaction. When this business was accomplished, on the 27th of December, the ship stood out to sea; and on the 5th of January 1771, came to an anchor under the S.E. side of "Prince's island," where the gentlemen of the ship, after having paid their respects to the king, commenced a traffic with the natives for turtles, fowls, fish, monkies, small deer, and vegetables. On the 15th the commander weighed, and stood out for sea. In the prosecution of the voyage to the Cape of Good Hope, the seeds of disease, which had been received at Batavia, appeared with very threatening symptoms, and reduced the navigators to a very melancholy situation. The ship was a mere hospital; the water taken in at Prince's island was purified with lime; and in order farther to guard against infection, the commander ordered all the parts of the vessel between the decks to be washed with vinegar. So fatal, notwithstanding every precaution, was the disease, that almost every night a dead body was committed to the sea. The loss amounted in all to 23 persons, besides the seven who died at Batavia. Among these were Mr. Green the astronomer, Mr. Parkinson, natural history painter, Mr. Monkhouse the midshipman, another midshipman, &c. &c. These calamitous events contributed most probably to turn the attention of Mr. Cook to those methods of preserving the health of seamen, which he afterwards pursued with such remarkable success. On the 15th of March the Endeavour arrived off the Cape of Good Hope; and a proper place was provided on shore for the accommodation and recovery of the sick. Lieutenant Cook having staid here whilst the sick of his crew were recovered, necessary stores were procured, and the vessel refitted, till the 14th of April, stood out of the bay, and proceeded on his voyage homeward. In the morning of the 29th, he crossed his first meridian, having circumnavigated the globe in the direction from east to west; the consequence of which was that he had lost a day, an allowance for which had been made at Batavia. On the 1st of May he arrived at St. Helena, and on the 4th he departed from this island, and pursued his course in safety. On the 10th of June, land, which proved to be the Lizard, was discovered; on the 11th the ship ran up the channel; next morning he passed Beachy head; and in the afternoon of the same day anchored in the Downs, and went on shore at Deal. Thus ended Mr. Cook's first voyage round the world, in which he had gone through so many dangers, explored so many countries, and exhibited the strongest proofs of his possessing an eminently sagacious and active mind; a mind that was equal to every perilous enterprise, and to the boldest and most successful efforts of navigation and discovery.

Mr. Cook having thus recommended himself to the protection of government, and the favour of his sovereign, was promoted in the progressive order of the naval service, to be a commander in his majesty's navy, Aug. 29,

1771;

1771; an officer inferior in rank only, but equal in advantage to that of post-captain. On the 21st of May 1772, captain Cook communicated to the Royal Society by a letter to Dr. Maskelyne, "An Account of the flowing of the Tides in the South Sea, &c." (see Phil. Trans. vol. lxii. p. 357-8.) The curiosity of the public was much excited by the reports of lieutenant Cook's voyage; and it was amply gratified by Dr. Hawkesworth's Account, in 3 vols. 4to. Extensive and interesting was the knowledge obtained in consequence of this voyage; but the question concerning a southern continent remained still undecided. The reign of our present sovereign George III. has been favourable to every kind of scientific and literary inquiry; and the earl of Sandwich, who, at the period to which we now refer, was at the head of the admiralty, was eminently capable of comprehending and disposed also to encourage the most enlarged views and schemes with regard to navigation and discovery. By his particular recommendation, it was resolved to appoint a commission for determining the long disputed question relating to the existence of a southern continent. Quiros seems to have been the first person who suggested the idea of such a continent; but though he was sent out to ascertain it, he failed in the attempt. Mr. Dalrymple had now excited the public attention to this object, by his Historical Collection, in 2 vols. 4to. of the several voyages and discoveries in the south Pacific Ocean, 1770, 1771. When the Board of Admiralty determined to take up the business, captain Cook was immediately fixed upon as the person best qualified for conducting an enterprise which was to give the utmost possible extent to the geography of the globe, and the knowledge of navigation. Two ships, similar in construction to the Endeavour, were provided for this purpose; the largest of the two, which consisted of 462 tons burthen, was named the Resolution; and to the other, consisting of 336 tons burthen, was given the name of the Adventure. On the 28th of November 1771, captain Cook was appointed to the command of the former; and, about the same time, Mr. Tobias Furneaux was promoted to the command of the latter. The complement of the Resolution, in officers and men, was fixed at 112 persons, and that of the Adventure at 81. In the equipment of these ships, attention was directed to every circumstance that could contribute to the comfort and success of the voyage. Lord Sandwich was singularly attentive on the occasion; and both the navy and victualling boards took care to procure for the ships the best stores and provisions, together with an ample supply of antiscorbutic articles, such as malt, sour krout, salted cabbage, portable broth, soup, mustard, marmalade of carrots, and inspissated juice of wort and beer. Scientific objects were also duly regarded. Mr. William Hodges, an excellent landscape painter, Mr. Reinhold Foster, and his son, well informed in natural history, and Mr. William Wales, and Mr. William Bayley, skilful astronomers, were appointed to accompany the expedition; they were furnished with the best instruments for observation, and particularly with four time-pieces, three of Mr. Arnold's construction, and one of Mr. Kendal's, upon the principles of Mr. Harrison. Captain Cook, on board the Resolution, joined the Adventure in Plymouth Sound, on the 3d of July 1772, and there received his instructions, which comprehended, without entering into a minute detail, the most enlarged plan of discovery that is known in the history of navigation. He was instructed not only to circumnavigate the whole globe, but to circumnavigate it in high southern latitudes, making such traverses, from time to time, into every corner of the Pacific ocean not before examined, as might finally and effectually resolve the much agitated question about the existence of a southern continent, in any part of the southern hemisphere, to which access could be had, by the efforts of the boldest and most skilful navigators.

On the 17th of July, captain Cook sailed from Plymouth, and on the 29th anchored in Funchiale road, in the island of Madeira. Having supplied himself with water, wine, and other necessaries, he left the island Aug. 1st, and sailed to the southward. As he proceeded, he made three puncheons of beer of the inspissated juice of malt, and the liquor was brisk and drinkable; though on account of the heat of the weather, and the agitation of the ship, the juice was in a high state of fermentation. If it could be kept from fermenting, this would be a most valuable article at sea. At St. Jago, one of the Cape de Verd islands, he stopped to procure a fresh supply of water. On the 20th of the month, they were delayed with rain; but to guard against the pernicious effects of rain on any future occasion, captain Cook took care to well air and dry the ship with fires between the decks, and to smoak its damp places; besides, the people were ordered to air their bedding, and to wash and dry their cloaths, whenever they had an opportunity; such was the result of these precautions, that there was not one sick person on board the Resolution. On the 8th of September, the ship crossed the line in W. long. 8°, and proceeded on its voyage. On the 29th, being near the Cape of Good Hope, the whole sea, as far as our voyagers could see, became at once, as it were, illuminated. In order to ascertain the true cause of this phenomenon, which had in the former voyage been attributed to luminous insects, captain Cook examined some buckets of water, and found in them a number of globular insects, about the size of a common pin's head, and quite transparent. Mr. R. Forster was satisfied that these were the cause of the sea's illumination. On the 30th, the Resolution and Adventure anchored in Table bay; and the captains on going a-shore, were received by the governor with great politeness. On the 22d of November, our commander sailed from the Cape, and prosecuted his voyage in search of a southern continent. He directed his course for Cape Circumcision; but, by tempestuous weather, our voyagers were driven far to the eastward of their intended course, being in S. lat. 48° 41′. E. long. 18° 24′, so that they had no hopes of reaching this Cape. In this gale, they had the misfortune to lose the principal part of the live stock on board, consisting of sheep, hogs, and geese.

On the 10th of December, in S. lat. 50° 40′, and long. 2° E. of the Cape of Good Hope, they began to meet with islands of ice, one of which was judged by captain Cook to be about 50 feet high, and half a mile in circuit. The weather was hazy, and danger was imminent. On the 18th they happily got clear of the field of ice. They were now in S. lat. 55° 8′, and long. 24° 3′. An opinion had been entertained, that such ice was formed in bays and rivers; and hence our voyagers were led to conclude, that land was not far distant. But they proceeded without finding it. The whole crew began to complain much of cold, and therefore the captain directed the sleeves of their jackets to be lengthened with baize, and ordered a cap to be made for each, strengthened with canvas. This season, it should be recollected, was with them the middle of summer. As some of the crew appeared to have symptoms of the scurvy, fresh wort was given them every day. By the 29th, the commander was satisfied that the field of ice, along which the ships had sailed, did not join to any land. Determining to run as far W. as the meridian of Cape Circumcision, a gale sprung up on the 31st, which brought with it such a swell of

of fea, as rendered a continuance among the ice perilous; our navigators, therefore, hauled to the fouth. On the 1ft of January 1773, the gale abated, and the people had a fight of the moon, which they had obferved but once, fuch was the ftate of the weather fince they had left the Cape of Good Hope. They were now in S. lat. 58° 53′ 30″, and E. long. 9° 34′ 30″. In this fituation, land, if it had exifted, might have been at the diftance of 14 or 15 leagues; but as it was not vifible, captain Cook concluded it to be very probable, that Bouvet had miftaken mountains of ice for land. Upon the whole, there was reafon to believe that no land was to be met with under this meridian, between the latitude of 55 and 59 degrees, as fome had fuppofed. From the ice, however, captain Cook derived the advantage of procuring a fupply of frefh water, which was fweet, and well tafted. On the fields of ice, they obferved penguins, albatroffes, and other birds; but the prevalent opinion, that fuch birds never go far from land, was now found to be erroneous. On the 17th of January captain Cook, having reached the latitude of 67° 15′ S., could advance no farther; and as the ice towards the fouth exhibited no appearance of any opening, he thought it prudent not to perfevere in failing farther fouthward, more efpecially as the fummer was already half fpent, and there was no profpect of being able to get round the ice. He, therefore, determined to fearch for the land which had lately been difcovered by the French, and feparated the fhips at an interval of four miles, the weather being occafionally clear, as the beft method of inveftigation. On the 1ft of February our voyagers were in S. lat. 48° 30′, and E. long. 58° 7′, nearly in the meridian of the ifland of St. Mauritius. From the perpetual high fea which had been lately met with, captain Cook inferred that there could be no great extent of land to the weft. But whilft he was fteering eaftward, in S. lat. 49° 13′, captain Furneaux fuggefted that the land was to the N.W. of them, as he had obferved the fea to be fmooth when the wind blew in that direction. Captain Cook, in deference to this opinion, purfued the fearch; and the refult was a conviction, that, if any land was near, it could be only an ifland of inconfiderable extent. In this part of the fouthern ocean the mean variation of the compafs was 29° 4′ W. When the fun was on the ftarboard of the fhip, the variation was the leaft; and when on the larboard fide, the greateft. A feparation now took place between the two fhips, and the Refolution was under a neceffity of purfuing its voyage alone. As they proceeded they were fatisfied that the fight of oceanic birds, which frequent high latitudes, are no fure figns of the vicinity of land. In the morning of the 17th, lights were feen in the heavens, fimilar to thofe which are known in the northern hemifphere under the appellation of Aurora Borealis. On the 20th our navigators thought they faw land to the fouth-weft; but they found, on endeavouring to approach it, that they had been deceived by clouds, and nothing could be difcerned but ice iflands. At night the Aurora Auftralis was again feen, affuming a very brilliant and luminous appearance, difcovering itfelf firft in the eaft, and foon fpreading over the whole heavens. On the 23d, in S. lat. 61° 52′. E. long. 95° 2′, our navigators, in the midft of mountains of ice, were on every fide furrounded with danger; and hence captain Cook was led to alter his purpofe of once more croffing the Antarctic circle; and on the 24th he ftood to the north, expofed to the hazard of injury from large pieces of broken ice, in very thick and hazy weather. In failing from the 25th to the 28th captain Cook was convinced to a certainty, that no land, of any confiderable extent, could lie within 100 or 150 leagues from eaft to fouth-weft. As he proceeded on his voyage from the 28th of February to the 11th of March, he had ample reafon for concluding, from the fwell of the fea and other circumftances, that there could be no land to the fouth, that did not lie at a great diftance. By obfervation of the fun and moon on the 13th and 14th they were in S. lat. 58° 22′. E. long. 136° 22′. Mr. Kendal's and Mr. Arnold's watches gave each of them 134° 42′; and this was the firft and only time, in which they had pointed out the fame longitude fince the fhips had left England: the greateft difference, however, between them, fince our navigators had left the Cape, had not much exceeded two degrees. Farther evidence occurred to our commander, as he advanced in his courfe, that he had left no land behind him, in the direction of W. S. W., and that no land lay to the S. on this fide of 60 degrees of latitude. On the 17th he therefore determined to quit the high fouthern latitudes, being now in S. lat. 59° 7′, and E. long. 146° 53′, and to proceed to New Zealand, in fearch of the Adventure, and for the refrefhment of his people. He had alfo a defire of vifiting the eaft coaft of Van Diemen's land, in order to gain fatisfaction whether it joined the coaft of New South Wales. But the wind preventing his accomplifhing this object; he fhaped his courfe for New Zealand, and came to anchor on the 26th in "Dufky bay." He had now been 117 days at fea, in which time he had failed 3660 leagues, without once coming within fight of land. So falutary had been the effects of fweet wort and feveral articles of provifion, and efpecially of the frequent airing and fweetening of the fhip, that there was only one man on board who could be faid to be afflicted with the fcurvy; and his diforder was occafioned by a bad habit of body and a complication of other difeafes. On the 27th the fhip entered "Pickerfgill Harbour," fo called from the name of the gentleman by whom it had been firft difcovered, and fituated in S. lat. 45° 47′ 26½″ S. and E. long. 166° 18′. Here wood for fuel and other purpofes was immediately at hand: and a fine ftream of frefh water was not above 100 yards from the ftern of the veffel. Having felected a fuitable place on the fhore for future operations, captain Cook employed fome of the crew in the brewing of beer from the branches or leaves of a tree refembling the American black fpruce, which, with the addition of the infpiffated juice of wort and melaffes, would make, as he knew, a very wholefome liquor, and fupply the want of vegetables of which the country was deftitute. While captain Cook continued in this fituation, he took every opportunity of examining the bay. See Dusky *Bay*.

On the 11th of May, captain Cook left Dufky bay, and directed his courfe for Queen Charlotte's Sound, where he expected to find the Adventure; but on the 17th, the wind flattened to a calm, the fky became fuddenly obfcured by dark denfe clouds, and there was every prognoftication of a tempeft. Soon after fix water fpouts were feen, four of which rofe and fpent themfelves between the fhip and the land; but they all fpent themfelves without doing any injury. On the next day the Refolution came within fight of Queen Charlotte's Sound, and there capt. Cook had the fatisfaction of finding the Adventure; after a feparation of fourteen weeks, captain Furneaux had an opportunity of examining Van Diemen's land; and it was his opinion that there are no ftraits between this land and New Holland, but a very deep bay. He met likewife, with farther proofs, that the New Zealanders are eaters of human flefh. On the morning after captain Cook's arrival in Queen Charlotte's Sound, he went on fhore and returned with a boatload of fcurvy-grafs, celery, and other vegetables; and he gave

gave orders that they ſhould be boiled, with wheat and portable broth, every day for breakfaſt, and with peaſe and broth for dinner. Experience had taught him that theſe vegetables, thus dreſſed, are very beneficial to ſeamen, in removing various ſcorbutic complaints. The intercourſe with the natives of the country was of a friendly nature; and proved advantageous in a variety of reſpects, particularly in ſupplying a quantity of fiſh. On the 2d of June, when the ſhips were almoſt ready to put to ſea, captain Cook ſent on ſhore a male and female goat; and captain Furneaux left at Cannibal cove, two breeding ſows, and a boar. It is a remarkable circumſtance, that during captain Cook's ſecond viſit to Charlotte Sound, he could not recollect the face of any one perſon he had ſeen three years before, nor did it appear that a ſingle Indian had any knowledge of him. Hence he infers, that in the interval the natives had either been driven away, or had removed, of their own accord, to ſome other ſituation. Not one-third of the inhabitants, formerly obſerved, ſeemed to be now there; their ſtrong hold on the point of Motuara was deſerted, and in every part of the Sound many forſaken habitations were diſcovered.

In the captain's opinion, the place had never been very populous. From comparing the two voyages, it appears that the Indians of Eahei-nomauwe are in ſomewhat of a more improved ſtate of ſociety than thoſe of Tavai-poenammoo. During captain Cook's ſtay in the Sound, he had obſerved that the ſecond viſit to this country had not mended the morals of the natives of either ſex. He had always looked upon the females of New Zealand as more chaſte than the generality of Indian women. But he was now told, that the male Indians were the chief promoters of a ſhameful traffic, and that, for a ſpike-nail, or any other thing they valued, they would oblige the women to proſtitute themſelves, whether it was agreeable or contrary to their inclinations. At the ſame time, no regard was paid to the privacy which decency required. The account of this fact muſt be read with concern by every well-wiſher to the good order and happineſs of ſociety, even without adverting to conſiderations of a higher nature. On the 7th of June captain Cook put to ſea from Queen Charlotte's Sound together with the Adventure; and on the 1ſt of Auguſt, when they were in S. lat. 25° 1′, and W. long. 134° 6′, they were nearly in the ſituation aſſigned by captain Carteret for "Pitcairn's iſland," diſcovered by him in 1767; but they did not obſerve it. As our commander advanced in his courſe, every circumſtance concurred to convince him that between the meridian of America and New Zealand there is no ſouthern continent; and that there is no continent farther to the ſouth unleſs in a very high latitude. But the inveſtigation and deciſion of the fact were reſerved for the employment of the enſuing ſummer. It was the 6th of Auguſt before the ſhips had the advantage of the trade wind; which they got at S.E. in S. lat. 19° 36′. W. long. 131° 32′. Having obtained this wind, captain Cook directed his courſe to the W.N.W. and proceeded in the track purſued by M. de Bougainville. To four of the iſlands which he paſſed, he gave the names of "Reſolution iſland," "Doubtful iſland," "Furneaux iſland," and "Adventure iſland," which ſee reſpectively. Theſe are ſuppoſed to be the ſame that were ſeen by M. de Bougainville; and they, with ſeveral others, conſtitute a cluſter of low and half-drowned iſles, which that gentleman diſtinguiſhed by the name of the Dangerous Archipelago. On the 15th of Auguſt the ſhips came within ſight of "Oſnaburg iſland," or Maitea, which had been diſcovered by captain Wallis. Having eſcaped being wrecked on the coaſt of Otaheite, they anchored, on the 17th, in Oaitipiha bay, near the S.E. end of the iſland; and they were immediately crowded with the inhabitants of the country, who brought with them cocoa nuts, plaintains, bananas, apples, yams, and other roots, which were exchanged for nails and beads. On the 24th the ſhips put to ſea, and arrived the next evening in Matavai-bay; but before they could come to anchor, the decks were crowded by the natives, many of whom were known to captain Cook or by moſt of whom he was well remembered. At Oparree the tents and aſtronomer's obſervatories remained, on the ſame ſpot from which the tranſit of Venus had been obſerved in 1769. As ſoon as the ſick were recovered, the water completed, and the neceſſary repairs of the ſhips finiſhed, captain Cook determined to put to ſea, and on the 1ſt of September he ordered the veſſels to be unmoored. In the mean while lieutenant Pickerſgill returned from Attahourou, where he had been to procure hogs; and in this expedition he had ſeen Oberea, in a very humble ſituation, compared with that which ſhe had formerly occupied. In the evening of this day a favourable wind having ſprung up, the commander put to ſea; on which occaſion he diſmiſſed his Otaheite friends ſooner than they wiſhed to depart; but well ſatisfied with his kind and liberal treatment. From Matavai captain Cook directed his courſe for the iſland Huaheine; this he reached the next day, and on the 3d of September anchored in the harbour of Owharre. Both the captains landed upon the iſland, and being cordially received by the natives, commenced a trade with them. Every thing was conducted with mutual confidence and harmony till the 6th, when ſeveral circumſtances occurred on the part of the natives, which interrupted the friendly intercourſe. Captain Cook at length complained to Oreo, the king, of their inſolence and frauds, who was much concerned on the occaſion; and exerted himſelf to obtain redreſs and to puniſh the delinquents. It was from the iſland Huaheine that captain Furneaux received into his ſhip a young man named Omai, a native of Ulietea, of whom ſo much hath ſince been known and written. This choice was at firſt diſapproved by captain Cook, who thought that this youth was not a proper ſample of the inhabitants of the Society iſlands; being inferior to many of them in birth and acquired rank, and not having any peculiar advantage with reſpect to ſhape, figure, or complexion. The captain afterwards found reaſon to be better ſatisfied with Omai's having accompanied our navigators to England. At Huaheine the veſſels, though their ſtay was ſhort, obtained very plentiful ſupplies of proviſions. Not leſs than 300 hogs, beſides fowls and fruit, were procured. From Huaheine our navigators failed for Ulietea, where trade was carried on in the uſual manner, and a moſt friendly intercourſe renewed between captain Cook and Oreo, the chief of the iſland. An interruption took place in the intercourſe between the ſhips and the natives, which was occaſioned by a miſapprehenſion on the part of the latter, and which upon proper explanation was ſoon rectified. So that proviſions were furniſhed at Ulietea no leſs plentifully than at Huaheine. Captain Cook eſtimated that the number of hogs, which had been obtained, amounted to 400 or upwards. Our commander, by his ſecond viſit to the Society iſlands, gained a farther knowledge of their general ſtate and of the cuſtom of the inhabitants. With regard to a certain diſorder, captain Cook was not able to determine whether it was known to the iſlanders before they were viſited by the Europeans; but he found upon inquiry that the introduction of it, if of recent origin, was unanimouſly aſcribed to the voyage of M. de Bougain-

ville,

ville. Captain Cook wifhed to fatisfy himfelf, whether human facrifices conftituted a part of the religious cuftoms of thefe people. From Omai he afterwards learned that the inhabitants of the Society iflands offer human facrifices to the Supreme Being. The knowledge he was able to obtain concerning their religion was very defective. With regard to the character of their women, he was enabled to rectify a prevailing error; and he does them juftice by informing us, that the favours both of the married women and of the unmarried, of the better fort, were as difficult to be obtained in the Society iflands as in any other country. And as to the unmarried females of the lower clafs, there were many who would not admit of any indecent familiarities. This voyage enabled our commander to gain fome further knowledge concerning the geography of the Society ifles; and he found it highly probable, that Otaheite is of greater extent than he had computed it in his former eftimation. On the 17th of September captain Cook failed from Ulietea, directing his courfe to the weft, with an inclination to the fouth. Land was difcovered on the 23d, to which he gave the name of "Harvey's ifland." S. lat. 19°18'. W. long. 158°54'. On the 1ft of October he reached the "ifland of Middleburg." From Middleburg the fhip failed to "Amfterdam," the natives of which ifland were no lefs difpofed than thofe of the former to maintain a friendly intercourfe with the Englifh. A few old rags at this ifland were fufficient for the purchafe of a pig or a fowl.

Although the natives of Amfterdam were of a friendly difpofition, they were not entirely free from the thievifh propenfity which pertained to the iflanders of the Southern Ocean. The two iflands of Middleburg and Amfterdam are guarded from the fea by a reef of coral rocks, extending from the fhore about 100 fathoms. Similar to this, in a great meafure, is the fituation of all the tropical ifles which our commander had feen in that part of the globe: and hence arifes an evidence of the wifdom and goodnefs of Providence; as by fuch a provifion nature has effectually fecured them from the encroachments of the fea, though many of them are mere points, when compared with the vaft ocean by which they are furrounded. The two iflands above-mentioned are fituated between the lat. of 21° 29' and 21° 3' S., and between the long. of 174° 40' and 175° 15' W. See Amsterdam and Middleburg.

On the 7th of October captain Cook proceeded on his voyage: next day he paffed the "ifland of Pilftart," difcovered by Tanoram, and fituated in S. lat. 22° 26'. W. long. 175° 59'. On the 21ft he made the land of New Zealand, at the diftance of 8 or 10 leagues from Table cape. To a chief, who came off in a canoe, he gave two boars, two fows, four hens, and two cocks, and a quantity of feeds, of wheat, French and kidney beans, peafe, cabbage, turnips, onions, carrots, parfnips, and yams. On the 3d of November the Refolution was brought into Ship Cove, in Queen Charlotte's Sound. After his arrival, the firft object of the captain was to provide for the repair of his fhip, and the next to examine into the ftate of his bread, much of which had become unfit for ufe. To the inhabitants, who refided at the Cove, he gave a boar, a young fow, two cocks, and two hens, which he had brought from the Society Iflands; and at the bottom of the weft bay he ordered to be landed three fows and a boar, together with two cocks and two hens; together with as much food as would laft them 10 or 12 days. In the fecond vifit of our navigators to New Zealand, they met with indubitable evidence that the inhabitants were eaters of human flefh; but it was captain Cook's firm opinion, that the only flefh that was eaten by thefe people was that of their enemies who had been flain in battle. Our commander did not leave New Zealand without making fuch remarks on the coaft between Cape Teerawhitte and Cape Pallifer, as may be of ufe to future navigators. As the Adventure had been feparated from the Refolution, and was thought to be no where upon the ifland, captain Cook gave up all hopes of feeing her any more during the voyage. On the 26th of November the captain failed from New Zealand, in fearch of a continent, and fteered to the fouth, inclining to the eaft. Some days afterwards, our navigators reckoned themfelves to be antipodes to their friends in London, and confequently at as great a diftance from them as poffible. The firft ice ifland which they faw, was on the 12th of December, in S. lat. 62° 10'. W. long. 172°. In the procefs of the voyage fuch iflands continually occurred, and the navigation became daily more difficult and dangerous. In S. lat. 67° 5', our voyagers all at once got within fuch a clufter of thefe iflands, and of loofe pieces, that they found it almoft impoffible to efcape. However, being releafed, the Refolution, on the 22d of the month, was in the higheft latitude fhe had yet reached, *viz.* 67° 31'. W. long. 142° 54'; and circumftances became fo unfavourable, that captain Cook determined to return towards the north. Here was no probability of finding land, or a poffibility of getting farther fouth. As our navigators advanced to the N.E., on the 24th, the ice-iflands increafed very much upon them; and in the midft of about 100, they fpent Chriftmas day. As captain Cook, agreeably to his late refolution, had traverfed a large extent of ocean, without feeing land, he again directed his courfe towards the fouth; and by the 30th of January, 1774, after encountering innumerable obftructions, he reached to S. lat. 71° 10'. W. long. 106° 54'. Farther it would have been extreme folly to have proceeded. The captain was of opinion, in which moft of the gentlemen on board concurred, that the ice now in fight extended quite to the pole, or might join to fome land, to which it might have been fixed from the earlieft time. Compelled at laft by inevitable neceffity to tack, and to ftand towards the north, captain Cook formed a refolution of fpending the enfuing winter within the tropic. He was well fatisfied, that no continent was to be found in this ocean, but that which muft lie fo far fouth as to be wholly inacceffible, on account of ice. If a continent exifted in the Southern Atlantic Ocean, he was fenfible that he muft have the whole fummer before him, in order to explore it. Upon the fuppofition, that no land could be found, he might reach the Cape of Good Hope by April: in that cafe he would have finifhed the bufinefs of finding a continent, which was indeed the firft object of the voyage. But this could not fatisfy the comprehenfive and magnanimous mind of our commander. He had a good fhip, exprefsly fent out on difcoveries, a healthy crew, and wanted neither ftores nor provifions. In fuch circumftances, to have quitted this Southern Pacific Ocean would have been betraying, as he thought, not only a want of perfeverance, but of judgment, in fuppofing it to have been fo well explored, that nothing farther could be done. Although he had proved that, if there were a continent, it muft lie far to the fouth, there remained room for very large iflands, in places as yet unexamined. He was alfo perfuaded, that his continuing for fome time longer in this fea would be ferviceable to geography and navigation, and other fciences. Thus he reafoned; and accordingly it was his intention firft to go in fearch of the land, faid to have been difcovered by Juan Fernandez, in the laft century, in about the lat. of 38°; and if he failed in finding this land, he propofed to direct his courfe in queft of "Eafter ifland," or "Davis's land." He next intended to go within the tropic, and

and so proceed westward till he arrived at Otaheite, where it was necessary for him to explore the Adventure. It was also in his contemplation to run as far west as the "Terra Austral del' Espiritu Santo," discovered by Quiros, and called by M. de Bougainville the "Great Cyclades." Hence he proposed to steer to the south, and so back to the east, between the latitudes of 50° and 60°. In the execution of this plan, it was his purpose to attain the length of Cape Horn, in the ensuing November, when he should have the best part of the summer before him, to explore the southern part of the Atlantic ocean. When he communicated this extensive plan, comprehending hazards and difficulties without number, to his officers, they unanimously and chearfully concurred. In pursuing his course to the north, captain Cook became well assured that the discovery of Juan Fernandez, if any such was ever made, could be nothing more than a small island. Our captain was at this time confined to his bed by a bilious colic: by the attention of Mr. Patten, the surgeon, he was relieved, and at length the disorder subsided; but his stomach was so weak, that he could taste nothing but the broth and flesh of a favourite dog, belonging to Mr. Forster. On the 11th of March our navigators came within sight of "Easter island," or "Davis's land." in S. lat. 27° 5′ 30″. W. long. 109° 46′ 20″. On the 6th and 7th of April they came within sight of four islands, which they knew to be the "Marquesas." To one of them captain Cook gave ehe name of "Hood's island;" and as soon as the ship was brought to an anchor in Madre de Dios, or Resolution bay, in the island of "Christina," a traffic commenced, in the course of which the natives would frequently keep the goods, without making any return. Theft was so common, that it was impossible to guard against it; and one of the thieves was accidentally killed by a shot, in the act of stealing. After some time the trade was carried on in a better manner; and the ship was supplied with yams, plantains, bread-fruit, a few cocoa-nuts, fowls, and small pigs. From the Marquesas captain Cook steered for Otaheite, with a view of falling in with some of the islands discovered by former navigators, and especially by the Dutch, the situation of which had not been accurately determined. In the course of the voyage he passed a number of low islets, connected together by reefs of coral rocks. One of these islands was "Tiookea," discovered and visited by Byron. Besides passing by "St. George's islands," so named by captain Byron, captain Cook discovered four others, which he called "Palliser's isles." On the 22d he anchored in Matavai bay, at Otaheite, where he took measures for the repairs of the ship. During his stay at Otaheite, he maintained a most friendly connection with the inhabitants; and a continual interchange of visits took place between him and Otoo, Towka, and other chiefs of the country. On the 15th of May, our captain anchored in O'wharre harbour, in the island of Huaheine, where he procured bread-fruit, cocoa-nuts, and other vegetables in abundance; but there was a scarcity of hogs. When they were leaving the island, the good old chief, Oreo, was the last man that left the vessel. At parting, captain Cook told him that they should meet each other no more: Oreo wept, and said, "let your sons come, we will treat them well." At Ulietea nothing particular occurred. It was the last request of Oreo, the chief, to captain Cook, that he would return; and when he could not obtain a promise to that effect, he asked the name of his burying place. Oreo's anguish at parting was very great: "he looked up at the ship, burst into tears, and then sunk down into the canoe." On the 6th of June, the day after our voyagers left Ulietea, they saw land, which they found to be a low reef island, about four leagues in compass, and of a circular form, called "Howe island," discovered by captain Wallis, and situated in S. lat. 16° 46′. W. long. 154° 8′. Another reef island was seen on the 16th, to which captain Cook gave the name of "Palmerston island," in S. lat. 18° 4′. W. long. 163° 10′. On the 20th land was again seen, called by captain Cook "Savage island," S. lat. 19° 1′. W. long. 169° 37′. Pursuing his course to the W.S.W., captain Cook passed by a number of small islands, and on the 26th anchored on the north side of "Anamooka," or "Rotterdam," S. lat. 20° 15′. W. long. 174° 31′. While the captain was on shore at this island, he got the names of 20 islands which lie between the N.W. and N.E.; but two of them are most remarkable on account of their great height, *viz.* "Amattafoa," and "Oghao." From the N.W. to the S. of Rotterdam, round by the E. and N., it is encompassed by many small isles, sand-banks, and breakers: no termination of them could be seen to the N., and they may possibly reach as far S. as Amsterdam, or Tongataboo. Together with Middleburg or Eaoowe and Pilstart, these form a group, containing about three degrees of latitude and two of longitude; and captain Cook called them the "Friendly isles, or Archipelago." Pursuing their course to the west, our navigators discovered land on the 1st of July, which they found to be a small island, to which captain Cook gave the name of "Turtle isle," on account of the number of turtle which were seen on the coast. On the 16th high land was seen to the S.W., which was the Austral's del' Espiritu Santo of Quiros, or the Great Cyclades of M. de Bougainville. After exploring the coast for some days, the captain anchored in a harbour of the island of "Mallicollo," which he called "Port Sandwich," situated in the N.E. side of the island, not far from the S.E. end, in S. lat. 16° 25′ 20″. E. long. 167° 57′ 23″. On the 23d of July our navigators, having gotten to sea, discovered three or four small islands; and at this time the Resolution was not far from the "isle of Ambryu," "the isle of Paoom," and "the isle of Apee;" S.E. of which latter island was discovered a group, which captain Cook called "Shepherd's isles." Amidst the number of islands now observed, one only appeared to be uninhabited: it consisted of a remarkable peaked rock, accessible only to birds, and obtained the name of the "Monument." In the farther course of the ship to the southward, our navigators approached other islands, which they found to consist of one large island, and three or four smaller ones. The two principal of the latter were called "Montagu" and "Hinchinbrook;" and the large island captain Cook named "Sandwich," in honour of his patron, the earl of Sandwich. Pursuing his discoveries, he came to an island, called by the natives "Erromangu," in a bay of which he anchored. As the inhabitants behaved treacherously, captain Cook called a promontory, or peninsula, near which a skirmish happened, "Traitor's Head," in S. lat. 18° 43′. E. long. 169° 28′. From this place the captain sailed for an island, before discovered, on which he proposed to make some stay, for the purpose of obtaining a supply of wood and water. This island was called "Tanna;" and three others near it were distinguished by the names of "Immer," "Errona," or "Footoona," and "Annatom." The harbour in which he anchored was called by him "Port Resolution," after the name of the ship; it was situated in S. lat. 19° 32′ 25½″, and E. long. 169° 44′ 35″. To this Archipelago, or group of islands, which captain Cook particularly examined, he gave the name of "New Hebrides." The season of the year came on when captain Cook proposed to return towards the south; but he improved the intervening time in exploring any land which he might yet meet with between the New Hebrides

Hebrides and New Zealand, at which place it was his intention to refresh his people, and to renew his stock of wood and water for another southern course. Sailing with this view, September the 1st, he discovered land on the 4th; and the Resolution anchored next day in a harbour belonging to it. The inhabitants behaved to him in a very civil and friendly manner; and he returned their kindness with presents to their chief. Captain Cook gave this island the name of "New Caledonia." On one of the small adjoining islands the captain found a species of spruce-pine, of which spars and very good masts might be made, and called it the "isle of Pines." To another, which afforded ample employment to the botanists, he gave the name of "Botany isle." The captain, before he left this island, was enabled so far to survey it as to ascertain, that, excepting New Zealand, it is probably the largest island in the South Pacific ocean. Another island was observed of good height, and five leagues in circuit, to which was given the name of "Norfolk isle," in S. lat. 29° 2′ 30″. E. long. 168° 16′. On the 18th of October our captain anchored in Ship Cove, in Queen Charlotte's Sound, on the coast of New Zealand; and his intercourse with the inhabitants was altogether peaceable and friendly. Mr. Wales, on this occasion, accurately ascertained the latitude and longitude of this sound, and found the bottom of Ship Cove to be in S. lat. 41° 5′ 56½″, and E. long. 174° 25′ 7½″. The 10th of November captain Cook left New Zealand, in the prosecution of his great object, or the determination of the question concerning the existence of a southern continent. Having failed in different latitudes, extending from 43° to 55° 48′ S., till the 27th, the ship being in W. long. 138° 56′, he gave up all hopes of finding any more land in this ocean. He therefore resolved to steer directly for the west entrance of the straits of Magalhaens, with a view of coasting the S. side of Terra del Fuego, round Cape Horn, to the strait Le Maire. In the prosecution of this voyage, on the 17th of December, he reached the W. coast of Terra del Fuego, and on the 20th anchored in a place to which he gave the name of "Christmas Sound." The whole coast and country were desolate and uninteresting. Near every harbour, however, fresh water and wood for fuel were obtained. The country also abounds with wild fowl, and particularly geese. See CHRISTMAS *Sound*, and *Terra del* FUEGO. On the 28th, captain Cook left Christmas Sound, and proceeded round Cape Horn, through strait Le Maire, to Staten land. Having passed this famous Cape on the next day, he entered the southern Atlantic ocean. On Staten island he found a port, on the 1st of January, which, from this circumstance, was denominated "New Year's Harbour." In the small islands adjacent to Staten land, and called "New Year's Isles," captain Cook perceived a harmony between the different animals of the place, which he thought deserving of being recorded. It seemed, he says, as if they had entered into a league not to disturb each other's tranquillity. The greater part of the sea coast is occupied by the sea-lions; the sea-bears take up their abode in the isle; the shags are posted on the highest cliffs; the penguins fix their quarter where they have the most ready communication with the sea; and the rest of the birds chuse the most retired places. All these animals were occasionally seen to mix together like domestic cattle and poultry in a farm-yard, without any attempt on the part of one to molest the other. Nay, the captain had often observed the eagles and vultures sitting on the hills among the shags, while none of the latter, whether old or young, appeared to be in the least disturbed at their presence. Should it be asked, how do these birds of prey live? The captain answers the question, by supposing, that they feed on the carcases of seals and birds, which perish by various causes. It is probable, from the immense quantity of animals with which the isle abounds, that such carcases exist in great numbers. On the 4th of January, captain Cook sailed from Staten island, in order to reconnoitre that extensive coast laid down by Mr. Dalrymple in his chart, in which is the gulf of St. Sebastian. As he had some doubt of the existence of such a coast, he determined to make the western point of the gulf; but when he came to the different points of it, he could discover neither land nor any unequivocal signs of it. Proceeding in his voyage, land was seen on the 14th, but being almost wholly covered with snow, it was at first mistaken for an island of ice. This was named from its first observer, "Willis's island," S. lat. 54°. W. long. 38° 23′. Another larger island, on which was a very considerable number of birds, was called "Bird island." On the 17th captain Cook landed in a bay of an extensive tract of country, very desolate in its appearance, which he took possession of in his majesty's name. The bay, situated in S. lat. 54° 5′. W. long. 37° 18′, he called "Possession bay," and the country, which proved to be an island 70 leagues in circuit, was called the "isle of Georgia," situated between 53° 57′, and 54° 57′ S. lat., and 38° 13′, and 35° 34′ W. long. On the 27th captain Cook, having left Georgia the 25th, computed that he was in S. lat. 60°. Here he was satisfied there could be no land in the direction towards the W., from which there was a long hollow swell; and hence he inferred, that the extensive coast laid down in Mr. Dalrymple's chart of the ocean between Africa and America, and the gulf of St. Sebastian, doth not exist. An elevated coast, observed on the 31st, was called the "Southern Thule," S. lat. 59° 13′ 30″. W. long. 27° 45′. To the more distinguished tracts of country, discovered from Jan. 31st to Feb. 6th, captain Cook gave the names of "Cape Bristol," "Cape Montagu," "Saunders's isle," "Candlemas isles," and "Sandwich's land." The last is either a group of islands, or else a point of the continent; for the captain was firmly of opinion, that a considerable tract of land existed near the pole, which was the source of most of the ice that is spread over this vast southern ocean. He thought it probable that this land must extend farthest to the N., where it is opposite to the southern Atlantic and Indian oceans. Ice had always been found by him farther to the north in these oceans than any where else, and this he judged could not be the case if there were not land of considerable extent to the south. See *Southern* CONTINENT.

Captain Cook having accomplished the great object of his navigation round the globe, began to direct his views towards England. Many circumstances relating to the state of his provisions, and the health of his crew, contributed to hasten his return. In his course to the Cape of Good Hope, he searched for the isles of "Denia" and "Marseveen," laid down in Halley's variation chart, in S. lat. 41° 30′, and about 4° of longitude E. of the meridian of the Cape of Good Hope; but after sailing from February 25th to March 13th, no such islands could be discovered. On the 22d of March he anchored in Table bay; having sailed from the time of leaving the Cape of Good Hope, to his return thither, no less than 20,000 leagues, which was an extent of voyage nearly equal to three times the equatorial circumference of the earth. It could not therefore be surprising, that the rigging and sails of the Resolution should be essentially damaged, and even worn out; and yet in the whole of this run, made in every latitude between 9° and 71°, she did not spring either low-mast, top-mast, lower or top-sail yard; nor did she so much as break a lower or top-mast shroud;

ſhroud; theſe happy circumſtances were owing to the good properties of the veſſel, and the ſingular care and abilities of her officers. Captain Cook having completed the neceſſary repairs, and ſupplied himſelf with requiſite ſtores and proviſions, left the Cape on the 27th of April, and reached the iſland of St. Helena on the 15th of May; on the 28th he anchored on the iſland of Aſcenſion, and arrived at the iſland of Fernando de Noronha, on the 9th of June. In the progreſs of the voyage, he made an experiment upon the ſtill for procuring freſh water; the reſult of which was, that the invention is uſeful upon the whole, but that it would by no means be adviſable to truſt to it entirely; more eſpecially as captain Cook was convinced, that nothing contributes more to the health of ſeamen, than a plentiful ſupply of water. On the 16th of July, the captain anchored in the bay of Fayal, one of the Azores iſlands; and on the 19th, proceeded with all expedition for England. On the 30th, he anchored at Spithead, and landed at Portſmouth; having been abſent from Great Britain three years and 18 days, during which time, and all changes of climate, he had loſt but four men, and only one of them by ſickneſs. The able manner in which captain Cook had conducted this voyage, and the diſcoveries he had made, could not fail to recommend him to the protection and encouragement of thoſe who had patronized the undertaking. The noble lord who had taken a lead in the plans of navigation and diſcovery, was ſtill at the head of the admiralty-board; and recommended by him to his majeſty, our navigator was raiſed, on the 9th of Auguſt, to the rank of a poſt-captain, and three days after, appointed a captain in Greenwich hoſpital; a ſituation which was intended to afford him a pleaſing and honourable reward for his illuſtrious labours and ſervices. Moreover, ſo important were his diſcoveries to ſcience in general, that on the 29th of February 1776, he was unanimouſly choſen a member of the Royal Society; and on the evening of the 7th of March, when he was admitted, a paper was read containing an account of the method he had taken to preſerve the health of the ſeamen. (See Philoſ. Tranſ. vol. lxvi. p. 402—406.) Another paper was communicated, at the requeſt of the preſident, ſir John Pringle, on the 18th of April, relative to the tides in the South Sea, *viz.* thoſe in the Endeavour river, on the eaſt coaſt of New Holland. (See Phil. Tranſ. ibid. p. 447, &c.) It was alſo reſolved by the preſident and council to beſtow on captain Cook ſir Godfrey Copley's gold medal. The preſident, according to his cuſtom, delivered an elaborate diſcourſe on the ſubject of the paper, which was thus diſtinguiſhed.

The particulars of this voyage were related by captain Cook himſelf, in a manner that redounds to his reputation as a writer. His ſtyle is natural, clear, and manly; being well adapted to the ſubject and to his own character. The ſuperintendence of the publication was undertaken by his learned and valuable friend, Dr. Douglas, who lately died in the ſee of Saliſbury, and whoſe promotion afforded pleaſure to perſons of literature of every denomination. The hiſtory of the voyage was recommended to the public by the accuracy and excellence of its charts, and by a great variety of engravings from the curious and beautiful drawings of Mr. Hodges. It was followed by the publication of the original aſtronomical obſervations, which had been made by Mr. Wales in the Reſolution, and Mr. Bayley in the Adventure.

The illuſion of a "Terra Auſtralis incognita," to any purpoſes of commerce, colonization, and utility, having been diſpelled; another geographical queſtion of very general intereſt remained to be determined; and that was the practicability of a northern paſſage to the Pacific ocean. Many perſons had conceived that there was a ſhorter, a more commodious, and a more profitable courſe of ſailing to Japan and China, and, indeed, to the Eaſt Indies in general, than by the tedious circuit of the Cape of Good Hope. To find a weſtern paſſage round North America had been attempted by ſeveral bold adventurers from Frobiſher's firſt voyage, in 1576, to thoſe of James and of Fox, in 1631. By theſe expeditions a conſiderable acceſſion was made to the knowledge of the northern extent of America, and Hudſon's and Baffin's bays were diſcovered. But the wiſhed-for paſſage, on that ſide, into the Pacific ocean, was ſtill unattained. Nor were the various attempts of our countrymen, and of the Dutch, to find ſuch a paſſage, by ſailing round the north of Aſia, in an eaſtern direction, attended with better ſucceſs. Wood's failure in 1676, ſeems to have terminated the long liſt of unfortunate expeditions in that century. The diſcovery had ceaſed for many years to be an object of purſuit. However, the queſtion was revived in the laſt century. Accordingly captain Middleton was ſent out by government in 1741, and captains Smith and Moore in 1746. But, though an act of parliament had been paſſed, enſuring a reward of 20,000*l.* to the diſcovery of a paſſage, the accompliſhment of their favourite object ſtill remained to be effected. Previouſly to the full execution of this deſign, lord Mulgrave ſailed with two ſhips, in order to determine how far navigation was practicable towards the north-pole. In this expedition his lordſhip encountered many difficulties. Nevertheleſs, the expectation of opening a communication between the Pacific and Atlantic ocean, by a northerly courſe, was not abandoned; and it was reſolved that a voyage ſhould be undertaken for that purpoſe. Captain Cook was inſtantly, and unanimouſly, thought to be in every reſpect the moſt proper perſon to accompliſh this difficult and hazardous, but very important and intereſting object. He had, however, done ſo much, and undergone ſo many trials, that his moſt zealous friends, and thoſe who were moſt ardently devoted to the object, could not think of aſking him to engage in freſh perils; the undertaking, however, became a ſubject of converſation at the table of lord Sandwich, when captain Cook was preſent. The object, with all the intereſts connected with it, excited the ardour of the captain's mind, and he offered to undertake the direction of the enterpriſe. The earl of Sandwich loſt no time; the matter was laid before the king; and captain Cook was appointed to the command of the expedition, Feb. 10, 1776. At the ſame time, it was agreed, that, on his return to England, he ſhould be reſtored to his ſituation at Greenwich: and, if no vacancy occurred during the interval, the officer who ſucceeded him was to reſign in his favour. All former navigators round the globe had returned to Europe by the Cape of Good Hope; but captain Cook undertook to accompliſh the arduous taſk by reaching the high northern latitudes between Aſia and America; and it is thought that the captain's own reflections on the ſubject ſuggeſted this plan. Inſtead, therefore, of a paſſage from the Atlantic to the Pacific, one from the latter into the former was to be tried. Accordingly captain Cook was ordered to proceed into the Pacific ocean, through the chain of new iſlands, which had been viſited by him in the ſouthern tropic. After having croſſed the equator into the northern parts of that ocean, he was to hold ſuch a courſe as might probably fix many intereſting points in geography, and produce intermediate diſcoveries, in his progreſs northward to the principal ſcene of his diſcoveries. With regard to his grand object, it was determined, after the moſt mature deliberation and inquiry, that,

that, upon his arrival on the coaft of New Albion, he fhould proceed northward as far as the latitude of 65°, and not lofe any time in exploring rivers or inlets, or upon any other account, till he had gotten into that latitude. In the profecution of this great defign, motives of intereft were annexed to obligations of duty. By a new law, paffed in 1776, fupplying the deficiencies of the act of 1745, it was enacted, "that if any fhip belonging to any of his majefty's fubjects, or to his majefty, fhall find out, and fail through, any paffage, by fea, between the Atlantic and Pacific oceans, in any direction, or parallel of the northern hemifphere, to the northward of the fifty-fecond degree of latitude, the owners of fuch fhips, if belonging to any of his majefty's fubjects, or the commander, officers, and feamen of fuch fhip belonging to his majefty, fhall receive, as a reward for fuch difcovery, the fum of 20,000*l*." Two veffels were fixed upon by government for the intended fervice; the Refolution and the Difcovery; the former commanded by captain Cook, and the latter by captain Clerke. To the Refolution was affigned the fame number of officers and men, which fhe had during her former voyage; and the only difference in the eftablifhment of the Difcovery from that of the Adventure, was that fhe had no marine officer on board. Both fhips were equipped in the moft complete manner, and furnifhed with fuch an eftablifhment and apparatus, &c. as might moft effectually conduce to the improvement of aftronomy and navigation. As the fhips were to touch at Otaheite and the Society iflands, it was determined to carry Omai back to his native country, who returned with deep impreffions of gratitude and refpect for the liberal treatment which he had received during his abfence, and whilft he continued in England. Captain Cook failed from the Nore to the Downs on the 25th of June, and on the 30th anchored in Plymouth Sound, where the Difcovery was already arrived. On the 8th of July he received his inftructions, with orders to proceed to the Cape of Good Hope. On the 12th he ftood off Plymouth Sound, and proceeding in his courfe, touched at Teneriffe; anchoring on the 1ft of Auguft in the road of Santa Cruz. Having procured the neceffary articles of refrefhment, he failed from Teneriffe on the 4th; and on the 13th arrived before Port Praya in the ifland of St. Jago, and then, not finding the Difcovery there, ftood out to the fouthward. On the 1ft of September, our navigator croffed the equator in W. long. 27° 38′; and on the 8th, being near the eaftern coaft of Brazil, he took pains to fettle its longitude, which he concluded to be 35½° or 36° W. On the 18th of October, the Refolution came to an anchor in Table bay, at the Cape of Good Hope. On the 10th of November captain Cook had the fatisfaction of feeing the Difcovery arrive in the bay. Befides the attention which our captain manifefted to the ftate of his fhip, and the accommodation of his feamen in the further profecution of his voyage, fcientific objects engaged his particular notice. On the 30th of November he weighed from Table bay, and on the 3d of December got clear of the land. On the 12th land was feen, which was found, upon a nearer approach, to confift of two iflands. That which lies moft to the fouth, and is the largeft, was eftimated to be about 15 leagues in circuit; the northerly one was about nine leagues; and the two iflands are about the diftance of five leagues from each other. The largeft lies in S. lat. 46° 53′, and E. long. 37° 46′; and the fmaller one in S. lat. 46° 4′, and E. long. 38° 8′. They feemed to have a rocky and bold fhore, and their furface is for the moft part compofed of barren mountains, the fummits and fides of which were covered with fnow. Thefe two iflands, with four others, which lie from nine to twelve degrees of longitude more to the eaft, and nearly in the fame latitude, had been difcovered by captain Marion du Frefne, and Crozet, French navigators, in January 1772. As no names had been affigned to them in a chart of the Southern ocean, communicated by Crozet to captain Cook in 1773, our commander diftinguifhed the two larger ones by calling them "Prince Edward's iflands." To the other four he gave the name of "Marion's" and "Crozet's" iflands. Paffing fouthward of thefe iflands, he fhaped his courfe fo as to get into the latitude of the land which had been difcovered by M. de Kerguelen, a French navigator. On the 24th he obferved land, which proved to be an ifland of confiderable height, and about three leagues in circuit. He foon after difcovered another ifland about the fame fize, and alfo a third, befides fome fmaller ones. Another ifland was feen in S. lat. 48° 29′. E. long. 68° 40′, which was a high round rock, and which was called "Bligh's Cap." This he perceived to be the fame with Kerguelen's "ifle of Rendezvous." As foon as the weather began to clear up, captain Cook fteered in for the land, called "Kerguelen's land." At length a good harbour was difcovered, in which the fhips anchored on Chriftmas day. Here the captain difplayed the Britifh flag, and named the place "Chriftmas Harbour." On the 29th he left this harbour, and ranged along the coaft, in order to difcover its pofition and extent. In purfuing his courfe he met with feveral promontories and bays, together with a peninfula, all of which he has defcribed and named. Another harbour, in which the fhips anchored for one night, is fituated in S. lat. 49° 3′, and E. long. 69° 37′, and was called "Port Pallifer." On the 30th, when this harbour was difcovered, he came to a point, which proved to be the very eaftern extremity of Kerguelen's land. This point was called "Cape Digby," and is fituated in S. lat. 49° 23′, and E. long. 70° 34′. The refult of captain Cook's examination of Kerguelen's land was, that it did not occupy an interval much exceeding 1¼ degree. From this defolate coaft our captain took his departure on the 31ft, intending to touch at New Zealand; but on the 3d of January 1777, the wind veered to the north, and on the 12th the northerly winds ended in a calm; the fhip being then in S. lat. 48° 40′. E. long. 110° 26′. On the 24th our voyagers difcovered the coaft of "Van Diemen's" land, and on the 26th came to an anchor in "Adventure bay." While captain Cook was at this country, he neglected no inquiry which could promote the knowledge of navigation, and other branches of fcience. He fettled the latitude and longitude of places, marked the variations of the compafs, and recorded the nature of the tides. Adventure bay he found to be fituated in S. lat. 43° 21′ 20″, and E. long. 147° 29′. On the 30th of January he failed from this bay, and on the 12th of February came to his old ftation in Queen Charlotte's Sound, in New Zealand. Here he found that ten men, who had feparated from captain Furneaux's crew in the former voyage, had been murdered by the natives, and that their flefh had been confumed as food. The fear of revenge rendered them very averfe from approaching the Englifh veffels. On the 27th captain Cook got clear of New Zealand; and having met with unfavourable winds, it was not till the 29th of March that he difcovered land, which was found to be an inhabited ifland, called "Mangeea," in S. lat. 21° 57′. E. long. 201° 53′. Purfuing his voyage, on the 30th he again found land, which was an ifland, called by the natives "Wateeoo," in S. lat. 20° 1′. E. long. 201° 45′. The next place which he vifited was a fmall ifland called "Wennooa-ette," or "Otakootaia," in S. lat. 19° 15′. E. long. 201° 37.′ On the 5th he directed his courfe to "Harvey's ifland," which he

he had difcovered in 1773, and which he now found to be well peopled. Having by various adverfe circumftances been fo much retarded in his progrefs, that nothing could be done this year in the high latitudes of the northern hemifphere, he determined to bear away for the Friendly iflands, where he was fure of being abundantly provided. Accordingly he reached Palmerfton ifland in his courfe, where he obtained fome refrefhment; and after leaving this ifland, he fteered to the weft, with a view of making the beft of his way to "Annamooka." On the 28th of April, he touched at the ifland of "Komango," and on the 1ft of May arrived at Annamooka. The only interruption of the harmony that fubfifted between our voyagers and the natives of this ifland arofe from the thievifh difpofition of many of them. In order to correct and counteract this propenfity, captain Clerke invented a mode of treatment which produced fome effect, the putting of the thieves into the hands of the barber, who completely fhaved their heads. They thus became objects of ridicule to their countrymen, and their rogueries were reftrained. Captain Cook having exhaufted Annamooka of its articles of food, propofed, on the 11th, to proceed directly for "Tongataboo." But it was recommended to him to touch at another ifland, or rather a group of iflands, called "Hapaee," lying to the N.E., where he might be plentifully fupplied with every refrefhment in the eafieft manner. Hapaee was therefore chofen for the next ftation, where our commander arrived on the 17th, and met with a moft friendly reception. Here the captain took an opportunity of examining not only Hapaee, but "Lefooga," and other neighbouring iflands. On the 10th of June he arrived at "Tongataboo;" where he was kindly received, but fomewhat molefted by the thievifh propenfity of the inhabitants. On the 10th he left Tongataboo, and two days after came to an anchor in the ifland of "Middleburg," or "Eooa," as it is called by the inhabitants. Captain Cook remained at the Friendly iflands between two and three months; and his intercourfe with the natives was little interrupted. This intercourfe was productive of many advantages. See FRIENDLY *iflands*. On the 17th of July, captain Cook refumed his voyage; and on the 8th of Auguft, an ifland was difcovered, called by the natives "Toobouai," and fituated in S. lat. 23° 25'. E. long. 210° 37'. Purfuing his courfe he reached Otaheite on the 12th, and fteered for Oheitepeha bay, defigning to anchor there before he went down to Matavai. Omai's reception among his countrymen was not entirely of a flattering nature. Nothing that was peculiarly ftriking occurred at their firft meeting; his interview with his fifter, however, was agreeable to the feelings of nature; and his aunt threw herfelf at his feet, and bedewed them with tears of joy. On the 24th, the captain refumed his old ftation in Matavai bay. On this vifit he was fully fatisfied that human facrifices formed a part of the religious inftitutions of Otaheite; for he was witnefs to a folemnity of this kind, which he has particularly defcribed with the juft fentiments of indignation and abhorrence. Here the captain was cured of a rheumatic complaint, extending from the hip to the foot in an extraordinary manner. The mother of Otoo, a chief of the ifland, his three fifters, and eight other women, undertook the cure. Being defired to lay himfelf down amongft them, as many as could get round him began to fqueeze him with both hands, from head to foot, but more particularly in the part where the pain was lodged, till they made his bones crack, and his flefh became a perfect mummy. After undergoing this difcipline about a quarter of an hour, he was glad to be releafed from his female friends. The operation, however, gave him immediate relief, fo that he was encouraged to fubmit to another rubbing down before he went to bed; the confequence of which was, that he was tolerably eafy the whole fucceeding night. His female phyficians repeated their prefcription the next morning, and again in the evening; after which his pains were entirely removed, and the cure was perfected. This operation, which is called "Romee," is univerfally practifed among thefe iflanders: being fometimes performed by the men, but generally by the women. During this vifit of our voyagers to Otaheite, fuch a cordial friendfhip and confidence fubfifted between them and the natives, as never once to be interrupted by any untoward accident. From Otaheite our voyagers failed on the 30th to Eimeo, where they anchored. The tranfactions on this ifland were, upon the whole, unpleafant. On the 11th of October, the fhip left it, and next day arrived at Owharre harbour, on the weft fide of Huaheine. Here they fettled Omai to mutual fatisfaction; having procured for him a portion of land and built a houfe, on the outfide of which was this infcription:

Georgius Tertius, Rex. 2 Novembris, 1777.
Naves, { *Refolution, Jac. Cook, Pr.* / *Difcovery, Car. Clerke, Pr.* }

After parting with Omai in an affectionate manner, and leaving him comfortably fettled among feveral of his relatives, captain Cook arrived at Bolabola, the laft of the Society iflands, which he vifited on the 8th of December. Upon the whole, it has been obferved, that the future felicity of the inhabitants of Otaheite, and the Society iflands, will not a little depend on occafional vifits from Europe, for it would have been better for thefe poor people, as captain Cook fays, never to have known our fuperiority in the accommodations and arts which render life comfortable, than, after once knowing it, to be again abandoned to their original incapacity of improvement. On the 8th of December our commander failed from Bolabola, and in the night between the 22d and 23d, croffed the line in E. long. 203° 15', and on the 24th difcovered land, which was called "Chriftmas ifland," the weft fide of it, on which was obferved an eclipfe of the fun, being in N. lat. 1° 59'. E. long. 202° 30'. On the 2d of January 1778, the fhips refumed their courfe towards the north, and in their progrefs difcovered three iflands. On the 22d they touched at one of thefe iflands, called by the natives "Atooi," and where captain Cook found the horrid practice of eating human flefh, which the inhabitants denominated "favoury eating." But it was afcertained that enemies flain in battle, are the fole objects of this abominable cuftom. Near this was another ifland, called "Oneeheow," where our commander anchored on the 29th. It is obferved, that the iflands in the Pacific ocean, which European voyagers have difcovered, have generally been found to lie in groups, or clufters. This was the cafe with thofe that were now vifited; and to which captain Cook gave the name of "Sandwich iflands," which fee. On the 2d of February, our navigators purfued their courfe to the northward; and on the 7th of March they difcovered the coaft of "New Albion," the fhips being then in N. lat. 44° 33'. E. long. 235° 20'. In ranging on the weft fide of America, captain Cook gave names to feveral capes and head lands, which appeared in fight. At length, on the 29th he anchored in an inlet, where the country appeared full of mountains, with fnow covering their fummits, interfperfed with vallies which produced high ftraight trees, exhibiting a beautiful profpect, as of one vaft foreft. The fhips were now in N. lat. 49° 29'. E. long. 232° 29'. The inhabitants on the coaft appeared to be difpofed to maintain a friendly intercourfe with ftrangers;

ers; and a trade immediately commenced, the articles of which were the ſkins of various animals, ſuch as bears, wolves, foxes, deer, rackoons, polecats, and martins; and, particularly, ſea-otters. Garments made of theſe were alſo offered for ſale; the moſt extraordinary articles, however, were human ſkulls, and hands not quite ſtripped of their fleſh, ſome of which exhibited marks of having been upon the fire. In exchange the natives took knives, chiſſels, pieces of iron and tin, nails, looking-glaſſes, buttons, or any kind of metal. Although commerce was, in general, carried on with mutual honeſty, ſome of theſe people were no leſs inclined to theft than the iſlanders in the Southern ocean. Of all the uncivilized tribes, which our commander met with in his various navigations, he never found any who had ſuch ſtrict notions of their right to the excluſive property of every thing which their country produced, as the inhabitants of the Sound where he was now ſtationed. With captain Cook, very much to the honour of his character and of his country, it was a ſacred rule never to take any part of the property of the people whom he viſited, without an ample compenſation. Whilſt the ſhips were under repair for the proſecution of the expedition, our captain improved every opportunity that occurred for extending his knowledge of the manners and cuſtoms of the inhabitants, who, in general, treated him with great civility. The natives were much addicted to ſinging; and in ſome inſtances, the whole body joined, ſome in a ſlow, and others in a quicker time; accompanying their notes with the moſt regular motions of their hands, or with beating in concert with their paddles, on the ſides of the canoes, to which were added other very expreſſive geſtures. At the end of each ſong, they continued ſilent for a few moments, and then began again, ſometimes pronouncing the word *Hooee!* forcibly as a chorus. At our captain's firſt arrival in this inlet, he denominated it "King George's Sound;" but he afterwards was informed that the natives called it "Nootka." The entrance of the Sound is ſituated in the eaſt corner of Hope bay, in N. lat. 49° 53′. E. long. 233° 12′. On the 26th the repairs of the ſhips being completed, every thing was ready for the captain's departure. In the proſecution of the voyage to the north, and back again to the Sandwich iſlands, the incidents that occurred were chiefly of a nautical kind. The firſt place at which captain Cook landed, after his departure from Nootka Sound, was an iſland which he called "Kaye's iſland," ſituated at its S.W. point in N. lat. 59° 49′. E. long. 216° 58′. To an inlet in which the ſhips anchored on the 12th, he gave the appellation of "Prince William's Sound." Some days after leaving this Sound, our navigators came to an inlet, which they hoped would be found to communicate with the ſea to the north, or with Baffin's or Hudſon's bay to the eaſt; and therefore they determined particularly to examine it. In conſequence of a complete inveſtigation of this inlet, it was diſcovered to be a river, which was afterwards called "Cook's river." On the 6th of June they got clear of this river, and purſuing their voyage, they ſailed on the 19th, amidſt the group of iſlands, which had been called by Beering "Schumagin's iſlands." On the 21ſt, among ſome hills, on the main land, that towered above the clouds to a moſt amazing height, one was diſcovered to have a volcano, which continually threw up vaſt columns of ſmoke. It does not ſtand far from the coaſt, and is ſituated in N. lat. 54° 48′, and long. 195° 45′. The mountain is of a completely conical figure, and the volcano is at its very ſummit. A canoe, from an iſland in the neighbourhood, approached the ſhip, and the ſingle perſon on board bowed as he came near. From ſuch tokens of politeneſs, our captain reaſonably inferred, that the Ruſſians muſt have ſome communication and traffic with theſe people. On the 27th our voyagers reached an iſland, known by the name of "Oonalaſhka," the inhabitants of which behaved with a degree of politeneſs uncommon to ſavage tribes. The harbour of "Samgamooda," on the north ſide of the iſland, in which captain Cook came to an anchor, is ſituated in N. lat. 53° 55′. E. long. 193° 30′. On the 2d of July our voyagers left Oonalaſhka, and on the 16th were within ſight of a promontory, on which lieutenant Williamſon landed; but he found that the land, as far as his view extended, produces neither tree nor ſhrub, though the lower grounds were not deſtitute of graſs, and of ſome other plants. To this promontory, in N. lat. 58° 42′. E. long. 197° 36′, was given the name of "Cape Newenham." When our navigators, on the 3d of Auguſt, had advanced to the latitude of 62° 34′, they had the misfortune to loſe Mr. Anderſon, the ſurgeon of the Reſolution, who had for more than twelve months been lingering under a conſumption. Mr. Anderſon, who was a perſon of a cultivated underſtanding and agreeable manners, to diſtinguiſhed ſkill in his own profeſſion, added a very conſiderable knowledge in other branches of ſcience. An iſland, diſcovered ſoon after his death, was honoured with the appellation of "Anderſon's iſland." On the 9th captain Cook anchored under a point of land, to which he gave the name of "Cape Prince of Wales," ſituated in N. lat. 65° 46′. E. long. 191° 45′, and remarkable for being the moſt weſtern extremity of America hitherto explored. This extremity is diſtant from the eaſtern cape of Siberia only 13 leagues; and there our commander had the glory of aſcertaining the vicinity of the two continents, which had only been conjectured from the reports of the neighbouring Aſiatic inhabitants, and the imperfect obſervations of the Ruſſian navigators. Reſuming his courſe on the 10th, captain Cook anchored in a bay, the land of which was at firſt ſuppoſed to be a part of the iſland "Alaſchka;" but from the figure of the coaſt, from the ſituation of the oppoſite ſhore of America, and from the longitude, the captain thought to be more probably the country of the "Tſchutſki," on the eaſtern extremity of Aſia, which had been explored by Beering in 1728; and this was found to be the fact. From the bay of St. Lawrence, belonging to the country of the Tſchutſki, our navigators ſteered, on the 11th, to the eaſt, in order to get nearer to the coaſt of America. Afterwards, proceeding to the north, they reached, on the 17th, the latitude of 70° 33′, in longitude 197° 41′. On this day a brightneſs was perceived in the northern horizon, reſembling that which is reflected from ice, and which is commonly called the *blink*. In about an hour's time, the ſight of a large field of ice removed all doubt in captain Cook's mind with reſpect to the cauſe of the brightneſs of the horizon. The ſhips were ſoon cloſe to the edge of the ice, in lat. 70° 41′, and unable to proceed any farther. On the 18th, in lat. 70° 44′, the ice near them was as compact as a wall, and judged to be at leaſt ten or twelve feet high. Farther to the north, it appeared much higher. A prodigious number of ſea-horſes lay upon the ice; and ſome of them were procured for food, in order to ſupply the want of freſh proviſions. Our voyagers lived on the ſea-horſes as long as they laſted; and they were generally preferred to ſalt proviſions. Captain Cook continued, until the 29th, to traverſe the Icy ſea beyond Beering's ſtrait, in various directions, and through numberleſs obſtructions and difficulties. The ſeaſon, indeed, was now ſo far advanced, that it would have been highly imprudent to have made any farther attempts, till the next ſummer, at finding a paſſage into the Atlantic. Our commander's attention was now directed to the diſcovery of a proper-

proper place for obtaining a fupply of wood and water; and to the manner in which he fhould fpend the winter, with fome improvements in geography and navigation, and fo as to be in a condition to return to the north, for a farther fearch of a paffage, in the enfuing fummer. Before he proceeded to the fouth, he employed a confiderable time in examining the fea and coafts in the vicinity of Beering's ftrait, on the fide both of Afia and America. In this examination, he afcertained the accuracy of Beering, fo far as he went; demonftrated the errors with which Stæhlin's map of the new northern Archipelago abounds; and made large additions to the geographical knowledge of this part of the world. "It reflects," as Mr. Coxe juftly obferves, "the higheft honour even on the Britifh name, that our great navigator extended his difcoveries much farther in one expedition, and at fo great a diftance from the point of his departure, than the Ruffians accomplifhed in a long feries of years, and in parts belonging or contiguous to their own empire."

On the 2d of October, our voyagers came within fight of the ifland of Oonalafhka, and anchored again in Samganoodah harbour. Here, whilft the fhips were repairing, the feamen collected berries, with which the ifland abounds, and which, in conjunction with the fpruce-beer, contributed effectually to eradicate every feed of the fcurvy that might exift in either of the veffels. They alfo procured an ample fupply of fifh. Captain Cook, on the 8th, received a very fingular prefent, which was a rye-loaf, or rather a pye in the form of a loaf, for it inclofed fome falmon, highly feafoned with pepper. Captain Clerke received alfo the fame kind of prefent. Thefe prefents, it was reafonably fuppofed, came, by the hands of an Oonalafhkan, from fome Ruffians in the neighbourhood. On the 10th corporal Lediard of the marines returned from his refearches with three Ruffian feamen, or furriers, who, with feveral others, refided at "Engooehfhar," where they had a dwelling-houfe, fome ftore-houfes, and a floop of about 30 tons burthen. From thefe perfons captain Cook derived every poffible degree of information. Afterwards, another Ruffian was introduced to our captain, whofe name was Erafim Gregorioff Sin Ifmyloff, and who was the principal perfon among his countrymen in this and the neighbouring iflands. From him he obtained two charts, which he was permitted to copy. The firft included the "Penfhinkian" fea; the coaft of Tartary, down to the latitude of 41°; the Kuril iflands; and the peninfula of Kamtfchatka. The fecond chart, which was the moft interefting, comprehended all the difcoveries made by the Ruffians to the eaftward of Kamtfchatka, towards America; which, however, exclufively of the voyages of Beering and Tfcherikoff, amounted to little or nothing. Indeed captain Cook was affured, that no Ruffians had even feen any part of the continent of America to the northward, excepting that which lies oppofite to the country of the Tfchutkis. On the 26th, all things being ready for captain Cook's departure, he put to fea, and failed for the Sandwich iflands; it being his intention to fpend a few months there, and then to direct his courfe to Kamtfchatka, fo as to endeavour to reach that country by the middle of May, in the enfuing fummer. On the 26th of November, when the fhips had proceeded fouthward to the latitude of 20° 55′, land was difcovered, which proved to be the ifland of "Mowee," one of the group of the Sandwich iflands, with the inhabitants of which a friendly intercourfe was maintained. Another ifland was difcovered on the 30th, called by the natives "Owhyhee." Among the articles procured from the natives, was a quantity of fugar-cane, a ftrong decoction of which was found, upon trial, to be a very palatable beer; more efpecially when improved with a few hops. On the 16th of January 1779, canoes in great numbers came out from all parts of the ifland, fo that the two fhips were furrounded with no fewer than a thoufand, crowded with people and laden with hogs, and other productions of the ifland. Some of them, however, manifefted a thievifh difpofition, and captain Cook, in order to check it, ordered two or three mufkets, and as many four pounders, to be fired over one of the canoes, which had carried away a rudder. Into a bay, affording good anchorage and frefh water, captain Cook refolved to take the fhips in order to refit, and to obtain every refrefhment which the place could afford. The bay in which the fhips anchored on the 17th was called by the inhabitants "Karakakooa." The veffels were foon furrounded with a multitude of canoes; and the whole fhore of the bay was covered with fpectators, whilft many hundreds were fwimming round the fhips like fhoals of fifh. Our navigators were much impreffed by the fingularity of the fcene; and few of them lamented their unfuccefsful endeavours of getting homeward, the laft fummer, by a northern paffage. "To this difappointment," fays the captain, "we owed our having it in our power to revife the Sandwich iflands, and to enrich our voyage with a difcovery, which, though the laft, feemed, in many refpects, to be the moft important that had hitherto been made by Europeans, throughout the extent of the Pacific ocean." Such, alas! is the concluding fentence of our illuftrious commander's journal. Little did he then imagine, that a difcovery which promifed to annex no fmall honour to his name, and to be productive of very agreeable confequences, would be fo fatal in the refult. Little did he think, that the ifland of Owhyhee was deftined to be the laft fcene of his exploits and the caufe of his deftruction.

The reception which the captain met with from the natives, on his proceeding to anchor in Karakakooa bay, was in a very high degree encouraging. The natives expreffed their joy by finging and fhouting, and by exhibiting a variety of wild and extravagant geftures. During the long cruife of our navigators off the ifland of Owhyhee, the inhabitants had conducted themfelves in their dealings, almoft univerfally, with fairnefs and honefty; but after the arrival of the fhips in the bay, they altered their conduct. The immenfe crowds of iflanders that encompaffed the fhips afforded frequent opportunities of pilfering without the rifk of detection, and held out, efpecially as their number was much fuperior to that of the Englifh, the profpect of efcaping with impunity. Another circumftance to which the alteration in the conduct of the natives may be afcribed, arofe from the prefence and encouragement of their chiefs, into whofe poffeffion the booty might be traced, and who were probably the inftigators of the depredations that were committed. Soon after the Refolution had gotten into her ftation, three chiefs, one of whom named Koah, who was a prieft, and in his youth had been a diftinguifhed warrier, vifited the fhip; and in the evening, captain Cook, accompanied by Mr. Bayley and Mr. King, attended him on fhore. The captain was received with great civility and a refpect, on the part of the natives, approaching to adoration. The captain was particularly defirous of procuring from the ifland fome falted hogs for fea-ftore; and, with this view, of renewing former attempts in the operation for this purpofe. The event anfwered his moft fanguine expectations. On the 26th captain Cook had his firft interview with Terreeoboo, the king of the ifland; which was conducted with a variety of ceremonies, among which, the cuftom of exchanging names, which

which among the islanders of the Pacific ocean is the strongest pledge of friendship, was observed. The king, attended by several chiefs, was conducted in a pinnace on board the Resolution; where they were received, apparently much to their satisfaction, with peculiar attention and respect. In the progress of the intercourse which was carried on between our voyagers and the natives, the quiet and inoffensive behaviour of the latter took away every apprehension of danger and inspired an unsuspecting confidence in the English. A society of priests, in particular, displayed a generosity and munificence, of which there are few examples: for they furnished a constant supply of hogs and vegetables to our navigators, without ever demanding, or even suggesting, a return. Indeed, the conduct of the warrior chiefs, or *Earees*, was always less satisfactory than that of the priests. Although the kind and liberal behaviour of the natives continued without remission, Terreeoboo, and his chiefs, began at length to be very inquisitive about the time of the departure of the English; but this is not surprising, when we consider the enormous consumption of hogs and vegetables, which had taken place during their abode of 16 days in the bay. When the king was informed that they were to leave the island in a day or two, a proclamation was made through the island, requiring the people to bring their hogs and vegetables, that they might be presented by the king to the *Orono*, the title of respect given to captain Cook, on his quitting the country. Accordingly, on the 3d of February, being the day preceding that which was fixed for leaving the island, Terreeoboo invited captain Cook and Mr. King to attend him to the place where Kaoo resided. On their arrival, they found the adjoining ground covered with parcels of cloth, and at a little distance an immense quantity of vegetables; and near them was a large herd of hogs. At the close of the visit a great part of the cloth, and all the vegetables and hogs were given by Terreeoboo to captain Cook and Mr. King, who were astonished at the value of the present. Such was the attachment of the inhabitants of Owhyhee to Mr. King, that Terreeoboo and Kaoo waited upon captain Cook, whose son they supposed him to be, to solicit his residence in their country. Early on the 4th the ships sailed out of Karakakooa bay, being followed by a large number of canoes. It was the captain's design, before he visited the other islands to make a complete survey of Owhyhee, in hopes of finding a better sheltered bay than that which he had left; and upon failure of success, to take a view of the south-east part of Mowee, where, as he was informed, he might find an excellent harbour. After sailing about the island of Owyhee for several days, the weather being stormy, and the foremast of the Resolution being damaged, our navigators returned on the 11th to Karakakooa bay; but in coming to an anchor, they found their reception to be very different from what it had been on their first arrival. Their anxiety, however, was in some measure relieved, by the return of a boat which had been sent on shore, and which brought information, that Terreeoboo was absent, and had left the bay under the *Taboo*. The behaviour of the natives, however, appeared mysterious and excited suspicion; the interdiction of intercourse, on pretence of the king's absence, afforded reason for apprehending that he only wished to gain time for consulting with his chiefs. On the next morning Terreeoboo arrived and immediately visited captain Cook; this circumstance, and the return of the natives to their usual friendly intercourse, were considered as strong proofs, that they neither meant, nor apprehended, any change of conduct. Some other incidents confirmed this opinion. Towards the evening of the 13th information was received, that several chiefs assembled at the well near the beach and drove away the natives who had been hired to assist the sailors in rolling down the casks to the shore. It was afterwards found, that the islanders had armed themselves with stones and were very tumultuous. Not to mention some instances of theft and subsequent dissensions which occurred, one of a very serious and unpleasant nature happened, which it may not be improper to specify on account of the consequences that ensued. A canoe, belonging to Pareea, was seized; and he, protesting his innocence with regard to the theft that had been committed, claimed his property. A scuffle took place between him and the English officer with some of his companions, in which Pareea was knocked down by a violent blow on the head, with an oar. The natives, who had been peaceable spectators, immediately attacked the English seamen with a shower of stones, which obliged them precipitately to retreat and to swim off to a rock at some distance from the shore. The pinnace, which was waiting for captain Cook's return, was immediately ransacked by the islanders; and if it had not been for the seasonable interposition of Pareea, would have been entirely demolished, Pareea interfered further in restoring the pinnace; and being assured that he would be kindly received by the *Orono*, joined noses (according to their custom) with the officers, in token of friendship, and paddled over to the village of Kowrowa. Captain Cook, on being informed of this occurrence, expressed much uneasiness: "I am afraid," says he, "that these people will oblige me to use some violent measures; for," he added, "they must not be left to imagine, that they have gained an advantage over us." The confidence of our navigators in the natives gradually abated; and they thought it necessary to be very much upon their guard. At this time the cutter belonging to the Discovery was stolen, and captain Cook made the necessary preparations for the recovery of it. On occasions of a similar kind, it had been his practice to get the king, or some of the principal *Erees*, on board, and to detain them as hostages till the article, that had been lost, was restored. This method he meant now to pursue; and he also gave orders to stop all the canoes that should attempt to leave the bay, with an intention of seizing and destroying them, if by peaceable means he could not recover the cutter. Captain Cook and Mr. King, together with Mr. Philips, and nine marines, left the ship; and when they landed, the captain instructed Mr. King to quiet the minds of the natives, by assuring them they should not be hurt, to keep his people together, and to be on his guard. Whilst Mr. King was employed in executing his commission, captain Cook proceeded to Kowrowa, where the king resided, and landed with the lieutenant and nine marines. The people received him with the usual tokens of respect; prostrating themselves before him, and bringing their customary offerings of small hogs. Having gained an interview with Terreeoboo, he invited him to return in the boat, and spend the day on board the Resolution. To this proposal the old king assented, and immediately accompanied him. One of the king's favourite wives, however, besought him, with many tears and intreaties, not to go on board; and two chiefs, who accompanied her, forced him to sit down. The natives, who were collecting in great numbers on the shore, and who had been alarmed by the hostilities that had previously occurred in the bay, thronged round captain Cook and their king. The lieutenant of marines, perceiving that they were much pressed, and thus rendered incapable of using their arms, if occasion should require it, proposed to the captain to draw them up along the rocks, close to the water's edge; and accordingly they

they formed a line, at the diſtance of about 30 yards from the place where the king was ſitting. The old king appeared to be much alarmed; and when captain King urged him to proceed, the chiefs interpoſed, and at firſt by prayers and intreaties, and afterwards by force and violence, inſiſted on his ſtaying where he was. The captain at length deſiſted; obſerving to Mr. Philips, that it would be impoſſible to compel him to go on board, without the riſk of killing a great number of the inhabitants. Captain Cook's perſon had hitherto appeared to be in no danger; but a circumſtance accidentally occurred, which gave a fatal turn to his ſituation. The boats, which had been ſtationed acroſs the bay to prevent the eſcape of the canoes, fired at ſome of them that were endeavouring to go off, and unfortunately killed a chief of the firſt rank. The news of his death arrived at the village, where captain Cook was, juſt as he had left the king, and was walking ſlowly toward the ſhore. Upon this, the women and children were immediately ſent off; and the men put on their war-mats, and armed themſelves with ſpears and ſtones. One of the natives, having in his hands a ſtone, and a long iron ſpike (called a *pahooa*), advanced to the captain, flouriſhing his weapon in defiance, and threatening to throw the ſtone. The captain, after having ineffectually deſired him to deſiſt, fired a load of ſmall ſhot, which, as the man had on his war-mat, ſerved only to irritate and encourage the enraged people. Several ſtones were thrown at the marines; and one of the *Erees* attempted to ſtab Mr. Philips with his *pahooa*, but failed in the attempt. Captain Cook now fired his ſecond barrel, loaded with ball, and killed one of the foremoſt of the natives. A general attack with ſtones immediately followed, which was returned by a diſcharge of muſquetry from the marines, and the people in the boats. The iſlanders, contrary to expectation, ſtood the fire with great firmneſs; and before the marines had time to reload, broke in upon them with dreadful ſhouts and yells. Four marines were cut off among the rocks, in their retreat; three more were dangerouſly wounded; and the lieutenant, who had received a ſtab between the ſhoulders with a *pahooa*, having fortunately reſerved his fire, ſhot the man who had wounded him, juſt as he was going to repeat his blow. The unfortunate commander, the laſt time in which he was diſtinctly ſeen, was ſtanding at the water's edge, and calling out to the boats to ceaſe firing, and to pull in. If it be true, as ſome of thoſe who were preſent imagined, that the mariners and boatmen had fired without his orders, and that he was deſirous of preventing any further bloodſhed, it is not improbable that his humanity, on this occaſion, proved fatal to him. For it was remarked, that whilſt he faced the natives, none of them had offered him any violence; but that having turned about, to give his orders to the boats, he was ſtabbed in the back, and fell with his face into the water. On ſeeing him fall, the iſlanders ſet up a great ſhout, and his body was immediately dragged on ſhore, and ſurrounded by the enemy, who, ſnatching the dagger out of each other's hands, ſhewed a ſavage eagerneſs to have a ſhare in his deſtruction. "Thus fell," ſays captain King, "our great and excellent commander!" For other particulars, we refer to "Samwell's Narrative of the Death of Captain Cook."

In conſequence of the ſavage diſpoſition of the natives, the whole remains of captain Cook could not be recovered. Although various means, ſoothing and menacing, were employed for this purpoſe, little more than the principal part of the bones could be procured. By the poſſeſſion of theſe, our navigators were enabled to perform the laſt offices to their eminent and unfortunate commander. The bones, having been put into a coffin, and the ſervice being read over them, were committed to the deep, on the 21ſt, with the uſual military honours. What were the feelings of the companies of both the ſhips, on this occaſion, the world muſt be left to conceive; for thoſe who were preſent know, that it is not in the power of any pen to deſcribe them.

Such was the high eſtimation in which the character and enterpriſes of captain Cook were held by neighbouring nations, that, when war was declared between France and England, a letter was iſſued, on the 15th of March, 1779, by Monſ. Sartine, ſecretary of the marine department at Paris, and ſent to all the commanders of the French ſhips, which, after doing honour to the importance and utility of his diſcoveries, ordered, that the ſhip of captain Cook ſhould be treated with reſpect at ſea. The adoption of this meaſure was ſuggeſted by Monſ. Turgot, who alſo compoſed a memorial, in which he proved that honour, reaſon, and even intereſt, dictated this act of reſpect for humanity; and it was in conſequence of this memorial, as we learn from M. Condorcet (in his Life of M. Turgot), that an order was given not to treat as an enemy the common benefactor of every European nation. The firſt thought of ſuch a plan of conduct was very probably ſuggeſted by Dr. Benjamin Franklin, who, when he was ambaſſador at Paris from the United States of America, preceded the court of France in iſſuing a ſimilar requiſition.

We ſhall cloſe this article, as far as it reſpects the diſcoveries of captain Cook, with merely mentioning, that the Sandwich iſlands were further explored; that Kamtſchatka was viſited, and a very friendly intercourſe maintained with the Ruſſian officers of that country; that our navigators experienced the moſt generous and hoſpitable treatment from major Behm, in particular, the commander of the garriſon at Bolcharetſk; that they proceeded to the north, in purſuit of the grand object of the expedition; that, having paſſed through Beering's ſtrait, and attained to ſomewhat more than 69½ degrees of northern latitude, they found it abſolutely impoſſible to penetrate through the ice, either on the ſide of America or on the ſide of Aſia; that every hope being precluded of accompliſhing, in this way, a paſſage into the Atlantic ocean, captain Clerke was obliged to come to the determination of ſailing back to the ſouthward; that on the 22d of April (1779) the captain died of a conſumption (ſee his article); that captain Gore ſucceeded to the command of the Reſolution, and lieutenant King to that of the Diſcovery; that a ſecond viſit was paid to Kamtſchatka, which extended our acquaintance with that part of the world; that no ſmall acceſſion of information was acquired, with reſpect to geographical ſcience in general; that our voyagers purſued their courſe by the coaſts of Japan and China; that they made ſome ſtay at Canton; that thence they proceeded to the Cape of Good Hope; that they came to an anchor at Stromneſs, on the 22d of May, 1780; that both ſhips arrived at the Nore, on the 4th of October, after an abſence of 4 years, 2 months, and 22 days; that, during the whole of the expedition, the Reſolution loſt only five men by ſickneſs, three of whom were in a precarious ſtate of health at their departure from England, while the Diſcovery did not loſe a ſingle man; and that the hiſtory of the voyage, from the time in which captain Cook's journal ends, was written with great ability by Mr. King. By the deceaſe of captain King, who died at Nice in Italy, in 1784, this country ſuſtained another loſs of an able and ſcientific commander and navigator, who hath left a memorial of his talents and ſervices, which has honourably united his name with that of the immortal Cook.

In ſketching the talents and character of captain Cook, ſtrikingly illuſtrated in the actions and enterpriſes of his life, we

we ſhall avail ourſelves of the aſſiſtance that is afforded us by his profeſſed or incidental biographers. Captain Cook poſſeſſed, in an eminent degree, an inventive mind, which, by its native vigour, ſuggeſted noble objects of purſuit, and the moſt effectual methods of proſecuting and attaining them. This faculty he exemplified in a great variety of critical and difficult ſituations. To this kind of genius he added unwearied application. By his genius and unremitting aſſiduity he acquired an extenſive acquaintance, not only with navigation, but with many other ſciences. He was ſo well informed with regard to different branches of the mathematics, and particularly in aſtronomy, that he was able to take the lead in various obſervations of an aſtronomical kind, in the courſe of his voyages. In general literature, and even the art of compoſition, he was ſo great a proficient, that he acquired reputation, not merely as the performer, but as the narrator, of his various intereſting enterpriſes. Perſeverance and ſteadineſs in the proſecution of the objects to which his life was devoted, were diſtinguiſhing features of his character; and ſuch was the invincible fortitude of his ſpirit, that no difficulties or dangers intimidated him, or deterred him from accompliſhing any purpoſe which he formed, or which the hazardous ſervices aſſigned him required. His fortitude was of courſe accompanied with complete ſelf-poſſeſſion. This latter quality was eminently uſeful to him in many critical and trying circumſtances. Accordingly it is obſerved, that the calmneſs and compoſure of his mind were ſuch, that, after having given neceſſary directions, he could take his reſt, and ſleep during the hours which he allotted to himſelf with perfect ſoundneſs. To the great qualities poſſeſſed by captain Cook, he added the moſt amiable and conciliatory virtues. His humanity is illuſtrated in the whole courſe of his conduct, during his ſucceſſive voyages; with regard to the inhabitants of the countries which he viſited, and with reſpect to the accommodation, health, and comfort of his own ſeamen. In the private relations of life, he maintained an excellent and exemplary character, as a huſband and father, and as a ſincere and ſteady friend: and his ſobriety and virtue gave ſtability and ſecurity to every other moral qualification. He was alſo diſtinguiſhed by the ſimplicity of his manners. In converſation he was unaffected and unaſſuming; and yet, on neceſſary occaſions, obliging and communicative. To this general account of his talents and virtues, we ſhall ſubjoin ſome delineations of his character by thoſe who were in habits of intimate acquaintance with him, and who had an opportunity of marking his temper and conduct in the various trying circumſtances that occurred in the courſe of his life. Captain King, the continuator of the journal of his laſt voyage, has given us the following ſketch of his character: "The conſtitution of his body was robuſt, inured to labour, and capable of undergoing the ſevereſt hardſhips. His ſtomach bore, without difficulty, the coarſeſt and moſt ungrateful food. Indeed temperance in him was ſcarcely a virtue; ſo great was the indifference with which he ſubmitted to every kind of ſelf-denial. The qualities of his mind were of the ſame hardy, vigorous kind with thoſe of his body. His underſtanding was ſtrong and perſpicacious; his judgment, in whatever related to the ſervices he was engaged in, quick and ſure. His deſigns were bold and manly; and both in the conception, and in the mode of execution, bore evident marks of a great original genius. His courage was cool and determined, and accompanied with an admirable preſence of mind in the moment of danger. His manners were plain and unaffected. His temper might perhaps have been juſtly blamed, as ſubject to haſtineſs and paſſion, had not theſe been diſarmed by a diſpoſition the moſt benevolent and humane. Such were the outlines of captain Cook's character; but its moſt diſtinguiſhed feature was that unremitting perſeverance in the purſuit of his object, which was not only ſuperior to the oppoſition of dangers, and the preſſure of hardſhips, but even exempt from the want of ordinary relaxation. During the long and tedious voyages in which he was engaged, his eagerneſs and activity were never in the leaſt abated. No incidental temptation could detain him for a moment; even thoſe intervals of recreation, which ſometimes unavoidably occurred, and were looked for by us with a longing, that perſons, who have experienced the fatigues of ſervice, will readily excuſe, were ſubmitted to by him with a certain impatience, whenever they could not be employed in making further proviſion for the more effectual proſecution of his deſigns." (See King's Voyage, vol. iii. p. 48, 49.) Mr. Samwell has alſo annexed ſome particulars, relative to the life and character of captain Cook, to the "Narrative of his Death." Dr. Reinhold Forſter has alſo, with ſome abatement, paſſed an eulogium on his character, in his "Hiſtory of the Voyages and Diſcoveries made in the North." The following tribute to his memory, —the memory of "the ableſt and moſt renowned navigator this or any country hath produced," is drawn up by one of his own profeſſion, of whom it is ſaid, that he is not more diſtinguiſhed by the elevation of rank, than by the dignity of private virtues. (See Introduction to Cook's third Voyage, vol. i. p. 85—87, &c.) Captain James Cook, ſays this writer, "poſſeſſed, in an eminent degree, all the qualifications requiſite for his profeſſion and great undertakings; together with the amiable and worthy qualities of the beſt men. Cool and deliberate in judging; ſagacious in determining; active in executing; ſteady and perſevering in enterpriſing from vigilance and unremitting caution: unſubdued by labours, difficulties, and diſappointments: fertile in expedients: never wanting preſence of mind: always poſſeſſing himſelf, and the full uſe of a ſound underſtanding. Mild, juſt, but exact in diſcipline: he was a father to his people, who were attached to him from affection, and obedient from confidence. His knowledge, his experience, his ſagacity, rendered him ſo entirely maſter of his ſubject, that the greateſt obſtacles were ſurmounted, and the moſt dangerous navigations became eaſy, and almoſt ſafe, under his direction. He explored the ſouthern hemiſphere to a much higher latitude than had been ever reached, and with fewer accidents than frequently befal thoſe who navigate the coaſts of this iſland. By his benevolent and unabating attention to the welfare of his ſhip's company, he diſcovered and introduced a ſyſtem for the preſervation of the health of ſeamen in long voyages, which has proved wonderfully efficacious; for in his ſecond voyage round the world, which continued upwards of three years, he loſt only one man by diſtemper, of 118, of which his company conſiſted. The death of this eminent and valuable man was a loſs to mankind in general; and particularly to be deplored by every nation that reſpects uſeful accompliſhments, that honours ſcience, and loves the benevolent and amiable affections of the heart. It is ſtill more to be deplored by this country, which may juſtly boaſt of having produced a man hitherto unequalled for nautical talents; and that ſorrow is farther aggravated by the reflection, that his country was deprived of this ornament by the enmity of a people, from whom, indeed, it might have been dreaded, but, from whom it was not deſerved. For, actuated always by the moſt attentive care and tender compaſſion for the ſavages in general, this excellent man was ever aſſiduouſly endeavouring, by kind treatment, to diſſipate their fears and court their friendſhip; overlooking their thefts and treacheries, and frequently

frequently interpofing, at the hazard of his life, to protect them from the fudden refentment of his own injured people. The object of his laft miffion was to difcover and afcertain the boundaries of Afia and America, and to penetrate into the northern ocean by the N. E. Cape of Afia.

Traveller! contemplate, admire, revere, and emulate this great mafter in his profeffion; whofe fkill and labours have enlarged natural philofophy; have extended nautical fcience; and have difclofed the long unfealed and admirable arrangement of the Almighty, in the formation of this globe, and, at the fame time, the arrogance of mortals, in prefuming to account, by their fpeculations, for the laws by which he was pleafed to create it. It is now difcovered, beyond all doubt, that the fame great being who created the univerfe by his *fiat*, by the fame ordained our earth to keep a juft poife, without a correfponding fouthern continent—and it was fo! "*He ftretches out the north over the empty place, and hangeth the earth upon nothing.* Job. xxxvi. 7. If the arduous but exact refearches of this extraordinary man have not difcovered a new world, they have difcovered feas unnavigated and unknown before. They have made us acquainted with iflands, people, and productions, of which we had no conception. And if he has not been fo fortunate as Americus to give his name to a continent, his pretenfions to fuch a diftinction remain unrivalled; and he will be revered, while there remains a page of his own modeft account of his voyage, and as long as mariners and geographers fhall be inftructed, by his new map of the fouthern hemifphere, to trace the various courfes and difcoveries he has made. If public fervices merit public acknowledgments; if the man who adorned and raifed the fame of his country, is deferving of honour, then captain Cook deferves to have a monument raifed to his memory, by a generous and grateful nation.

Virtutis uberrimum alimentum eft honos.

Val. Max. l. ii. c. 6.

From the numerous poetical tributes, paid to the memory of captain Cook, by our elegant female writers, we muft confine ourfelves to a fingle extract from Mifs Hannah More's poem on "Slavery."

"Had thofe advent'rous fpirits who explore
Thro' ocean's tracklefs waftes, the far-fought fhore,
Whether of wealth infatiate, or of power,
Conquerors who wafte, or ruffians who devour:
Had thefe poffefs'd, O Cook! thy gentle mind,
Thy love of arts, thy love of human-kind;
Had thefe purfu'd thy mild and liberal plan,
Discoverers had not been a curfe to man!
Then, blefs'd Philanthropy! thy focial hands
Had link'd diffever'd worlds in brother's bands;
Carelefs, if colour, or if clime divide;
Then lov'd, and loving, man had liv'd, and died."

Mifs Seward's admirable poem in celebration of captain Cook's memory would have furnifhed many pleafing extracts, if our limits allowed our farther enlarging on this interefting article; but we muft refer the reader to this lady's elegy on the occafion.

The Royal Society teftified their refpect for the memory of their illuftrious member by medals, ftruck on this occafion, fome of gold, others of filver, and others of bronze; the expence of which was defrayed by fubfcription. On one fide is the head of captain Cook in profile, and round it, Jac. Cook oceani investigator acerrimus; and on the exergue, Reg. Soc. Lond. Socio suo. On the reverfe is a reprefentation of Britannia, holding a globe; round her is infcribed, Nil intentatum nostri liquere; and on the exergue, Auspiciis Georgii III.

Among the numerous teftimonies of regard that have been rendered to the merits and memory of captain Cook, the important object of providing for his family hath not been forgotten. Soon after his death was known, the lords of the admiralty prefented a memorial to his majefty; and he was pleafed, by the advice of his privy council, to order a penfion of 200*l.* a year to be fettled on the widow, and 25*l.* a year to each of the three fons of the captain. A confiderable benefit alfo redounded to his family from the fale of the charts and plans, belonging to the voyage to the Pacific ocean, which were provided at the expence of government. On September the 3d, 1785, a coat of arms was granted to the family, with an appropriate device. Our navigator had fix children. On the fubject of this article fee the firft, fecond, and third voyages of Cook; the firft included in Hawkefworth's Voyages, publifhed in 3 vols. 4to, 1773. The fecond, written by captain Cook himfelf, and publifhed in 2 vols. 4to. in 1777, and the third publifhed in 3 vols. 4to. in 1784; the two firft being written by captain Cook, and the third by captain King. To the firft of thefe volumes is prefixed an introduction by Dr. Douglas, the late bifhop of Salifbury, containing a brief hiftorical account of voyages that had been previoufly performed with a view to the objects comprehended by thofe of captain Cook, a concife ftatement of his difcoveries, and a detail of the advantages refulting from them. See alfo Kippis's Life of Captain Cook, and Biog. Brit. vol. iv.

Cook, *Captain* Henry, a choir-man, brought up in the chapel-royal during the reign of Charles I., which he quitted at the commencement of the grand rebellion, and went into the king's army, where he confiderably diftinguifhed himfelf; and in 1642, obtained a captain's commiffion. At the reftoration, he was appointed mafter of the children of the chapel-royal. He compofed the coronation anthem, according to Ant. Wood, for Charles II., and a hymn in four parts, compofed by him, is likewife faid to have been performed inftead of the litany, in the chapel of St. George at Windfor, by order of the fovereign and knights of the garter, on the 17th of April 1661. None of his church mufic, however, was printed, nor has Dr. Tudway inferted any of his compofitions in the voluminous MS. Harleian collection of Englifh fervices and anthems. And, indeed, if we may judge of them by the few fecular compofitions which appear in the collections of the times, he was little fitted for the high office to which he was appointed at the reftoration. In the fecond part of Playford's "Mufical Companion," 1667, there are two or three of his fongs which are dry, ill accented, and equally deftitute of melody and mafterly harmony. However, he had the merit, or at leaft the good fortune, to be the mafter of three boys among the children of the chapel, who gave very early teftimony of their genius and progrefs in compofition. Thefe were Pelham Humphrey, John Blow, and Michael Wife, who, even while they were chorifters in the chapel, produced verfe anthems, far fuperior in melody and defign to any that our church could boaft, anterior to Purcell. Cook died in 1672, according to Ant. Wood, of grief, at being fo far furpaffed in compofition by his young pupil, Pelham Humphrey.

Cook, *Dr.* Benjamin, an eminent organift and contrapuntift, in the ftyle of our beft ecclefiaftical compofers, whom he had ftudied from Tallis, to Crofts, Weldon, and Green: a very correct harmonift and good organ player, but with limited

limited powers of invention. He was organift of Weftminfter Abbey, and on the death of Kelway elected organift of St. Martin's in the Fields. He long prefided at the Crown and Anchor concert, which was originally eftablifhed for the prefervation of the beft works of the moft eminent mafters of old times. It is a curious circumftance, that at this concert of ancient mufic, Handel was regarded as an innovator, and Geminiani thought it an honour to be allowed to dedicate his laft concertos to this fociety. Dr. Pepufch, who eftablifhed and directed this concert, to the time of his death, never allowed Handel any other merit than that of a good practical mufician. The irreconcileable enmity between the lovers of old and new mufic, became from the time of this inftitution, as violent as the rage between the champions of ancient and modern learning. Dr. Cook, a fteady votary of the old mafters, died September 1793. He was the fon of Benjamin Cook, who kept a mufic fhop in New-ftreet, Covent Garden, and who publifhed by patent, among other things, fix concertos for violins, tenor and bafs, by Alexander Scarlatti; the chamber fymphonies of Porpora, for three inftruments; and the two books of leffons by Domenico Scarlatti, in long 4to., of which Rofingrave was the editor. After the deceafe of Cook, Johnfon reprinted Scarlatti's leffons, with the fame title page, and the fame errors, as had efcaped correction in the former edition.

COOK, HENRY, a native of this country, born in 1642. Having a tafte for hiftorical painting, he travelled to Italy for the purpofe of improving himfelf in this branch of the art, and ftudied under Salvator Rofa; but, on his return to England, met with fo little encouragement, that for many years he remained in want and obfcurity. At length, however, his talents gained him notice, and he was employed by king William to repair his cartoons; he likewife finifhed the equeftrian portrait of Charles II. at Chelfea-college, painted the choir of New-college chapel Oxford, and the ftaircafe at Ranelagh houfe, befides many other works mentioned by Mr. Walpole. He is alfo faid to have tried portrait painting, but to have given it up, difgufted with the caprices of thofe who fat to him. He died 18th Nov. 1700. Walpole's Anecdotes.

COOK, in *Ichthyology*, a fpecies of fifh, which is fometimes taken in great plenty on the coaft of Cornwall. It is a fcaly fifh, and does not grow to any great fize: the back is purple, the belly yellow, and the tail rounded.

COOK'S *River*, in *Geography*, a river of North America, which runs into the northern Pacific ocean, between Cape Elizabeth and Point Banks, *i. e.* between E. long. 207° 9', and 207° 45'; N. lat. 58° 42', and 59° 10'; and which, by its various branches, opens a very confiderable inland navigation. This name was given to the river by lord Sandwich, in honour of captain Cook, who, in the year 1778, traced it as high as the latitude of 61° 30', and the longitude of 210°, or about 70 leagues from its entrance, without perceiving the leaft appearance of its fource. "It was a fatisfaction to me," fays this perfevering navigator, (Third Voyage, vol. ii. p. 397.) "to reflect, that, if I had not examined this very confiderable inlet, it would have been affumed, by fpeculative fabricators of geography, as a fact, that it communicated with the fea to the north, or with Baffin's or Hudfon's bay to the eaft; and been marked, perhaps, on future maps of the world, with greater precifion, and more certain figns of reality than the invifible, becaufe imaginary, ftraits of de Fuca, and de Fonte." Mr. King was ordered to land on the northern point of the low land, on the S.E. fide of the river, there to difplay the flag, to take poffeffion of the country and river in the name of his Britifh majefty, and to bury in the ground a bottle, containing fome pieces of Englifh coin, of the year 1772, and a paper, on which were infcribed the names of the fhips and the date of the difcovery. Near the fhore Mr. King obferved about twenty of the natives, who appeared with their arms extended, probably to exprefs their peaceable difpofition, and to fhew that they were without weapons. When their alarm, occafioned by the fight of mufquets, had fubfided, they allowed their new vifitants to approach them, and appeared to be cheerful and fociable. Their fpears and their other hoftile weapons, as it was afterwards difcovered, were hid in the bufhes clofe behind them. The ground was fwampy, and the foil poor, light, and black. It produced a few trees and fhrubs, fuch as pines, alders, birch, and willows; rofe and currant bufhes, and a little grafs, but not fo much as a fingle plant or flower was difcovered. On a future day, feveral large and fome fmall canoes, with natives, came off to the Britifh fhips, and bartered their fwine; after which, they fold their garments, till many of them were quite naked. Among others, they brought a number of white hare or rabbit fkins, and very beautiful reddifh ones of foxes; but there were only two or three fkins of otters. They alfo fold pieces of falmon and halibut. They preferred iron to every thing elfe offered to them in exchange. The lip-ornaments did not feem fo frequent among them as at Prince William's Sound; but they had more of thofe which pafs through the nofe, and, in general, thefe were alfo much larger. They had, however, a greater quantity of a kind of white and red embroidered work on fome parts of their garments, and on other things, fuch as their quivers and knife-cafes. On the weft fide, a volcano was difcovered, in lat 60° 23'; and this is the firft high mountain N. of mount St. Auguftine. The volcano is on that fide of it next the river, and not far from the fummit. It only emitted a white fmoke without fire. Captain Cook obferves, that all the people met with near this river, feemed, by every ftriking token of refemblance, to be of the fame nation with thofe who inhabit Prince William's Sound, but effentially differing from thofe of Nootka, or King George's Sound, both in their perfons and language. The language of thefe is rather more guttural; but, like the others, they fpeak ftrongly and diftinctly in words which feem to be fentences. Thefe people are in poffeffion of iron; that is, the points of their fpears and their knives are of this metal, and fome of the former are alfo made of copper. Their fpears are like our fpontoons; and their knives, which they keep in fheaths, are of a confiderable length. Thefe, with a few glafs beads, were the only things feen among them that were not of their own manufacture.

Their beads and iron they muft have received from fome civilized nation; and it feems moft probable, that they procured them through the intervention of the more inland tribes from Hudfon's Bay, or the fettlements on the Canadian lakes; unlefs it can be fuppofed (which, however, is lefs likely) that the Ruffian traders from Kamtfchatka, have already extended their traffic fo far; or at leaft that the natives of their moft eafterly Fox iflands, communicate along the coaft, with thofe of *Prince William's Sound*; which fee. The Ruffians themfelves, fays captain Cook, have never been among them; for if that had been the cafe, we fhould hardly have found them clothed in fuch valuable fkins as thofe of the fea-otter. There is not the leaft doubt, continues captain Cook, that a very beneficial fur trade might be carried on with the inhabitants of this vaft coaft. But unlefs a northern paffage fhould be found practicable, it feems rather too remote for Great Britain to receive any emolument from it. It muft, however, be obferved, that the

the moft valuable, or the only valuable, fkins which Cook faw on the weft fide of America, were thofe of the fea-otter. All their other fkins feemed to be of an inferior quality, particularly thofe of their foxes and martins. Moft of the fkins that are fitteft for fale, are thofe which are made up for outer garments, and this is the chief ufe for which they kill the animals. By increafing intercourfe with purchafers, they would be more affiduous in procuring fkins, and thus a plentiful fupply might be obtained in this country.

In Cook's river, the tide is very confiderable; and much contributes to facilitate the navigation of it. It is high water in the ftream, on the days of the new and full moon, between two and three o'clock; and the tide rifes perpendicularly, between three and four fathoms. The reafon of the tides being greater here than at other parts of this coaft, is, that, the mouth of the river being fituated in a corner of the coaft, the flood from the ocean is forced into it by both fhores, and thus fwells the tide to a great height. The variation of the compafs was 25° 40′ E.

Cook-*room*, in a *Ship*, is where the cook and his mate drefs and deliver out the meat, &c.

Cook's *Strait*, in *Geography*, fo called from its difcoverer captain Cook, a ftrait which feparates the two iflands that form New Zealand. This ftrait is about four or five leagues broad; and the iflands, thus divided, are fituated between the latitudes of 34° and 48° S.; and between the longitudes of 181° and 194° W. See New Zealand.

COOKE, *Sir* Anthony, in *Biography*, governor, preceptor, or fchoolmafter, to king Edward VI., and great grandfon to fir Thomas Cooke, lord-mayor of London in 1462, was born at Giddy-hall in Effex about the year 1506, and educated, probably, at Cambridge. He became eminent in literature and the arts, being a thorough mafter of the Latin and Greek languages, an excellent critic and philologift, and equally fkilled in poetry, hiftory, and the mathematics. He was no lefs diftinguifhed for his piety and goodnefs. Thefe qualities recommended him to the office of inftructor to king Edward VI., and the royal pupil is well known to have done honour to the talents and character of his preceptor. During queen Mary's reign he was an exile for religion; but upon the acceffion of queen Elizabeth he returned to his native country, fixing his refidence at Giddy-hall, the building of which he completed. He died June 11, 1576, having attained the age of 70 years, and was buried in the chapel of Rumford in Effex, where a monument was erected to his memory. He left four daughters, eminently learned in the Greek and Latin languages; *viz.* Mildred, married to fir William Cecil, baron Burleigh, lord-treafurer of England; Anne, wife of fir Nicholas Bacon, lord keeper of the great feal; Elizabeth, married to John, lord Ruffel, fon and heir of Francis earl of Bedford; and Catherine, wife of Henry Killigrew, efq. He had alfo two fons.

COOKERY *of Meats*, in *Domeftic Economy*, denotes the application of heat to the feveral aliments taken both from vegetables and animals. The advantages attending the application of heat to vegetable aliments are fuch as follow: 1. That the greateft part of vegetable fubftances are thus rendered more foluble in the human ftomach. The only doubt, fays Dr. Cullen, that can arife with regard to this, refpects vegetables to which in their crude ftate a boiling heat is immediately applied, fo that in many of them a coagulation is produced; in confequence of which they feem to be rendered lefs foluble in water than they were before:—but this, he fays, does not feem to have any effect on their folution in the ftomach. Whether the difficult folution be obviated by fome degree of fermentation that neceffarily takes place in the ftomach, or by the powers of the gaftric fluid, it is not neceffary to determine, as it is certain that the action of heat feparates in fome meafure the fmall particles of bodies, and thereby renders them more readily feparable by the folvent powers of the ftomach. 2. The application of heat feparates and diffipates the volatile parts of vegetable fubftances, which are feldom of a nutritious nature, and, in many cafes, have a tendency to prove noxious. 3. The application of heat to a certain degree extricates and diffipates a confiderable quantity of air, which, in the natural ftate of vegetables, is always fixed in their fubftance; and it is probably, in this way efpecially, that heat beft contributes to the dividing and loofening of the cohefion of the fmall parts of vegetable fubftances. It is certainly in this way, by diffipating a large portion of their air, that vegetables are rendered lefs liable to fermentation, and lefs liable to produce that flatulence, which is occafionally fo troublefome in the ftomach and inteftines. Dr. Cullen obferves further, that, as the heat may be employed in two ways, either in a humid or a dry form; the former is always better fuited than the latter to all the purpofes above-mentioned. The cookery of animal fubftances alfo confifts chiefly in the application of heat. Other practices, however, previous to cookery, may be confidered as parts of it; particularly falting, drying, and pickling. Thefe practices, however, are merely ufeful for the purpofes of domeftic economy, as preferving meat from putrefaction, before it be fubjected to heat, for a longer time than it could be preferved without fuch means. Thefe practices, Dr. Cullen thinks, can never increafe the nutritious quality of meat, or render it even of more eafy digeftion. Drying certainly brings the folid parts of meat more clofely together, which muft render it of more difficult folution. The addition of falt, which ftimulates the ftomach, may feem in fome cafes to promote digeftion; but this muft be when the falt is added in fmall quantity, and when the meats preferved by it are taken in moderate quantity only. For when meats have been long falted they are hardened, and rendered in proportion lefs foluble in the ftomach: and a large quantity of falt accompanying them is certainly hurtful to the fyftem. There is one preparation of animal food, which is made without any addition; and that is by its being kept for fome time before it is fubjected to cookery, for a longer or fhorter interval, according to the feafons, and the nature of the meat; but always till it has made fome advance towards putrefaction. The tendency to this feems to take place from the moment that life is extinguifhed in the animal; and the allowing of it to take place to a certain degree renders the meat more eafy of folution in the ftomach; and if the putrefcency be only in a moderate degree, it does not feem to injure the nutritious quality of the meat. The proper degree of putrefcence is not eafily afcertained; and it is certainly different according to the conftitution of the perfon. Some can ufe meats tainted in a confiderable degree without inconvenience: whilft the digeftion of others is much difturbed by the fmalleft quantity of putrefcent meat. Every advance in meats towards putrefcency, renders them, as Dr. Cullen fays, more ready to increafe the tendency of the animal fluids to that ftate which we take to be always hurtful to the human conftitution, as it both favours the accefs of difeafes, and aggravates their fymptoms and danger when they occur.

The cookery of animal fubftances by the application of heat is of two kinds, as it is applied in a humid form by

boiling and *ſtewing*, or in a dry form, by *roaſting*, *broiling*, and *baking*, For the proceſſes and effects of boiling and ſtewing; ſee Boiling. The application of heat in a dry form is of two kinds, as it is in cloſe veſſels, or as it is expoſed to the free air. The firſt is *baking;* and though commonly in this practice the cover of the meat is merely paſte, any conſiderable exhalation is prevented, and the retention of the juices under the application of heat renders the meat more tender; and in all caſes when the heat applied looſens, and, in ſome meaſure, extricates the air, without exhaling it, the ſubſtance is rendered more tender than when with any other application an exhalation is allowed. In *broiling* an exhalation takes place; but as the heat of a naked fire is more nearly applied, the outer ſurface is in a degree hardened before the heat penetrates the whole, and thus a great exhalation is prevented, while the whole is rendered ſufficiently tender; but this kind of cookery is eſpecially ſuited to meats that are choſen to be eaten a little raw. *Frying* is a-kin to this; but as in this caſe the meat is cut into thin ſlices, and laid in a veſſel which is interpoſed between the meat and the naked fire, the heat is more equally applied to the whole ſubſtance. But as the part of the meat lying next to the bottom of the veſſel would be ſuddenly hardened by the heat, it is always neceſſary to interpoſe ſome fluid matter. When this, as is moſt commonly the caſe, is of an oily matter, a ſtrong heat is apt to render it empyreumatic, or at leaſt leſs miſcible with the fluids of the ſtomach; and, therefore, all fried meats are leſs eaſily digeſted than thoſe of any other preparation, except that ſometimes the ſame may happen to baked meats, to which an oily matter, and that only, is added to avoid the too drying heat. By *roaſting* the heat may be ſo managed as to be equally applied, and therefore its effect in rendering the meat more tender is certainly obtained; and though a conſiderable exhalation is made, it is almoſt only of a watery humidity. This, indeed, would take place to a very great degree, and render the meat again more inſoluble, were it not that large maſſes only are ſubjected to this operation, and that thereby the outer ſurface is firſt condenſed, and prevents the exhalation from the interior parts. At the ſame time, an oily matter is commonly and repeatedly applied to the outer ſurface, which prevents both much exhalation, and any great hardening of the outer ſurface, till the heat has penetrated the whole, and rendered it ſufficiently tender. Cull. Mat. Med. vol. i. pt. i. c. 2.

COOK-HOUSE, in *Geography*, a town of America, ſituated on the Cooquago branch of Delaware river, in the townſhip of Colcheſter, New-York, 18 miles S. of the mouth of Unadilla river.

COOKIA, in *Botany*, (named by Sonnerat, in honour of our illuſtrious circumnavigator, captain Cook.) Willd. 844. Juſſ. 261. Vent. 3. 155. Sonnerat It. 2. 181. tab. 80. Retz. Obſ. 62. Jacq. Hort. Schoenb. 1. 53. tab. 101. (Quinaria Lanſium; Lour. —. Wampi of the Chineſe.)

Gen. Ch. *Cal.* very ſmall, five-cleft. *Cor.* Petals five, ſpreading. *Stam.* Filaments ten, diſtinct; anthers roundiſh. *Piſt.* Germ ſomewhat pedicelled, hirſute; ſtyle one; ſtigma capitate. *Peric.* Berry; Juſſ. (Pome; Willd.) five-celled; three frequently abortive. *Seeds* one in each cell.

Eff. Ch. Calyx five-cleft, inferior. Petals five, equal, inferior. Berry or pome, five-celled. Seeds one in each cell.

Sp. Cookia *punctata*. A tree. *Trunk* browniſh, ſtriated, rugged. *Branches*, petioles and common peduncles rough, with prominent points. *Leaves* alternate, petioled, unequally pinnated; leaflets petioled, alternate, egg-ſhaped, acuminate, quite entire, ſmooth, ſprinkled with pellucid dots, inner ſide narrower. *Flowers* white, in a large divaricated terminal panicle. A native of China and of the South Sea iſlands.

COOLER, among *Brewers*, *Diſtillers*, &c. a large veſſel, uſually of ſmall depth and large ſurface, in which liquors are cooled, after having been boiled.

COOLIES, in the Eaſt Indies, are thoſe natives who are employed in carrying of burthens, digging of trenches, and ſuch laborious occupations; and who, ſupplying the place of pioneers, cannot be diſpenſed with in the operations of military tactics in Hindooſtan.

COOLING is the progreſſive decreaſe of temperature from a higher to a lower degree. From the higheſt degree of heat, which human induſtry has been able to obtain by means of combuſtion, or by concentrating the ſolar rays, to the loweſt degree of it, which both natural and artificial methods have produced, the ſcale is very conſiderable; and different parts of it have obtained diverſe denominations, which are derived from the moſt ſtriking phenomena that take place at particular points of the ſcale; thus we hear of porcelain heat, white heat, red heat, boiling heat, temperate, freezing, &c. and all theſe tranſitions from the firſt to the laſt, fall under the denomination of *cooling;* whereas the contrary tranſition from the loweſt to the higheſt, is called *heating*. In order to preſerve perſpicuity, and to aſſign to each of the received denominations, the particulars which belong more immediately to it, we have divided the ſubject into three articles, under the words *congelation*, *cooling*, and *freezing*. Under the firſt we have ſtated the phenomena of natural congelation; the laſt contains whatever relates to artificial freezing, *viz.* to the production of cold below 32° of Fahrenheit's ſcale; and under the preſent, we ſhall principally ſtate all the methods and the effects of cooling from the actual temperature of the atmoſphere to a lower degree; but not below that of melting ice, *viz.* 32°, which is commonly called the freezing point.

The temperature of the atmoſphere in the hotteſt climates, has hardly ever been known to exceed 130°, and it is but ſeldom that it reaches that moſt oppreſſive degree of heat. In the human ſpecies, nature has made ample proviſion, and has furniſhed them with induſtry ſufficient for counteracting the effects of a very high or a very low temperature; but without any artificial aſſiſtance, few are the degrees of heat in which human beings can live with perfect comfort. Making ſome allowance for the natives of different climates, the whole range temperature may be ſaid to reach from the 60th to the 70th degree of Fahrenheit's ſcale. Below 60° moſt perſons have no objection to a gentle fire in their apartments; and above 70° they generally complain of heat. Yet when the natural temperature of the atmoſphere is above 50°, cooled liquors are generally preferred for drink; but when the temperature is above 70°; then not only cooled liquors, but cool apartments alſo, are articles of great luxury; and (it may in great meaſure be ſaid) of neceſſity. The languor which is commonly induced by heat, is in great meaſure relieved by artificial cooling. Patients affected with fevers of the intermittent and putrid kinds, which are ſo very common and deſtructive in hot climates, receive great benefit from the uſe of cooled liquors, and ſuch are plentifully adminiſtered to them, whenever they can be obtained. The preſervation likewiſe, of meats, fruit, butter, &c. in warm climates, or in the hot ſeaſon, is conſiderably aſſiſted by cooling; and it may be extended to a very remarkable long period by actual freezing.

In order to anſwer all theſe purpoſes, mankind has, from time immemorial, endeavoured to diſcover and to apply methods

thods of cooling, or of refrigeration. These methods, as far as they are at present known, may be comprised under the following heads; *viz.* 1st, the application of something naturally colder than the actual temperature of the atmosphere; 2dly, ventilation; 3dly, evaporation; and 4thly, the solution of certain saline substances. Sometimes two or three of these means are applied at the same time, to the article which is required to be cooled. In every country of Europe, and especially in the southern part of it, ice is collected during the winter, in proper places, and is used for cooling liquors, &c. in the summer season, or throughout the whole year. And this undoubtedly is the most easy, the most extensive, and the most effectual method of cooling. A little ice taken out of the ice-house, and placed round a bottle of water or wine, in any convenient vessel, soon cools it to the desired degree; and if the effect is to be increased, so as to freeze creams, fruit, &c. by breaking the ice into small pieces, and mixing common salt with it, the desired end will be obtained. The ice-house itself is of very essential use for preserving meat, fish, butter, fruit, &c. which things need only be laid in it, until they are wanted.

When ice cannot be easily procured, well water forms a useful substitute to a certain degree. When the depth of the well is 40 or 50 feet, or upwards, the constant temperature of its water is very nearly equal to the mean temperature of the country, which, of course, is lower than the usual temperature of the summer season in that country; hence, if a pail of water be drawn, and a bottle of wine, or other liquor, be immediately placed in it; a considerable refrigeration may be obtained, and it may be maintained by drawing fresh water at intervals from the well, &c. Thus in London the mean temperature is about 50°, and so is the temperature of pretty deep wells throughout the year. Now in the summer season, the temperature frequently rises above 65°, or 70°; therefore, at those times, by applying fresh drawn well-water, the liquors we drink may be cooled about 15 or 20 degrees, which will render them incomparably more pleasant. When articles of food are required to be kept some time longer than the heat of the weather would allow, they may be placed in a basket at the end of a rope, and may be let down into the well, until they come within a foot or two of the water. For the like purposes, pretty deep pits, caves, or grottos may be used; since their temperature is nearly equal to the mean temperature of the country, and suffers little or no variation between winter and summer.

Ventilation is nothing more than a constant change of air; but if the air which has just passed by a body, and that which succeeds it are all of the same temperature, no cooling will be produced by the ventilation; but the refrigeration will take place, when the body is hotter than the air which passes by it, or when an increase of evaporation ensues. Expose a thermometer to the open air, but shelter it from the wind, and when the thermometer is become stationary, let the wind fall upon it; and it will be found that the quicksilver is not lowered in it. But when a human being, or other animal is exposed to ventilation, the quick transition of air cools it; first, because it continually removes the air which has been heated by the contact of the animal body, the breath, &c.; and secondly, because the evaporation from the body is increased by the ventilation. So that, upon the whole, the use of ventilation, such as is effected by means of fans, bellows, a particular disposition of apartments, and other machines, is to remove heated or vitiated air from the vicinity of human beings, from close habitations, prisons, ships, &c. The ingenious Dr. Hales fixed a machine of this sort in the old Newgate prison, which, being put in action by means of sails, like a wind-mill, constantly ventilated the inside of that prison; and this machine remained in use until the rebuilding of that prison upon a better plan rendered it superfluous. See Ventilator.

Hitherto we have supposed, that the air is colder than the human beings who are exposed to it; but should the contrary be the case, then ventilation will produce a different effect; *viz.* it will heat, instead of cooling, as may be easily conceived by considering what has been said above. And such is the case with the hot winds, which sometimes blow in Arabia, Africa, India, and other places.

One of the most useful and efficacious modes of cooling, especially in those countries where it may be mostly wanted, is performed by means of evaporation. The principle upon which the cooling power of evaporation depends, is, that whenever a body is expanded, *viz.* its volume is increased, its capacity for containing heat is increased at the same time; hence the expanding body absorbs the heat of the surrounding bodies, which, of course, are cooled by it.—A short experimental illustration of this theory will easily explain the effect we are treating of. Take three common mercurial thermometers: keep one in its natural state; place the second in a bottle of water, and close its aperture; wrap some cotton moistened with water round the bulb of the third; then expose all the three thermometers thus prepared to the ambient air, especially when the wind blows in the summer season; and after a few minutes observe their progress. It will be found that the naked thermometer, and that which stands in the bottle, indicate the same degree of temperature; but the third thermometer, which is wrapped in moistened cotton, will be found to indicate a temperature lower by a few degrees, than the former. The effect in this experiment is produced by the evaporation of the water from the cotton, and not from the water as water; for if that were the case, the thermometer in the bottle of water would likewise be cooled like the one involved in moistened cotton. Evaporation is the conversion of water into steam, or vapour; and the bulk of steam has been found to be many hundred times larger than the bulk of the water from which it originated. Now in that expanded state, steam is capable of holding a vast deal more of the element of heat, than in its form of water, and that without manifesting any higher degree of temperature. Or, in other words, if a thermometer be placed in a bottle full of vapour of water, and another thermometer be placed in the water from which that vapour was just produced, their temperatures will be found to be nearly the same; yet the vapour contains a vast deal more of the element of heat than an equal weight of water, which quantity of heat is essentially necessary for maintaining its elastic or vapourous existence; and this is proved by observing, that vapour cannot be converted into water without depositing its heat upon (and of course elevating the temperature of) the surrounding bodies; and on the other hand, that water cannot be converted into vapour, without absorbing heat from (and consequently cooling) the surrounding bodies. Mr. Watt of Birmingham says, that he has observed as exact a coincidence between the heat rendered latent in the vapour, and that which emerges from it, as can be desired; and that the heat obtainable from steam, capable of sustaining the ordinary pressure of the atmosphere, is not less than 900°; and that it does not exceed 950° of Fahrenheit's scale.

The cooling action of evaporation is counteracted by the influx of heat from the surrounding bodies, since heat always tends to equalize the temperature of contiguous bodies. Thus in the above described experiment, the heat of the surrounding air tends to elevate the temperature of the thermometer,

thermometer, at the ſame time that the evaporation from the cotton tends to lower it. And according as the one or the other of theſe oppoſite actions predominates, ſo the cooling effect is more or leſs conſpicuous. From theſe obſervations it naturally follows, that the cooling, occaſioned by evaporation, is greater when the evaporation is quicker, and contrarywiſe; alſo, that when different fluids are uſed for the evaporation, in ſimilar circumſtances, that fluid which evaporates quickeſt, produces the greateſt refrigeration. Mr. Cavallo ſays, "in order to try the degree of refrigeration produced by the evaporation of different fluids, I held up a naked thermometer, (*viz.* a thermometer, the bulb of which was not in contact with the metal of the ſcale) and poured upon its bulb a ſtream of ſome particular fluid, which iſſued out of the capillary aperture of a tube; taking care to throw juſt fluid enough to ſupply the waſte by evaporation. By this means, when the temperature of the air was 64°, I found that the evaporation of water cooled the thermometer 8°; *viz.* brought it down to 56°; the evaporation of ſpirit of wine cooled it 16°; *viz.* brought it down to 48°; and the evaporation of ether cooled it 54°; *viz.* brought it down to 10°. But, by the uſe of the beſt purified ſulphuric ether, when the temperature of the air was about 56°, I brought the thermometer down to 3°. The cooling produced by the evaporation of other fluids needs not be mentioned; their effect being generally intermediate between the effect of water, and that of ſpirit of wine." (Phil. Tranſ. vol. lxxi.) Whatever promotes the evaporation, ſuch as a dry air, and eſpecially a dry wind, tends to increaſe the refrigeration; and when all the favourable circumſtances concur, the effect is prodigious; ſo that in a dry, warm, and briſk wind, by means of the evaporation of the beſt ſulphuric ether, the temperature of any kind of bodies may be lowered many degrees below the freezing point; and animals might be eaſily frozen to death.

Though ſeveral of the above-mentioned particulars, and eſpecially the cauſes upon which they depend, have been but lately inveſtigated and aſcertained; yet the cooling effect of evaporation has been known and uſed by mankind from time immemorial. Athenæus ſays, as being related by Protagorides of Cyzicum, that in the time of king Antiochus, it was uſual to cool water by evaporation, and to drink it as a luxury. A very eaſy and familiar experiment to ſhew the effect of evaporation, may be performed in the following manner. Moiſten a ſmall ſpace on the upper part of each hand; cover one of thoſe places with an inverted wine glaſs, and let a perſon blow with a pair of bellows upon the other hand. The latter will be ſenſibly cooled, but not the former. Change the glaſs and the blowing, from one hand to the other, and the effects will be reverſed. Seamen, eſpecially in the night time, frequently employ this natural effect for diſcovering which way the wind blows. They moiſten a finger of their hands by putting it in their mouth; then expoſe it to the ambient air by elevating it above their head; and juſtly conclude that the wind blows from that quarter which is oppoſed to the moſt cooled ſide of the finger.

In warm climates, where the dryneſs of the air generally is very great, the refrigeration ariſing from evaporation is very conſiderable, and is of courſe frequently employed for counteracting the natural heat. The caravans which traverſe the parched deſerts of Arabia, are obliged to carry their ſupply of water in earthen jars upon camels; but in order to keep it pleaſantly cool, the jars are involved in cloths, which they take care to keep continually moiſtened with water. It is a pretty common practice in the ſouthern parts of Europe, as well as in the Eaſt and Weſt Indies, in America, &c. to wrap up a bottle of wine, or water, or other liquor, in a wet cloth, and thus to ſuſpend it in a ſhady place, either under a tree or in a paſſage, ſo as to expoſe it to the briſkeſt current of air that can be obtained; for by this means the liquor will be cooled ſeveral degrees; care, however, muſt be had to ſprinkle more water upon the cloth, which ſurrounds the bottle, in proportion as the former evaporates. Mr. Walker, of Oxford, deſcribes a peculiar method of producing a very conſiderable degree of cold by means of evaporation. "Having," he ſays, "in the courſe of the preceding winter, frequently ſucceeded in producing ice, by the cold produced from evaporation with water, when the temperature of the air was 38°; it occurred to me, that it might be poſſible to freeze water in the middle of ſummer, by a proceſs which depended on this principle, by the uſe of water only. Accordingly, I procured a tall cylindrical veſſel, holding about two gallons, in which is fixed a ſmall ſpiral tube, as in the worm-tub of a common ſtill; the lower end of this tube comes out through the veſſel near the bottom, ſufficient to connect the noſe of a pair of bellows to it, by the intervention of a bladder, ſecured air-tight; this ſpiral tube ends at the top of the cylindrical veſſel, where it is ſomewhat enlarged, like the mouth of a funnel. This veſſel, being covered with flannel, was filled with water and hung out in a briſk dry wind, the temperature of the air being 50°; after ſome time, by repeatedly wetting the flannel on the outſide of the veſſel, I found the water within was cooled to 40°; air being then forced through the tube (by means of the bellows), ſurrounded by the cooled water, came out at the upper extremity of the tube at nearly the ſame temperature.

"A thermometer having its bulb covered with lint, and wetted repeatedly with the cold water in the veſſel, placed ſo as to receive the draught of cold air from the tube, ſoon ſunk to 34°; hence by a ſeries of two or three of theſe veſſels, water might, upon this principle, be frozen at midſummer, recollecting that this experiment may always commence at 50°, the uſual temperature of ſprings; and hence it might be poſſible upon the ſame principle, to cauſe nature upon a ſmall ſcale, even without the immediate interpoſition of art, to depart from her uſual courſe, and to aſſume the hoary garb of winter at midſummer.

"For this purpoſe a current from the external air might be admitted into the tube, by means of a funnel, communicating with, and receiving, a conſtant draught of air.

"In an attempt of this kind, it would be neceſſary (beſides ſome other variation in the veſſels, which circumſtances might point out,) that the cylindrical veſſels be porous, or pierced with ſmall holes; ſo that the water may be conſtantly and gently oozing out."

In Spain, in Italy, in Egypt, and probably in other places, certain veſſels are made of a porous earth, which, when full of water, will juſt permit ſome of that fluid to ooze out on their external ſurface, whence it evaporates, and thus cools the remainder of the liquor within the veſſel. The Spaniſh veſſels for this purpoſe conſiſt of a reddiſh brown earth. They are pretty broad, but not very capacious. In Italy they have been made of a pale yellowiſh material, but much larger. In Egypt they are made ſomewhat in the ſhape of a Florence flaſk, and not much bigger; but their aperture ſpreads out in the form of a cone, or rather of an ale glaſs, which is done for the conveniency of drinking out of it. Their ſubſtance is of the colour of aſhes, and it is ſaid to be a ſcum left on the banks of rivers. But veſſels of any degree of poroſity may be made by mixing ſand and clay in various proportions.

The

The uſe of theſe veſſels in Spain, in Italy, and eſpecially in Egypt, is attended with a notable degree of refrigeration, on account of the great dryneſs of the air in thoſe climates, which enables it to abſorb a great deal of moiſture in a ſhort time; but the ſame veſſels having been brought over, and having been tried, in this country, have been found to cool the contained liquor in a very trifling degree; evidently owing to the ſtate of the air in this country, which is much leſs hot, and much leſs dry than in the above-mentioned places; therefore much leſs apt to promote evaporation. One of the Egyptian veſſels was tried in London at a time when the temperature of the atmoſphere was at a mean, and after about half an hour, when almoſt three quarters of the water had paſſed through it, and had dropped down, the remaining quantity of water was found barely 3° colder than the ſurrounding air.

It is but lately that liquor coolers have been manufactured in this country, and they are at preſent to be found in moſt of the earthenware ſhops in and about London. Theſe are cylindrical veſſels, about ſix inches in diameter, and about a foot high. It is directed to keep one of theſe veſſels entirely immerged in water during one hour. The veſſel, being then removed, in that moiſt ſtate, without putting any water in it, a bottle of wine, &c. muſt be placed in it, and this is ſaid to be cooled by the evaporation of that quantity of water, which the ſubſtance of the veſſel had imbibed whilſt it remained under water. Upon trial, however, it appears that the actual refrigeration which is obtained by means of one of theſe veſſels, ſeldom amounts to two or three degrees; and that, of courſe, a bottle of wine may be cooled much more effectually by placing it into a pail of water freſh drawn from a pretty deep well or pump; which may be renewed at intervals. Indeed, conſidering the form of theſe coolers, alſo that the ſides of it are at a conſiderable diſtance from the ſurface of the bottle, and the ambient air has a free acceſs to both, it is hardly to be expected that any ſenſible advantage ſhould be obtained from them.

In India the action of evaporation is uſed not only for cooling liquors, but likewiſe for cooling apartments, and the effect, by the teſtimony of thoſe perſons who have experienced it, is ſaid to be very remarkable. The method, (which, however, is practicable only when a dry wind blows,) is as follows. That door of the apartment which is oppoſed to the wind, and through which the wind enters, is ſtopped up with a peculiar ſort of ſcreen or curtain, which fits it exactly. This ſcreen conſiſts of two ſurfaces or gratings of bamboo, ſituated parallel to each other, and about three or four inches apart; then the ſpace between theſe external ſurfaces is filled up in a looſe manner with the roots of a ſweet-ſcented graſs. In ſhort the conſtruction of this ſcreen is calculated to admit the air not in a body, but divided through a vaſt number of paſſages. Two men are placed on the outſide, each having a goat's ſkin filled with water, which they keep continually ſprinkling upon the ſcreen. A conſtant and copious evaporation is of courſe kept up, which preſently cools the adjoining room to a very remarkable degree. By this means the temperature of the room has ſometimes been lowered upwards of 15°.

Amongſt thoſe cooling proceſſes which depend upon the expanſion of bodies, that which ariſes from the expanſion of air muſt not be forgotten; but as this is by no means very practicable, we ſhall barely mention it in this place. The condenſation and expanſion of air produce the effects which have been mentioned above; *viz.* the former is attended with an extrication of heat, and the latter with an abſorption of it; hence the contiguous bodies are heated by the former, and are cooled by the latter. When air is ſuddenly condenſed, (ſee CONDENSER, and CONDENSATION,) the heat which is extricated from it, has been found capable of ſetting fire to light combuſtible bodies; and when the air is rarefied either by means of an air-pump, or by liberating it from a veſſel, in which it has been condenſed; the cold it produces has ſometimes been found to lower the thermometer ſeveral degrees below the freezing point.

The laſt method of cooling which remains to be deſcribed, is obtained by the ſolution of ſalts. That certain ſaline ſubſtances, whilſt diſſolving in water, or in acids, would generate a conſiderable degree of refrigeration, and eſpecially that the ſolution of ſalt ammoniac would lower the thermometer down to the freezing point, has been long known; but, within theſe 15 or 20 years, the ſubject has received wonderful improvements, in conſequence of the experiments inſtituted by various ingenious perſons; and eſpecially from the aſſiduous inveſtigations, and ſucceſsful experiments of Mr. Walker of Oxford, who has examined the cooling powers of a vaſt number of ſaline ſubſtances both ſingle and mixed; and has been able to freeze quickſilver at Oxford in the middle of ſummer, merely by the ſolution of ſalts. His intereſting experiments, and his various freezing mixtures, will be found deſcribed under the article FREEZING.

A vaſt number of ſalts and ſaline mixtures may be uſed for cooling liquors; but the moſt advantageous are thoſe which, after ſolution, may be recovered by means of evaporation, ſo as to render them uſeful for a ſecond refrigeration, a third, and ſo forth. Yet the price of moſt of thoſe ſalts in Europe, the trouble of recovering them from the ſolution, and pounding them in order to render them fit for another cooling operation, have not rendered this method common in this part of the world; eſpecially where other eaſier methods are practicable. So that in fact the cooling power of ſaline ſolutions is moſtly uſed for particular experiments by the European philoſophers, eſpecially when a very powerful freezing mixture is required. In India, where nitre is very cheap, and the heat of the climate prompts the inhabitants eagerly to adopt every poſſible method of cooling, the practice of cooling liquors, by means of the ſolution of nitre in water, is very common. For this purpoſe, the wine, the water, or any other liquor, is put into a metallic bottle, generally a pewter one, having a pretty long neck. A tub is partly filed with water, and a quantity of nitre is thrown in it; then the operator holds the bottle by the upper end of its long neck, and gently moves it about the ſaline ſolution, and thus cools the liquor in it to a very conſiderable degree. As ſalts will produce cold only during their ſolution, therefore when the firſt quantity of nitre has been thoroughly diſſolved in the above proceſs, more nitre muſt be added; and when the water is completely ſaturated, ſo as not to be capable of diſſolving more ſalt, then the bottle muſt be removed to another tub with a freſh ſaline mixture. The nitre might afterwards be eaſily recovered merely by expoſing the ſolution, in ſhallow pans, to the hot rays of the ſun in that country; this economical plan, however, does not as yet ſeem to have been adopted.

The ſalts which might be uſed for the purpoſe of cooling liquors in this country, or in long voyages, are nitre and ſalt ammoniac; the other ſaline ſubſtances being either more expenſive or not eaſily recoverable after ſolution. Of the effects of nitre alone in water enough may be derived from the above deſcribed proceſs. Salt ammoniac by itſelf

gradually

gradually added to a quantity of water, will occafion a confiderable refrigeration, fo that a bottle of wine, &c. placed in the folution may be cooled even to 32° of Fahrenheit's fcale. But a mixture of both falts is much more efficacious, and the beft proportion is five parts of nitre, five of falt ammoniac, and 16 of water. During the folution, which will continue a confiderable time, this mixture will cool the thermometer feveral degrees below the freezing point; but it muft not be imagined that a fmall quantity of the fame will cool a bottle of wine to an equal degree. The folution of a given quantity of the mixture abforbs a certain quantity of heat, and this quantity abftracted from the fmall body of the thermometer, will lower its temperature confiderably; but the fame quantity of heat abftracted from a bottle of wine, will cool it proportionably lefs than the thermometer. In order to cool a bottle of wine from the ufual temperature of fpring waters (which in London is about 50° or 51°) down to about 32°; a pound of nitre with a pound of falt ammoniac, and a proportionate quantity of water, will generally fuffice. The falts for this purpofe muft be finely powdered and as dry as poffible. But when a moderate refrigeration is required; half a pound of each falt and about three pints of water will be fufficient.

Glauber falt, (*viz.* fulphate of foda) diffolved in water, likewife produces a very confiderable refrigeration; but this falt will not produce that effect unlefs it be in its cryftallized ftate. In that ftate, however, it is not eafily preferved, fince the mere contact of air will render it powdery and opaque, in which cafe its folution will generate heat rather than cold. On this account, therefore, this falt is not fo much to be recommended, as thofe which have been already mentioned. Nearly the fame obfervations are applicable to the muriate of lime, the folution of which faline fubftance, when properly conducted, has a very powerful cooling property.

Thus we have defcribed all the practicable proceffes of cooling, which, if not in this country, are undoubtedly of great confequence amongft the inhabitants of warmer climates. We have, likewife, ftated the moft neceffary particulars refpecting the quantity of materials proportionate to the effect, whence the intelligent reader may be enabled to make proper choice of a procefs fit for his purpofe, agreeably to the circumftances which the nature of the place, the actual temperature of the atmofphere, and other particulars, may offer.

There are now two other particulars belonging to the prefent article which deferve to be briefly mentioned. The firft is that by cooling, certain bodies acquire electrical properties; and the fecond is that the law of cooling, or progrefs of refrigeration, furnifhes a method of meafuring fuch high degrees of heat, as exceed the fcale of ordinary thermometers.

With refpect to the firft, it has been obferved that fulphur, in cooling after having been melted, becomes electrified, fo as to attract and repel fmall light bodies like any other excited electric. The fame thing alfo takes place with wax, chocolate, and a few other fubftances. Befides this effect of cooling after fufion, there are certain folids, like the tourmalin, the Brazilian emerald, &c. which are rendered electrical by any alteration of their temperature, be it from cold to heat, or from heat to cold; but for a full and particular account of thofe facts, which properly belong to the fcience of electricity, fee the articles ELECTRICITY, ELECTRICS, and EXCITATION.

The method of determining high degrees of heat, from the progrefs of cooling, depends upon the following obfervation. Sir Ifaac Newton, confidering the progrefs of cooling, was led to fuppofe, that the heat loft by any body originally at a high temperature, in equal fmall portions of time, is as the heat exifting in it; (reckoning the heat in the body, equal to its excefs above that of the furrounding atmofphere,) that is, taking the times in arithmetical progreffion. The portions of heat loft in thofe times would be in a geometrical one. The truth of this fuppofition has been fufficiently fhewn by fubfequent experiments, the refult of which has not differed much from the theoretical determinations. Hence we have the following practical rule for determining the high temperature to which a body has been expofed, from its fubfequent progrefs of cooling.

Meafure the time in minutes that elapfes from the hotteft ftate of the body (which is the degree fought,) to fuch a ftate of lower temperature as will allow the application of a common thermometer to the body in queftion, and call this number of degrees A; then having applied the thermometer, fet down the temperature, which is indicated by the fame, at the expiration of each fucceffive minute, until you have obtained three or four terms of the feries, which, as has been faid above, will be found to be a geometrical one (omitting, however, trifling differences.) Now, fince from thofe few terms it is eafy to determine any other terms of the fame feries, by the well known arithmetical rules; find fo many terms of the feries afcending, as are equal to the number of units in A; and the laft term of the feries, thus found, will be the degree of temperature of the body in its hotteft ftate. An example will eafily illuftrate the application of this rule. Suppofe it be required to determine the temperature of a piece of red-hot iron at the time that it came out of the forge. Look at the watch the moment the iron is taken out of the fire, and note the minute. Find by trials when the thermometer may be fafely applied to the iron, *viz.* when the heat is not fufficient to rarefy the mercury of the thermometer beyond the limit of its fcale, and when this is practicable, obferve the temperature of the iron, and the correfponding time as indicated by the watch. Suppofe, for inftance, that when the temperature of the iron was 250°, four minutes had elapfed fince the commencement of the obfervation; therefore in this experiment A is equal to 4. Let the thermometer continue in contact with the iron, and when one minute more has elapfed, let the temperature be 125°. When another minute has elapfed, let the temperature be $62\frac{1}{2}$ degrees; and after this, the obfervation needs not be continued. Now we have three fucceffive terms of a geometrical feries; *viz.* $62\frac{1}{2}$, 125, and 250; from which four more terms of the feries are to be found, (fince A was found equal to 4,) and the laft of thofe terms is the number of degrees indicating the temperature fought. By dividing 250 by 125, or the latter by $62\frac{1}{2}$, we have the quotient 2, (or nearly 2) which is the multiplier of the feries, and therefore multiplying 250 by 2, we have the term 500, which multiplied by 2, gives the next term 1000, which multiplied by 2, gives 2000; and laftly this term multipled by 2, gives the fourth term 4000; hence we conclude, that when the iron was taken out of the furnace, its temperature was 4000 degrees. The laft term of the feries may be found out by other means, but we have chofen the eafieft, for the conveniency of all readers. The two feries are annexed.

Time elapsed in minutes.	Corresponding heat.
0.	4000°.
1.	2000.
2.	1000.
3.	500.
4.	250.
5.	125.
6.	$62\frac{1}{2}$.

Instead of minutes, the intervals of time may be half minutes, or hours, or, in short, of any other denomination; provided they be all equal.

COOLING *of liquors*, in *Domestic Economy*, is a practice of ancient origin, and of general prevalence in warm countries, and, during the heat of summer, even in colder climates. This practice, as some have thought, is referred to by Solomon, in the book of Proverbs (ch. xxv. 13.); but however this be, evidences of it are very numerous in the works of the Greeks and Romans. Ice and snow were generally used for this purpose, and repositories were constructed for keeping these cooling materials. That the snow was preserved in pits or trenches is asserted by many; particularly by Seneca (Quæst. Natur. iv. 13.) and Pliny (H. N. l. xix. 4.) When Alexander the Great besieged the city of Petra, he caused thirty trenches to be dug, and filled with snow, which was covered with oak-branches, and which was kept in that manner for a long time (Athenæi Deipnos. iii. p. 124.) Plutarch says (Sympos. vi. Quæst. 6.), that a covering of chaff and coarse cloth is sufficient; and a like method is now practised in Portugal. Where the snow has been collected in a deep gulph, some grass or green sods, covered with dung from the sheep-pens, are thrown over it; and under these it is so well preserved, that it is sent through the whole summer for the distance of 60 Spanish miles to Lisbon. When the ancients wished to have cooling liquors, they either drank the melted snow, or put some of it in their wine, or they placed jars filled with wine in the snow, and suffered it to cool there as long as they thought proper. The dissipated and luxurious Heliogabalus caused whole mounts of snow to be heaped up in summer to cool the air (Lamprid. Vit. Heliogab. c. 23.) That ice was also preserved for the like purpose is probable from the testimony of various authors, Pliny, Seneca, &c.; but it appears not to have been used so much in warm countries as in the northern. At present snow is employed in Italy, Spain, Portugal; but in Persia, ice. The art of cooling water without snow or ice was soon suggested to mankind, by observing, that it became cold more speedily when it had been previously boiled, or at least warmed, and then put in a vessel among snow, or in a place much exposed to the air. Pliny (H. N. l. xxxi. 3. 23.) seems to ascribe this to the invention of Nero; and a jocular expression of Suetonius (Vit. Ner. c. 48.) renders it probable, that he was fond of water thus cooled. But this method was much more ancient than Nero; for it seems to have been known to Hippocrates (De Morb. Vulgar. lib. vi. 4.); and Aristotle was acquainted with it; for he says (Meteorol. i. cap. 12.) that some were accustomed, when they wished water to become soon cold, to place it first in the sun and suffer it to become warm. He relates also, that the fishermen near the Black Sea poured boiling water over the reeds, which they used in fishing on the ice, to cause them to freeze sooner. See also Galen, in lib. vi. Hippocrat. de Morb. Vulg. Comment. 4, 10. Athenæus remarks (Deipnos. iii.) that the pitchers filled with water, which had become warm by standing through the whole day in the sun, were kept continually wet during the night, by servants destined to that office, and in the morning they were bound round with straw. In the island Cimolus, water which had become warm in the day-time was put into earthen jars, and deposited in a cool cellar, where it became as cold as snow. From these facts it appears to have been a general opinion, that water which had been warmed or boiled, was soonest cooled, and acquired a greater degree of refrigeration. The same opinion prevails at present in the southern countries of Asia, and persons there let their water boil before they expose it to the air to cool. The experiments, however, that have been made on this subject, have given different results. Beckmann (ubi infra) inclines to the opinion, that the cooling of water in ancient times is not to be ascribed so much to the boiling as to the keeping of the jars continually wet, and to the air to which they were exposed. See CONGELATION and FREEZING, and also the preceding article.

Another method of cooling water seems to have been known to Plutarch. It consisted in throwing into it small pebbles or plates of lead (Sympos. vi. 5.)

The practice of cooling liquors, at the tables of the great, was not usual in any country besides Italy and the neighbouring states, before the end of the 16th century. In the middle of that century, there were no ice-cellars in France. Towards the end of this century, under the reign of Henry III., the use of snow must have been well known at the French court, though it appears that it was considered by the people as a mark of excessive and effeminate luxury. Towards the end of the 17th century, this luxury must have been very common in France. At that period there were many who dealt in snow and ice; and that was a free trade which every one might carry on: but soon after government farmed out a monopoly of cooling waters.

The method of cooling liquors by placing them in water, in which salt-petre has been dissolved, could not be known to the ancients, because they were unacquainted with that salt. This property of salt-petre was first discovered in the first half of the 16th century; and it was not remarked till a long period afterwards that it belongs also to other salts. The Italians were the first persons by whom it was employed; and about the year 1550, all the water, as well as the wine, drunk at the tables of the great and opulent families at Rome, was cooled in this manner. Towards the end of the 16th century this method of cooling liquors was well known. Mr. Beckmann says, that he cannot determine who first conceived the idea of mixing snow or ice with salt-petre, and other salts, which increase the cold so much, that a vessel filled with water, placed in that mixture, is congealed into a solid mass of ice, that may be used on the table, but the earliest account of it he has been able to find is in a work of Latinus Tancredus, a physician and professor at Naples, who, in his book, "De Fame et Siti," published in 1607, speaks of this experiment. In 1626 Sanct. Sanctorius, in his Commentary on the Works of Avicenna, relates, that, in the presence of many spectators, he had converted wine into ice, not by a mixture of snow and salt-petre, but of snow and common salt. When the salt, he says, was equal to a third part of the snow, the cold was three times as strong as when snow was used alone. Lord Bacon, who died in 1626, says, that a new method had been found out of bringing snow and ice to such a degree of cold, by means of salt-petre, as to make water freeze. This, he tells us, can be done also with common salt; and he adds, that in warm countries, where snow was not to be found, people made ice with salt-petre alone; but that he had never tried the experiment. Mr. Boyle, who died in 1691, made experiments with various

kinds of falt; and he defcribes, how, by means of falt, a piece of ice may be frozen to another folid body. Des Cartes fays, that, in his time, this was a well-known phenomenon, but highly worthy of attention. Since that period, the art of making ice has been mentioned in the writings of all philofophers, where they treated on heat and cold. Towards the end of the 17th century, the French began to congeal all kinds of well-tafted juices, which were ferved up as refrefhments at the tables of the great and wealthy. This was a grand invention for the art of cookery, and afterwards it became common, efpecially in the laft century, and fince that time the confectioners have univerfally practifed it. Beckmann's Hift. of Inventions, vol. ii. See Freezing and Ice.

Cooling *medicines*, thofe which have a tendency to diminifh febrile heat, to allay thirft, and to leffen the activity of the circulation. They confift chiefly of diluents, acids, and neutral falts. With the ufe of thefe a cooling regimen is commonly combined, which confifts in a free employment of thin watery drinks, and a forbearance from every thing ftimulating; fuch as animal food and fermented or fpirituous liquors. Occafional laxatives and gentle diaphoretics contribute to the fame purpofe. See Refrigerants.

COOLI-POU, in *Geography*, a port of Chinefe Tartary; 5 miles N. of Tie-ling-Hotun.

COOLLO, a town of Hindooftan, in the country of Oriffa; 39 miles S.W. of Cattack.

COOLOOME, an Indian town, fituated on the W. fide of Talapoofe river. See Talapoose.

COOM, a term for foot that gathers over an oven's mouth: alfo for that black greafy fubftance which works out of the wheels of carriages, and with which the axle-trees and boxes have been daubed or fmeared over, in order to leffen friction, and make them run eafy.

Coom, or foot, is fometimes ufed in medicine, infufed in wine with other ingredients, as an anti-hyfteric, and againft palpitations of the heart, &c. The fpirit of foot is alfo ufed for the fame intentions, and in cephalic cafes.

COOMB, or *Carnock of wheat*, according to the 9th and 51ft Henry III., 12th Henry VII., &c. was, 256 ℔ troy = 210.6614 ℔ avoirdupoife = 2 ftrikes = 16 pecks = 32 gallons = 256 pints or pounds.

Coomb, *Coom, or fack of corn*, is = 2 long ftrikes = 4 Winchefter bufhels = 16 pecks = 32 dry gallons = 128 dry quarts = 256 dry pints = 8601.6 cubic inches = 4.97 cubic feet = 1.843621 cubic yards = 17.32142 cubic links. In fome of the fen diftricts it confifts of 4 bufhels, and each bufhel of 8 gallons and a quart.

COOMBE Hill *Canal*, in *Geography*, is a fhort canal, in Gloucefterfhire, whofe principal trade confifts in carrying coals from the pits to the Severn river. See Canal.

COOMINGS, in *Naval Architecture*. See Coamings.

COOMTAH, in *Geography*, a town of Hindooftan, in the country of Berar; 45 miles N.E. of Nagpour.

COOP, in *Rural Economy*, a provincial term, fometimes applied to a tumbril or cart enclofed with boards, to carry dung, fand, grains, &c. See Cart.

Coop, alfo fignifies a pen, or enclofed place, where lambs, poultry, &c. are fhut up, to be fed or fattened.

Coop's *Town*, in *Geography*, a town of America, in the ftate of Maryland, and county of Harford; 12 miles N.W. of Harford, and 22 north-eafterly of Baltimore.

COOPA, a town of Perfia, in the province of Irak; 30 miles E.N.E. of Ifpahan.

COOPER, Samuel, in *Biography*, a miniature painter, whofe works are defervedly held in the higheft eftimation. He was born in London in 1609, and was inftructed by his uncle, Hofkins, who was himfelf a limner of confiderable merit. The fcholar, however, foon furpaffed his mafter in the variety of his tints, the clearnefs of his carnations, and the beautiful management of his hair. The works of Vandyke were the models upon which he formed his ftyle; and fo perfect, yet fo bold, is the imitation, that were fome of Cooper's pictures magnified to the fize of life, they would fcarcely lofe by their comparifon with the fineft heads of the great Flemifh mafter. He was the firft who gave to his miniatures the freedom and ftrength of oil painting; and had his fkill in drawing the other parts of the body been equal to that which he evinced in the face, his works might have challenged the moft fcrutinizing eye of criticifm. He feems, however, to have been confcious of his defects, and, probably on that account, left many of his fineft pictures with the neck and arms unfinifhed. It would far exceed our prefent limits to enumerate even the beft of Cooper's works. His portrait of Oliver Cromwell, which was lately in the poffeffion of fir Thomas Frankland, a defcendant of Oliver, is defcribed as a mafter-piece of character, and was engraved by Vertue. Mr. Walpole mentions fome of his other productions in the clofet of queen Caroline, at Kenfington; particularly a fine portrait of general Monk, of which the head only is finifhed. He was employed fome time by the court of France, and lived feveral years in Holland. He died in London, May 5th, 1672, and was buried in Pancras church, where a monument is erected to his memory. Walpole's Anecdotes.

Cooper, Alexander, was the brother of the preceding artift, and, with him, received inftruction in miniature painting from their uncle, Hofkins. We learn from Walpole, that Alexander painted landfcapes and figures in water colours, as well as portraits. The fame author mentions the ftory of Diana and Actæon by this mafter, at Burleigh. He refided fome time at Amfterdam, and ultimately entered into the fervice of queen Chriftina. Walpole's Anecdotes.

Cooper, Richard, a painter and engraver, a refident of Edinburgh, who flourifhed in 1730. Amongft other works, he engraved the portrait of William Carftares, and that of Andrea Allen, the painter, after William Robinfon.—Mr. Strutt mentions another *Richard Cooper*, who refided at London, and flourifhed in 1762. Like the former artift, he engraved portraits. One of his beft prints reprefents the five children of Charles I., accompanied by a great dog, from a picture of Vandyke. Other artifts of the name of Cooper are mentioned by Heinecken. Strutt.

Cooper, or Couper, Thomas, a learned prelate of the fixteenth century, was born at Oxford about the year 1517, and educated in grammar learning in the fchool joining to St. Mary Magdalen College; and afterwards ftudied in that college, where he took the feveral degrees, and fucceeded to a fellowfhip. When queen Mary came to the throne, he declined the purfuits of divinity for the ftudy of phyfic, being a found proteftant in principle. Upon the death of that fovereign, he refumed his former ftudies, and became a frequent and celebrated preacher. He was made dean of Chrift-Church in Oxford, and was for feveral years vice-chancellor of the univerfity. In 1569, he was inducted to the deanery of Gloucefter; and, in the following February, was confecrated bifhop of Lincoln. His diftinguifhed merit and great zeal, in the performance of the duties of his high office, recommended him to his fovereign's favour, who caufed him to be tranflated, in 1584, to the rich bifhopric of Winchefter, where he became celebrated for his learning, and for the exemplarinefs of his conduct. Soon after his confecration,

confecration, he went and refided in his new diocefe; but being apprehenfive of danger from the papifts, he petitioned the privy council to fupprefs their boldnefs. Among other methods propofed by the bifhop, were the following, which exhibit the true fpirit of the times: "That an hundred or two of obftinate recufants, lufty men, well able to labour, might, by fome convenient commiffion, be taken up, and fent into Flanders, as pioneers and labourers; whereby the country would be difburthened of a company of dangerous people: and the reft that remained be put in fome fear." In 1588 he preached at St. Paul's Crofs, November 17th, being the day of public thankfgiving, as well for the queen's acceffion to the throne, as for the fignal victory obtained over the Spanifh Armada. He died at Winchefter, April 29th, 1594, and was buried in the cathedral there, on the fouth fide of the choir, a little above the bifhop's feat. His publications were numerous, among which are, 1. "The Epitome of Chronicles, from the 17th year after Chrift to 1540, and thence afterwards to the year 1560." A part of this work was compofed by Thomas Lænquet, a young man of 24 years of age, who died before he could complete what he had taken in hand. 2. "Thefaurus Linguæ Romanæ et Britannicæ, et Dictionarium Hiftoricum et Poeticum, Lond. 1565." This work was fo much efteemed by queen Elizabeth, that fhe endeavoured to promote the author as high as poffible in the church. To thefe may be added, "An Expofition of certain Parts of the Old Teftament;" and "Sermons on various Subjects." Bifhop Cooper's character is reprefented by writers in a very advantageous light. "He was," according to A. Wood, "furnifhed with all kinds of learning, almoft beyond all his contemporaries; and not only adorned the pulpit with his fermons, but alfo the commonwealth of learning with his writings." Many other teftimonies might be adduced, in favour of the high reputation to which he attained with his contemporaries, among thefe is that of the celebrated fir John Harrington. Biog. Brit.

Cooper, Anthony Ashley, firft earl of Shaftefbury, one of the ableft perfons, and moft diftinguifhed minifters of the 17th century, was fon of fir John Cooper of Rockborn, in the county of Southampton, bart., by Anne, daughter and fole heirefs of fir Anthony Afhley of Winborne St. Giles, in the county of Dorfet, from whom he inherited an eftate of 8000*l.* per annum. He was born at Winborne, July 22, 1621, and educated with the greateft care under the eye of his parents, during his infancy, in which he difcovered fuch talents, that extraordinary things were predicted of him, while he was yet a boy. Before he was ten years of age, he had the misfortune to lofe his father; at fifteen he became a fellow-commoner of Exeter college Oxford, under the tuition of the celebrated Dr. Prideaux, who was then rector of it. At the univerfity, where he remained but two years, he obtained a character for great affiduity, and extraordinary genius. From Oxford he removed to Lincoln's Inn for the ftudy of the law, and before he had completed his nineteenth year, he was chofen member of parliament for Tewkefbury. This was in the year 1640; and, at the commencement of the civil war, he adhered to the king's fide, though he was always a friend to peace, and thought conceffions fhould be made by both parties to attain it. To accomplifh this great object, it is faid by the great Mr. Locke, that he repaired to the king at Oxford, and propofed a method of putting an end to the war, by treating with the parliamentary garrifons, and promifing them amnefty for the paft, and full fecurity for liberty in the future. The plan did not fucceed; and when fir Afhley found himfelf fufpected by the court, and that his perfon was in confiderable danger, he went over to the parliament party, by whom he was kindly received, as well on account of his great talents, as for the influence which his property muft create. He raifed forces in Dorfetfhire, and in 1644 he rendered the caufe in which he acted fome very fignal fervices. He feems even at this period to have been looked up to by the royal party, fince he was trufted with private negociations between the king and Denzil lord Hollis, at the treaty of Uxbridge, for which he was afterwards queftioned, and feverely threatened, in parliament. After the battle of Nafeby, he attempted to check the overgrown power of parliament, by exciting the "Club men," a body of people in feveral counties, encouraged to take up arms, to declare themfelves as a middle party, and to infift upon a fort of treaty by which they might be reftored to the benefits of the law, and the protection of the conftitution. The plan was in fome meafure executed; Fairfax received their propofals, and promifed to communicate them to parliament, but Cromwell, and other leaders of that party, perceiving that no time was to be loft, attacked the club-men without mercy, killed great numbers of them, and difperfed the reft. The fcheme was abandoned, but the author of it contrived fo as not only not to involve himfelf in their fate, but to obtain fhortly after the office of high fheriff of the county of Wiltfhire. Owing either to his great influence in the country, or to the warinefs of his own well-planned fchemes, he was elected a member of the convention, which fucceeded to the long parliament difmiffed by Cromwell; and, in 1754, we find him a member of parliament, and one of thofe who protefted againft the tyrannical government of Cromwell. He was on other occafions a ftrong, though perhaps neither a fteady nor uniform, oppofer of the protector, as he caufed himfelf to be ftyled. See Cromwell. Sir Anthony was neverthelefs chofen by the protector to be one of his privy council; and it has been afferted, that he even fought an alliance by marriage with the baronet's daughter. Dr. Kippis, however, who inveftigated the matter, gives no credit to this part of the charge. When Richard Cromwell was depofed, fir Anthony was appointed by the rump parliament one of the council of ftate, and a commiffioner for the managing army, although, it is now well known, that he was, at the fame time, engaged in a plan to reftore Charles II. to the throne, notwithftanding the ftrong proteftations which he made of his innocence when queftioned on the bufinefs, by which he obtained an acquittal. Like other difcerning men, he forefaw, from exifting circumftances, that a change in favour of monarchy muft eventually take place, and therefore he took care to fecure a claim of merit in the reftoration, which he promoted with great zeal and affiduity, when he perceived an evident tendency to that event. In 1660, he was a member of the healing parliament, and one of twelve who were deputed to invite the return of the king; who, in grateful remembrance of his fervices, made him a privy counfellor; gave him a commiffion for the trial of the regicides; and, in the courfe of a year, raifed him to the rank of peer of the realm, by the title of baron Afhley of Winborne St. Giles. He was foon after appointed chancellor and under-treafurer of the exchequer, and, upon the death of lord Southampton, one of the lords commiffioners of the treafury. He was a member of the celebrated cabal miniftry, in which, from his fuperior talents and forcible eloquence, he took a decifive lead. He contiuued in the councils and confidence of the king his mafter, during the happieft part of his reign, and ftood as high in his favour as any of his minifters. He was afterwards appointed to the lord lieutenancy of the county of Dorfet, and on the twenty-

twenty-third of April 1672, was created baron Cooper of Pawlet, and earl of Shaftesbury. In the following November, he was raised to the highest office of state, *viz.* that of lord chancellor of England, the duties of which station he executed with equal ability and integrity. In his other capacities, of a minister and privy counsellor, he has been variously described; but he is allowed, on all hands, to have been one of the ablest men, and one of the most accomplished orators that have adorned this country. "The short time," says one of his biographers, "that he was at the helm, was a season of storms and tempests, and it is but doing him strict justice to say, that they could neither affright nor distract him. Whatever he did, he did with his might, and there was a spirit and dignity in his administration, which that government could never recover after he left it. He was the soul and genius of the ministry while he made a part of it; but whether he did not carry things too high, and out of the reach of all other capacities but his own, it would savour of rashness to determine." Some historians attribute to him the arbitrary counsel of shutting up the exchequer, while others assert that he opposed it with all his power, and drew up a paper of reasons against it. It is certain that he was an earnest promoter of the declaration for liberty of conscience, which, though intended principally to favour the Papists, probably agreed with his own real judgment, as a decided friend to religious toleration. It is generally admitted that he had no concern in the disgraceful treaty with Lewis XIV., of which the main object was to render Charles a pensioner on the French monarch; but he was a strenuous supporter of the Dutch war, and was guilty of advising the illegal measure of issuing writs for the election of members of parliament, during a recess, and abusing the influence of the crown to procure returns in favour of the court. He had not been more than a year in possession of the seals, when he manifested hostility to the principles which governed the Stuart family; so that the duke of York became his enemy, and at length in Nov. 1673 got him removed from his office. After he had quitted the court, he continued to make a great figure in parliament, and for his warmth in maintaining that a prorogation for fifteen months was equal to a dissolution, he was committed to the tower, where he remained a prisoner full thirteen months, when he submitted and was released, and the precedent made in his case was afterwards reversed. Previously to this, he had shewn himself a friend to civil and religious liberty, by opposing the test-bill introduced into the house of peers by lord Danby, and on this business, he is said to have distinguished himself more than he had ever done. He managed the opposition to lord Danby's administration with so much dexterity and vigour, that it was found absolutely impossible to do any thing effectually in parliament, without changing the system which then prevailed. The king accordingly dismissed all his privy council at once, and formed a new one, making lord Shaftesbury the lord president. He had, however, already drawn upon himself the implacable hatred of the duke of York, by steadily promoting, if not originally inventing, the project of an "exclusion bill." To him also is imputed the contrivance of the Popish plot in 1678; which, if it were not a fiction of his own, was urged by him with the greatest virulence against the court party, so as to be the means of throwing out lord Danby's administration; and there is no doubt that he was the author and promoter of all the persecutions which followed on this business, as well in the inferior courts as in parliament, with a view of quashing the popish party entirely, and of excluding the duke from the succession, which were points he had most at heart, and which he pursued with an indefensible severity. Amidst many violent and very unjust proceedings, he was the author of a measure of signal national benefit, the passing of the "Habeas Corpus act;" to the protection of which he had occasion to appeal shortly after, for his own personal security. His new employment was short-lived, as he was dismissed after holding it little more than five months; and some of the practices to which he had recourse against the papists, were turned against himself. He was applied to by a man pretending to make discoveries relating to the popish plot, and the murder of sir Edmundbury Godfrey, provided that for this service he might obtain a pardon. The man was conducted to the privy council; but instead of giving the information expected, he charged the noble earl with endeavouring to suborn him. Upon this information his lordship was apprehended on the 2d of July 1681, and after an examination by his majesty in council, he was committed to the tower, where he remained four months, notwithstanding he took every legal method to obtain a trial, or to be admitted to bail, according to the principles of the habeas corpus act. At length, on the 24th of October, a bill was presented to the grand jury at the sessions house in the Old Bailey, against his lordship, for high treason. Witnesses were brought against him, but their characters were too infamous to permit their evidence to have the smallest degree of weight. Considerable stress was laid upon the draught of an association found in his study, which, however, was neither written nor signed by the noble earl; and the jury, after some consideration, threw out the bill, and he was acquitted, amidst the acclamations of the people. A medal was struck on the occasion, which was the cause of a very bitter satirical poem, from the pen of Dryden, who had before personified Shaftesbury, as the great counsellor of rebellion, in his "Absalom and Achitophel."

As soon as he was at liberty, lord Shaftesbury endeavoured to vindicate himself by law, and brought an action against a person for speaking of him as a traitor: this he thought proper to discontinue before it came to trial. For many years he had resided at Thanet-house in Aldersgate-street; but finding his health decay, his spirits declining, and the times becoming more serious, he withdrew into Holland, where he arrived in November 1682, and in the following January he died at Amsterdam in the sixty-second year of his age. His body being embalmed was transported to England, and buried with his ancestors, at Winborne St. Giles. Much has been written concerning the character of this nobleman. As a public man, he was, says Dr. Kippis, guilty of manifold inconsistencies, and submitted to shameful compliances. "There were, however," adds the same candid and excellent biographer, "three points in which, through the usual tenor of his life, the earl of Shaftesbury was entitled to applause. These were, his attention to the protection and advancement of trade and commerce; his endeavours to counteract the growing power of France; and his attachment to the cause of religious liberty. He wrote an essay on toleration, still preserved in the family, which was evidently the ground work of Mr. Locke's admirable letters on that subject. Several of the measures, proposed and supported by him, were preparatory to those that were adopted at the Revolution, and he contributed, by his ardour, to raise and animate the spirit, which, in the end, produced the event, so that amidst all his obliquities and faults, he deserves to be celebrated, as having been no small benefactor to the free constitution of England." He left in MS. a history of his own times; and some of his speeches have been published. He was thrice married, but left only one son, who succeeded him in

in his eftates and titles, and who died in November 1699, and was fucceeded by Anthony his fon and heir, of whom we are now to give an account.

Cooper, Anthony Ashley, third earl of Shaftefbury, was born Feb. 26, 1670-71, at Exeter-houfe, London, which was at that time the town-refidence of his grandfather, who undertook the fuperintendance of his education. He firft entrufted him to the care of a learned lady of the name of Birch, under whom he made fuch rapid advances in the Greek and Latin languages, as to be able to read the common authors in each before he was eleven years old. He was then placed in a private fchool, where he continued till the death of his grandfather, when he was fent to Winchefter; where, on account of the infults which he fuffered, through the hatred borne to his grandfather's memory by the friends to arbitrary power, he remained but a fhort time, and, in 1686, he commenced his travels under the care of a well qualified tutor. With him he fpent much time in France and Italy, improving himfelf in the languages and accomplifhments of thofe countries, and laying the foundation of the knowledge and tafte for which his own fubfequent writings were juftly celebrated. He returned to England in 1689, and was offered a feat in parliament, which for the prefent he declined, wifhing rather to employ all his leifure in the improvement of his mind, and in extending his knowledge on fubjects of the greateft importance. In thefe views he fucceeded, and laid a foundation in learning which was accurate, extenfive, and truly liberal. After purfuing the ftudies congenial to his temper, with much ardour and almoft unabating diligence, for nearly five years, he was elected member of parliament for Poole. In this high ftation he fhortly had an opportunity of expreffing that attachment to liberty, by which he was diftinguifhed through the whole of his life, and of conciliating the houfe to the object which he had in view. The occafion was the introduction of a bill for granting, among other things, the aid of counfel to perfons indicted for high-treafon. Lord Afhley had prepared a fpeech for the purpofe, but when the moment came, in which he was to deliver it, he was utterly unable to proceed. After a fhort paufe, he addreffed the fpeaker. "If I, fir, who only rife to give an opinion on the bill now depending, am fo confounded, that I am unable to exprefs the leaft of what I propofed to fay, what muft be the condition of that man, who, without any affiftance, is pleading for his life, and under the apprehenfion of being deprived of it?" This happy turn of thought, fo appropriate to the occafion, is fuppofed to have contributed more than any of the arguments which were urged in obtaining the juftice for which he pleaded. The neceffity of this wife and humane law has been of late years amply manifefted by the conduct of certain great law officers, who took the very moderate fpace of feven, nine, and eleven hours in opening cafes of *fuppofed* high-treafon. During the remainder of that parliament, lord Afhley was indefatigable in the promotion and fupport of every meafure in favour of liberty, without regard to the perfon by whom it was introduced, influenced unqueftionably by an attention to the public good, without feeling the paltry motives which too frequently actuate political men. At the diffolution in 1698, he refigned his pretenfions to a feat in the houfe, on account of ill health, and with a view alfo of fecuring more time for literary purfuits. He went to Holland under the affumed character of a ftudent in phyfic: here he cultivated an acquaintance with Bayle, Le Clerc, and other men of celebrity, and it was not till a fhort time before he left the country that he made his name known. Before his lordfhip's return an imperfect and furreptitious edition of his "Enquiry concerning Virtue," was publifhed in a moft unhandfome manner by Mr. John Toland, who, fays Dr. Kippis, in this tranfaction, repaid with ingratitude a very generous benefactor. His lordfhip bought up the edition, and fet about compleating the treatife, which afterwards appeared as the fecond volume of the "Characteriftics." Soon after lord Afhley's return to England, he became, by the deceafe of his father, the earl of Shaftefbury, but he did not take his feat in the houfe of peers till the beginning of the year 1700-1, when his friend, lord Somers, fent a meffenger to acquaint him that his prefence was neceffary, on account of the Partition-treaty, which, at that time, was under the confideration of parliament. During the remainder of the feffion he attended his duty as frequently as the ftate of his health permitted, zealoufly fupporting the meafures of king William, who was, at that period, negociating the grand alliance. That fovereign regarded the fupport of lord Shaftefbury fo highly, that he wifhed to appoint him fecretary of ftate. This honour his health did not allow him to accept; but he was neverthelefs affiduous in rendering to his majefty advice on every important occafion. Soon after the acceffion of queen Anne, lord Shaftefbury retired from public life, being no longer a friend to the meafures of the court. Minifters now took from him the vice-admiralty of the county of Dorfet, which had been held by his family for three fucceffive generations. He went to Holland a fecond time, where he fpent two years among the learned connections, which he had already formed in that country. About this period the French prophets having excited a confiderable difturbance, in the nation, by their enthufiaftic extravagances; fome great men recommended profecutions and punifhments as the only methods of fuppreffing them: to thefe lord Shaftefbury was decidedly inimical, thinking that fuch meafures would increafe rather than cure the malady. This was the origin of his "Letter on Enthufiafm," which he fent to lord Somers, then prefident of the council, which, being approved by that nobleman and others, was publifhed in 1708, though without the name of the author, or that of the perfon to whom it was addreffed. In the following year he publifhed his "Moralifts," a philofophical rhapfody, being a recital of certain converfations on natural and moral fubjects; and in a few months afterwards his "Senfus Communis; an Effay upon the Freedom of Wit and Humour, in a Letter to a Friend." In the fame year he married Mifs Jane Ewer, the youngeft daughter of Thomas Ewer, efq. of Lee, in Hertfordfhire. In forming this connection, it fhould feem that his lordfhip was principally influenced by the folicitations of his friends, rather than from any inclination of his own, or high expectations of the happinefs of that ftate. Letters to this effect are preferved in the Biographia Britannica. By his lady, to whom he was previoufly related, he had an only fon Anthony, afterwards earl of Shaftefbury.

In 1710 the noble lord publifhed his "Soliloquy, or Advice to an Author;" after which his health obliged him to try the effects of a warmer climate. He accordingly, in 1711, paffed through France and Piedmont, and fixed his refidence at Naples, where he died on the 4th of February, 1712-13, at the early age of forty-two. During his abode at Naples, he finifhed his "Judgment of Hercules," and the "Letter concerning Defign," which have fince been added to the "Characteriftics." It was in 1711 that the firft edition was publifhed of all the Characteriftics, in the fame order in which they now ftand: but this publication not being entirely to his lordfhip's fatisfaction, he chiefly employed his time abroad in preparing his writings for a more elegant edition, which was given to the world foon after

after his deceafe, in the year 1713. The feveral engravings, that were then firft interfperfed through the volumes, were all invented by himfelf, and defigned under his immediate infpection. The impreffion of the "Characteriftics of Men, Manners, Opinions, and Times," in 3 vols. 8vo., contains the whole of his works which he intended to fubmit to the judgment of the public. In the year 1716, fome of his private letters upon philofophical and theological fubjects were publifhed, under the title of "Several Letters written by a noble Lord to a young Man at the Univerfity;" and in 1721, another collection of the fame kind appeared, entitled, "Letters from the Right Honourable the late Earl of Shaftefbury to Robert Molefworth, efq. now Lord Vifcount of that Name; with two Letters written by the late Sir John Cropley: to which is prefixed, a large Introduction by the Editor." That editor, fays the candid biographer already referred to, was Mr. Toland, who, in the prefent, as well as in the former cafe, affumed a liberty not very agreeable to the family. In their opinion, as the correfpondence was almoft entirely of a private nature, it was on that account unfit for public view. It neverthelefs fet his lordfhip's integrity in the moft amiable point of light. Lord Shaftefbury alfo wrote a preface to a volume of Dr. Whichcote's fermons, publifhed in 1698; and in his Letters to a young Man at the Univerfity, expatiates on the merits of Burnet, Hoadly, Tillotfon, Barrow, Chillingworth, and Hammond, as the great pillars of the church againft fanaticifm. But however highly he might efteem the labours of modern divines, his principal admiration was directed to the writings of antiquity. Thefe were the conftant fubjects of his ftudy, and on thefe his philofophy was built. His favourite books were the moral works of Xenophon, Horace, the Commentaries and Enchiridion of Epictetus, as publifhed by Arrian, and Marcus Antoninus. Thefe authors he always carried with him, in his various excurfions; and they are ftill extant, filled with marginal notes, written in his own hand. It remains now to notice more particularly the writings of lord Shaftefbury, which, by one clafs of critics, have received the moft extravagant applaufe, and, by another, have been the fubjects of indifcriminate condemnation. They have been examined with a critical eye, and in rather an elaborate manner, by Dr. Kippis, to whofe article, in the Biographia Britannica, we refer the reader, contenting ourfelves with a brief outline. Lord Shaftefbury's Letter on Enthufiafm was written from excellent motives: it contains many admirable remarks, delivered in a neat and lively ftrain; but it wants precifion; conveys but little information; and contains fome exceptionable paffages. The fame character may be given, with truth and juftice, of "The Effay on the Freedom of Wit and Humour," defigned to defend the application of ridicule to fubjects of fpeculative inquiry, and among others to religious opinions. His "Soliloquy, or Advice to an Author," met with more general approbation. It contains a variety of excellent matter; and what the noble lord has advanced in recommendation of felf-examination, and in defence of critics and criticifm, is particularly valuable: it is evidently the refult of the author's knowledge and refined tafte in books, in life, and manners. Lord Shaftefbury's "Enquiry concerning Virtue" obtained more general applaufe. It is ably and finely written, and maintains with great force the important truth, that virtue is the greateft happinefs, and vice the greateft mifery of men. This work has met with much oppofition from thofe who deduce the principles of virtue from felf-love only, and refer the obligation of it folely to the will of God. In this "Enquiry," the noble author appeared in the clofe, the logical, and the didactic form. But in the "Moralifts," he affumes a higher tone, and figures in a new character. Here he prefents himfelf in the mode of dialogue, and is the emulator of Plato, in the boldeft poetic manner of that eminent philofopher. Bifhop Hurd ranks it among the beft compofitions of the kind in our language. Its matter is highly valuable and important, and prefents us with a truly argumentative and eloquent defence of the doctrines of a Deity and a Providence. The "Mifcellaneous Reflections on the preceding Treatifes, and other critical Subjects," are intended as a fort of defence and explanation of his former works: they contain a variety of juft and ingenious remarks, and much fine writing; but they are written in a defultory manner, abounding with many exceptionable paffages concerning revelation. With refpect to the ftyle of lord Shaftefbury, we may quote the opinion of Dr. Blair, which is at once accurate and judicious. "His language has many beauties; it is firm and fupported in an uncommon degree; it is rich and mufical. No Englifh author has attended fo much to the regular conftruction of his fentences, both with refpect to propriety, and with refpect to cadence. All this gives fo much elegance and pomp to his language, that there is no wonder it fhould fometimes be highly admired. It is greatly hurt, however, by perpetual ftiffnefs and affectation. This is its capital fault. His lordfhip can exprefs nothing with fimplicity. He feems to have confidered it as vulgar, and beneath the dignity of a man of quality, to fpeak like other men. Hence he is ever in bufkins; full of circumlocutions and artificial elegance. In every fentence we fee the marks of labour and art; nothing of that eafe which expreffes a fentiment coming natural and warm from the heart. Of figures and ornaments of every kind he is exceedingly fond; fometimes happy in them; but his fondnefs for them is too vifible, and having once laid hold of fome metaphor or allufion that pleafed, he knows not how to part with it. What is moft wonderful, he was a profeffed admirer of fimplicity; is always extolling it in the ancients, and cenfuring the moderns for want of it, though he departs from it himfelf as far as any one modern whatever. Lord Shaftefbury poffeffed delicacy and refinement of tafte to a degree that we may call exceffive and fickly; but he had little warmth of paffion; few ftrong or vigorous feelings; and the coldnefs of his character led him to that artificial and ftately manner which appears in his writings. He is fonder of nothing than of wit and raillery; but he is far from being happy in it. He attempts it often, but always awkwardly: he is ftiff even in his pleafantry, and laughs in form like an author, and not like a man." To this Dr. Kippis adds: "On the reperufal of the Characteriftics, we have been clearly convinced, that the noble author was always excellent in the difpofition of his words, but that in the choice of them he is frequently liable to cenfure." Lord Shaftefbury, in all his works, fhews himfelf a zealous advocate for liberty, the fteady friend of virtue, and a true believer in natural religion. He fometimes profeffed himfelf a Chriftian; but his writings, in many parts, render his faith in the divine miffion of Chrift very queftionable. The noble lord left one fon, Anthony Afhley Cooper, the fourth earl, of whom the learned Mr. Huntingford fays, "there never exifted a man of more benevolence, moral worth, and true piety." To this high character Dr. Kippis gives his own teftimony, having had the honour of enjoying his acquaintance and correfpondence. He was the author of the life of his father, in the great General Dictionary. It may not be improper to add in this place, that the tranflator of Xenophon's Cyropedia was the honourable Maurice Afhley Cooper, brother to the third earl.

COOPER, JOHN GILBERT, born in 1723, was of an ancient

cient family in Nottinghamſhire. He received the early part of his education at Weſtminſter ſchool, and finiſhed his ſtudies in Trinity College, Cambridge. As an author, his firſt work was on the " Power of Harmony," formed on the model of the " Pleaſures of the Imagination." In 1749 he publiſhed " The Life of Socrates, collected from the Memorabilia of Xenophon, and the Dialogues of Plato," &c. Learned notes were added by the Rev. J. Jackſon of Leiceſter. This work was well received, though at preſent it is in no great eſtimation. In 1754 he gave to the world " Letters on Taſte," which were written in an elegant ſtyle, for which, and for the vivacity in the deſcription, they were more admired than for accuracy and depth of thought. Cooper wrote ſome papers in " The World :" his other works are all poetical, of which the principal are, " The Tomb of Shakeſpeare, a Viſion ;" " Epiſtles to the Great, from Ariſtippus in Retirement ;" " The Call of Ariſtippus, an Epiſtle to Dr. Akenſide ;" and " A Tranſlation of Greſſet's Ver Vert." Mr. Cooper was not deſtitute of fancy, but his fancy was not always under proper regulation, and he ſometimes failed in the preciſion of his ideas. He excelled in the light, eaſy, and epiſtolary ſtrain. His ſentiments have conſiderable ſameneſs, being derived from the Shafteſburian ſchool of philoſophy, of which he was a diſciple. He was an active member of the Society for the Encouragement of Arts, Manufactures, &c. ; a diligent and uſeful magiſtrate. He died in 1769, of a fit of the ſtone.

Cooper, on board a *Ship,* the perſon that looks to the caſks and all other veſſels, for beer, water, or any other liquors. He has a mate under him.

Cooper, in *Geography,* one of the Bermudas iſlands.

Cooper, a large and navigable river of America, which mingles its waters with Aſhley river, below Charleſton city, in South Carolina. Theſe form a ſpacious and convenient harbour, which communicates with the ocean, juſt below Sullivan's iſland, leaving it on the N. 7 miles S.E. of the city. Cooper river is a mile wide at the ferry, 9 miles above Charleſton.

Cooper's-*Bridge,* over the Calder river, on the road between Huddersfield and Leeds in Yorkſhire, is the place at which ſir John Ramſden's canal connects with the Calder and Hibble navigation, which now has become a place of conſiderable traffic, in conſequence of the junction of the Huddersfield canal with the other end of ſir John Ramſden's canal. See Canal.

Cooper's *Iſland,* one of the Virgin iſlands in the Weſt Indies, S. W. of Ginger iſland, uninhabited; about five miles long, and from one to two broad. N. lat. 18° 7′. W. long. 63° 5′.

Cooper's, or de Kuiper *iſland,* lies on the north coaſt of the iſland of Java, near Batavia ; about 1600 feet from the iſland of Onruſt, and about one-third leſs in ſize. The Dutch company have ſeveral warehouſes in this iſland, in which they chiefly lay up coffee. At its ſouth ſide there are two pier-heads, where veſſels may load and diſcharge. Over the iſland are interſperſed ſeveral large tamarind trees, which afford an agreeable ſhade. The workmen that are employed here in the day-time, are fetched over at night to Onruſt, and two are left, as a watch, together with a number of dogs, ſo remarkably fierce, that no one dares to ſet his foot on the iſland at night.

Cooper's *Iſland,* an iſland in the Southern Pacific ocean, near the E. coaſt of the iſle of Georgia. It is a rock of conſiderable height, about five miles in circuit, and one mile from the main. At this iſle the main coaſt takes a S.W. direction for the ſpace of four or five leagues to a point, called by Cook " Cape Diſappointment." Off that are three ſmall iſles, the ſouthernmoſt of which is green, low, and flat, and lies one league from the cape. S. lat. 54° 57′. W. long. 36° 4′.

Cooper's *Town,* a poſt town, and townſhip of America, in the ſtate of New York and county of Otſego. It is the compact part of the townſhip of Otſego, and the chief town of the country round lake Otſego. It is pleaſantly ſituated at the S.W. end of the lake, on its banks, and thoſe of its outlet; 12 miles N.W. of Cherry valley, and 73 W. of Albany. It has a court-houſe, gaol, and academy. In 1789 it had only three houſes; in 1791 it contained 292 inhabitants ; and in 1795, 50 houſes had been erected on an improved plan, regularly laid out in ſquares. N. lat. 42° 44′. W. long. 74° 48′.

Cooper's *Town,* a town of Pennſylvania, ſituated on the Suſquehannah river. In 1785 this was a wilderneſs; but in nine years after, it contained 1800 inhabitants, a large and handſome church, a market-houſe, a library of 1200 volumes, and an academy of 64 ſcholars. Four hundred and ſeventy pipes were laid under ground for the purpoſe of bringing water from Weſt mountain, and conducting it to every houſe in the town.

CO-OPERATE, to, in a *Military Senſe,* is to carry a well-directed plan into execution in ſuch a manner, that the troops or forces, how much ſoever divided, may act at one time, on one principle, and towards one end.

CO-OPERATOR, derived from *con,* and *opera,* labour, denotes any cauſe, natural or ſupernatural, which concurs with another to the production of an effect. Thus, nature and medicine co-operate in the cure of diſorders ; and the will of man concurs with the grace of God in the performance of good works.

CO-OPERRIE Pallio. See Pallio.

COOPERS, *Company of.* See Company. Coopers are enjoined to make their veſſels of ſeaſonable wood, and to mark them with their own marks, on pain of forfeiting 3*s.* 4*d.* ; and the contents of veſſels are to be obſerved under a like penalty, ſo that the beer barrel ſhall contain 36 gallons, a kilderkin 18, a firkin 9, &c. The wardens of the Coopers' company in London, with an officer of the mayor, are to ſearch all veſſels for ale, beer, and ſoap to be ſold there, and to mark thoſe that are right ; and they may burn the others : and if any cooper diminiſh a veſſel by taking out the head, or any one of its ſtaves, it ſhall be burnt, and the offender forfeit 3*s.* 4*d.* Stat. 23 Hen. VIII. c. 4.

CO-OPERTURA, in *Antiquity,* a thicket or covert of wood. Chart. de Foreſt. cap. 12.

CO-OPTATION, derived from *co-opto,* I chooſe, ſignifies the admiſſion of members into any college or ſociety. Thus it was anciently applied to the choice of the augurs and pontiffs ; and in modern times, to an extraordinary nomination and election of perſons of diſtinguiſhed merit into a learned ſociety.

CO-ORDINATE, ſomething of equal order, rank, or degree, with another.

CO-ORDINATION, in reſpect of cauſes, denotes an order of cauſes, wherein ſeveral of the ſame kind, order, and tendency, concur to the production of the ſame effect.

COORNHAERT, or Cuernhert, in *Biography.* See Theodore Dirk.

COOROORAA, in *Geography,* one of the Pelew iſles, the capital of which is called Pelew; which ſee.

COOS, in *Ancient Geography,* an iſland of the Ægean or Icarian ſea, near Cnidus (now called *Zia*); in which was a city of the ſame name, from which Hippocrates, the cele-

 brated

brated phyfician, and Apelles, the famous painter, were called *Coi*. Here was a large temple of Æfculapius, and another of Juno. It abounded in rich wines, and here were made thofe " *Coæ veftes*," which were tranfparent, and are fo often mentioned by the ancient poets.

Coos, or Cohos, in *Geography*, a country of America, called *Upper* and *Lower Coos*, which lies on the Connecticut river, between 20 and 40 miles above Dartmouth college. Upper Coos is the country S. of Upper Amonoofuck river on John and Ifrael rivers. Lower Coos lies below the town of Haverhill, S. of the lower Amonoofuck. The diftance from Upper Coos to the tide in Kennebeck river was meafured in 1793, and found to be but 90 miles.

Coos-*Bayhar*. See Cooch-*Bahar*.

COOSA, or Coosa-Hatcha, a river which rifes in the high lands of the Cherokees' country, and joining Tallapoofe, forms Alabama river. Its courfe is generally S. through the country of the Natchez, and other tribes of the Upper Creeks. It is rapid, and full of rocks and fhoals, fo that it is hardly navigable by canoes.

COOSADES, an Indian town on Alabama river, in America, about 60 miles above its mouth, on Mobile river; below M'Gillivray's town, and oppofite the mouth of the Oakfufkee.

COOSA-HATCHEE, or Coosaw, a river of America, in S. Carolina, which rifes in Orangeburg diftrict, and after running in a S.S.W. courfe, difcharges itfelf into Broad river and Whale branch, which feparate Beaufort ifland from the main land.

COOSAWATCHIE, or Coosahatchie, a poft town of America, in the ftate of S. Carolina, and diftrict of Beaufort, fituated on the S.W. fide of Coofa river, over which a bridge has been erected. The place is flourifhing, having about 40 houfes, a court-houfe, and a gaol. The courts formerly held at Beaufort are held here. It is 33 miles diftant from Beaufort, and 77 W.S.W. from Charlefton.

COOSCOOSOO, a common food among the Moors of Africa, confifting of a pafte made of flour in the form of fmall grains in the manner of Italian paftes. This is dreffed by the vapour of broth in a round difh, with holes like a cullender, and that is fixed in the kettle in which they boil their meat. The coofcoofoo, contained in the deep plate or cullender, is flowly foftened, and prepared by the vapour of the broth, with which they take care to moiften it occafionally. This is a nourifhing and agreeable food, and eaten by the common people either with milk or with butter, but fuperior perfons have it dreffed by a rich broth made with mutton, poultry, and pigeons or hedge-hogs, and mix it afterwards with frefh butter.

COOSY, Cosa, or Koss, a river of Afia, which rifes in the mountains of Thibet, takes its courfe through Purneah, and runs into the Ganges, 20 miles E. of Boglipour in the country of Bahar.

COOT, in *Ornithology*. See Fulica *atra*.

COOTE, *Sir* Charles, in *Biography*, a diftinguifhed military officer in the 17th century, was the eldeft fon of fir Charles Coote, who was created baronet in April 1621. He was a gentleman of great confideration in Ireland. Upon the breaking out of the rebellion, in 1641, he had a commiffion for a regiment of foot, and was made governor of Dublin. From this period, to the year 1652, he was engaged in a great number of important fervices for his country. In almoft all the contefts of which he took a part he was fuccefsful. After Ireland was reduced to the obedience of the parliament, fir Charles was one of the court of juftice in the province of Connaught, of which he was made prefident by act of parliament. Being in England at the time of the depofing of Richard Cromwell, he went poft to Ireland, to carry the news to his brother Henry Cromwell, and to concert with him what to do in order to maintain themfelves in their pofts. When, however, he perceived that king Charles the Second's intereft was likely to prevail, he endeavoured to infinuate himfelf into his favour. For this purpofe he fent to the king fir Arthur Forbes, " to affure his majefty of fir Charles's affection and duty, and that if his majefty would vouchfafe to come to Ireland, he was confident the whole kingdom would declare for him; that though the prefent power in England had removed all the fober men from the government of the ftate in Ireland, under the character of prefbyterians; and had put Ludlow, Corbet, and others of the king's judges in their places, yet they were generally fo odious to the army as well as to the people, that they could feize on their perfons, and the caftle of Dublin when they fhould judge it convenient." The king did not think it prudent to accept the invitation. In a fhort time after fir Charles Coote, and fome others, fo influenced the whole council of officers, that they prevailed upon them to vote not to receive colonel Ludlow as commander in chief; they, moreover, made themfelves mafters of Athlone, Drogheda, Limerick, Dublin, and other important places for the fervice of the king. He immediately caufed colonel Monk to be made acquainted with the progrefs of the king's intereft in Ireland, who urged them by every means not to reftore the fufpended commiffioners to the exercife of their authority. Soon after, fir Charles Coote and others fent to the parliament a charge of high treafon, againft colonel Ludlow, Corbet, Jones, and Thomlinfon. He likewife made himfelf matter of Dublin-caftle; and apprehended John Coke, chief juftice of Ireland, who had been folicitor-general at the trial of king Charles I. Notwithftanding this, parliament thought themfelves fo fure of him in their intereft, that he received their vote of thanks on the 5th of Jan. 1659—60. On the 19th of the fame month he was appointed one of the commiffioners for the management of the affairs of Ireland. Before thofe commiffioners declared for king Charles, they infifted upon certain things relating to their intereft as members of that nation. On the 6th of September 1660, fir Charles Coote, on account of his many and very valuable fervices for the royal caufe, was created baron and vifcount Coote, and earl of Montrath in the queen's county. He was alfo appointed one of the lords juftices of Ireland, but he did not long enjoy thefe marks of his fovereign's favour, for he died in December 1661, and was fucceeded in his eftate and titles by his fon Charles, the fecond earl. Dr. Leland afferts that Coote and his father had engaged in the parliamentary fervice not from principle, but intereft. Dr. Kippis, however, doubts the affertion upon the ground that the Cootes were zealous prefbyterians, and therefore he thinks it highly probable that they were influenced, at leaft in part, by their real fentiments, civil and religious, and efpecially by their averfion from popery.—Biog. Britan.

COOTE-HILL, in *Geography*, a market and poft town of the county of Cavan, Ireland, near the borders of Monaghan. It was much neglected by the late proprietor, but the prefent one is improving its appearance by public buildings, fuch as a market-houfe and fhambles; and by obliging tenants to build on a plan adopted by him. It contains fix houfes of worfhip, befides the parifh-church. In the fale of its markets it is the moft confiderable town in the county. The fale of linen alone averages 4000*l.* weekly, principally of fheetings, in which branch no market in Ireland

land can vie with it. It is fifty-three Irish miles N.W. from Dublin, and ten miles N.E. from Cavan. Coote's survey of Cavan, &c.

COOTS-TOWN, a town of America; in the state of Pennsylvania and county of Berks, is situated on a branch of Sauhoca creek, which is itself a branch of the Schuylkill river. It contains forty houses, and a German Lutheran and Calvinist church. It is distant seventeen miles N.N.E. from Reading, and seventy-three N.W. by N. from Philadelphia.

COOTWYCK, or KOOTWYCX, JURIAN, in *Biography*, a goldsmith, born at Amsterdam in 1714, who applied himself after the example of his countryman Ploos Van Amstel, to the imitation of drawings by means of etching and aquatinta Amongst his works, are several prints from the designs of Backhuysen, Berghem, and other Dutch and Flemish masters; and likewise some, which it is supposed he executed from sketches of his own. One of his prints in imitation of black and white chalk, representing an old woman sitting in a chair, with a paper in her hand, is dated 1748. Heinecken.

COP, WILLIAM, born at Bale in Switzerland, took his degree of doctor in medicine at Paris, in the year 1495, and soon became so distinguished by his superior knowledge and abilities, that Ramus, no incompetent judge, called him, "Unica nobilium medicorum gloria." He was physician to Lewis the twelfth, and to Francis the first, and ancient to the Faculty of Medicine at Paris. He translated the work of Paulus of Ægina, de Ratione Victus, which was published at Paris in the year 1510, in 4to.; and the following year at Strasburg; also, Galen's six books, de Locis Affectis, et de Morborum Causis et Differentiis, and the Prognostics of Hippocrates. He died in 1531. His son Nicholas succeeded him as regent of the University of Paris, but giving into the errors, his biographer says, of Calvinism, he was obliged to leave Paris, and to pass the latter part of his life at Bale. Haller Bib. Med. Eloy. Dict. Hist.

COPÆ, in *Ancient Geography*, town of Greece, in Bœotia, situated on the north banks of the lake Copais, to which it gave name. It is mentioned by Strabo, Ptolemy, and Pliny; the latter of whom says, that cars were invented in this place. It had temples of Ceres, Bacchus, and Serapis.

COPAIBA BALSAM, in the *Materia Medica*. See BALSAM.

COPAIFERA, in *Botany*, (from Copaiva, the Indian name, and *fero*, to bear.) Linn. Gen. 542. Schreb. 757. Willd. 880. Juss. 365. Vent. 3. 430. Copaiba; Marg. Pis. Ray. Copaiva; Jacq. Copaier; Encyc. Class and order, *decandria monogynia*. Nat. Ord. Undetermined by Linnæus. *Leguminosæ*; Jussieu, with a doubt whether it be not more nearly allied to his next order, *Terebintaceæ*.

Gen. Ch. *Cal.* none. *Cor.* Petals four, oblong, acute, concave, widely spreading. (Calyx with four divisions. Corolla none; or petals numerous, caducous? Juss.) *Stam.* Filaments ten, filiform, incurved, a little longer than the corolla; anthers oblong, incumbent. *Pist.* Germ superior, rounded, compressed-flattish, pedicelled; style filiform, curved, the length of the stamens: stigma obtuse. *Peric.* Legume egg-shaped, pointed with part of the style, two-valved. *Seed* single, egg-shaped, involved in a berried aril; (Inclosed in a pulpy envelope; Lam.)

Eff. Ch. Calyx none. Petals four. Legume egg-shaped. Seed single, in a berried aril.

Sp. C. *officinalis*. Balsam of capevi tree. Linn. Sp. Pl. Jacq. Amer. 133. tab. 86. Pict. 67. 123. Lam. Ill. 342. Woodv. Med. Bot. tab. 137. A lofty tree with a handsome head; the smaller branches zig-zag, with a nearly smooth, brownish ash-coloured bark. *Leaves* alternate, winged, about four inches long; leaflets six or eight, petioled, lanceolate-egg-shaped, quite entire, ending in a blunt point narrower on one side than on the other, shining, somewhat coriaceous, not exactly opposite, one of the uppermost frequently wanting. *Flowers* white, on short peduncles; in solitary axillary panicles at the summit of the branches, which consist of about eight alternate, spreading racemes. A native of Brazil, Guiana, and New Spain, frequent about Tolu, sixty leagues from Carthagena, growing promiscuously among the trees which yield balsam of Tolu, Peru, &c. By a deep incision through the bark into the wood of the tree, a fluid balsam or resin is obtained, which gradually thickens when exposed to the air. For its chemical and medical properties, see the article *Copaiba* BALSAM.

COPAIS, in *Ancient Geography*, a lake of Bœotia; Strabo says that it had different names from the towns that were situated near it; thus it was called Copais, from Copæ; Haliartos, from Haliarte. It is also called Leuconis by Steph. Byz.; and Cephissis by Pausanias. Its present name is "Lagordi Topoglia." This lake was 380 stadia, or 14½ leagues in circumference, and served as a common receptacle for the rivers which issued from the mountains by which Bœotia was surrounded. As this lake had no apparent outlet, it must have overflown the country, if nature, or rather the industry of man, had not contrived secret passages for draining off the water. In the part adjoining to the sea, the lake terminates in three bays, which advance to the foot of mount Ptous, situated between the sea and the lake. From the bottom of each of these bays, diverge a number of canals, that traverse the mountain through its whole breadth, some of which are thirty stadia, or more than a league in length, and others of a much greater extent. To excavate or cleanse them, wells had been sunk at stated distances on the mountain, which are of a very great depth. The formation of these wells must be traced to the most remote antiquity, as no traditional or historical account of their origin exists. It requires great labour and expence to maintain them; and as most of them have been choaked up, the lake has proportionally gained on the plain.

It is not improbable that the deluge, or rather the inundation which happened in Bœotia, in the time of Ogyges, was caused merely by the obstruction of the water in these subterraneous conduits.

COPAL. This valuable and singular kind of resin is imported partly from South America, and partly from the East Indies, and like most of the other resins, is a natural exsudation from a large tree, which hardens in the air.

The best copal is a hard brittle resin, in rounded lumps of moderate size, easily reducible to fine powder, beautifully transparent, but often, like amber, containing parts of insects and other small extraneous bodies impacted in its substance.

The colour of copal is a light lemon yellow, varying to orange; but when dissolved and thinly spread over any surface, the colour is scarcely perceptible, and it only gives a fine hard, smooth, transparent glazing. It is this union of hardness and transparency, with want of colour, that renders copal so valuable as a varnish.

Copal unquestionably belongs to the class of resins, but it differs from most of these substances in the great difficulty with which it dissolves in alcohol and essential oils, so as to require great purity of these menstrua and particular management.

The three menstrua usually employed in varnishing, are alcohol, oil of turpentine, or any other essential oil, and drying

drying linfeed, or other fixed oil. Thefe are ufed fometimes feparately with the varnifh refins, but generally mixed.

We fhall give fome of the proceffes by which copal may be diffolved in each of thefe fubftances.

Alcohol fingly, which fo readily diffolves the other refins, has but little action on copal; for if this refin in fine powder be digefted with the very pureft alcohol, with or without heat, fcarcely any of it is diffolved, and the copal coalefces at the bottom of the veffel into a tough cohefive mafs. But a folution may be effected by the addition of *camphor*, the action of which, upon the refins, has been partly defcribed under that article. With none is it more ftriking than with copal. When the two are feparately powdered and mixed, the copal abforbs the camphor, fwells and foftens into a pafty mafs, which will remain for months of the fame confiftence, without hardening. To make an alcoholic folution of copal, diffolve half an ounce of camphor in a pint of highly rectified alcohol; put it in a glafs veffel over a lamp, and add four ounces of copal in fmall pieces, and continue the heat juft to that degree at which the bubbles may be counted, till the folution is compleat. Part of the copal feparates when cold, but moft of it remains in permanent folution.

It is neceffary firft to diffolve the camphor in the alcohol; for, if the pafty mafs arifing from the mixture of copal and camphor be added to alcohol, the folution will not go on.

A mixture of maftich, elemi, and other refins, will bear a moderate quantity of copal, without being rendered infoluble in alcohol, even without the affiftance of camphor.

To diffolve copal in the effential oils, Mr. Sheldrake has given the following procefs in the Tranfactions of the Society of Arts.

Reduce two ounces of copal to *coarfe* powder; put it into a glafs veffel, and pour thereon a pint of the *very beft* oil of turpentine, with one eighth of fpirit of fal ammoniac, previoufly well fhaken. Cork the glafs, leaving a pin-hole through the cork to allow of the efcape of vapour, and fpeedily heat it to that point at which the bubbles may be counted. Continue this till the folution is complete, taking care not to increafe the heat, otherwife the copal will coalefce at the bottom of the glafs, and the folution will not go on. The veffel fhould not be opened till quite cold. This liquor is of a rich deep yellow when in quantity, but when applied as a varnifh, it is nearly colourlefs. The fpirit of fal ammoniac is not a neceffary ingredient.

Mr. Tingry of Geneva (Painter's and Varnifher's Guide, 1804,) finds that copal may be united to oil of turpentine by the intermede of fome other of the effential oils, particularly oil of fpike and lavender. He gives the following procefs: Take two ounces of oil of lavender, heat it in a glafs matrafs, add thereto an ounce of copal grofsly powdered, and, at different times, ftirring the mixture with a ftick of white wood. When the copal is diffolved, add fix ounces of oil of turpentine, nearly boiling, and ftir the whole thoroughly. This gives a fine gold-coloured liquid, very fit for varnifhing.

Camphor alfo highly affifts the folution of copal, in oil of turpentine, as it does in alcohol, and the fame precaution is neceffary, of diffolving the camphor completely in the oil, before the copal is added. Half an ounce of camphor is fufficient to a quart of the oil, to enable it to take up as much copal as will make a good varnifh.

To unite any of the refins with drying linfeed oil in the compofition of the oil varnifhes, it is neceffary to expofe them to a much greater heat than in the former inftances, that is, not lefs than is fufficient to liquefy the refins. This, however, always gives the refin a certain degree of brown colour, which is often injurious to it when ufed as a varnifh. Copal when melted with as little heat as poffible, and then dropped into drying linfeed oil, diffolves therein with eafe, and this folution mixed with clear turpentine, forms a very fine hard varnifh. To avoid as much as poffible the difcolouration of the copal, Mr. Tingry inclofes it in a kind of wire-cage fufpended in a very flow well-regulated furnace; and, as foon as any portion melts, it falls in drops into the drying oil heated and fet beneath it.

When melted copal is dropped into water, a fmall quantity of oil is feparated, and floats at top, and the refin at the bottom is thereby rendered fomewhat more foluble in the different menftrua.

Copal is liable to be confounded with gum anime, when the latter is very clear and good. The diftinction is of fome confequence, as the anime, though valuable in varnifhing, is much lefs fo than the fineft copal, the varnifh with the former being darker coloured, and not fo hard. Befides the external appearance of each, which is pretty diftinct to a practifed eye, the folubility in alcohol furnifhes an ufeful teft, the anime being readily foluble in this fluid, but the copal fcarcely fo.

COPALLI, in *Botany*, Hernand. See Rhus *copallinum*.

COPAR, in *Ancient Geography*, a village of Arabia Felix, according to Ptolemy.—Alfo, a place of Paleftine, in the vicinity of Cæfarea Philippi.

COPARCENARY, the fhare, or quota, of a coparcener.

COPARCENERS, from *con*, and *particens*, *partner*; or parceners; fuch as have equal portions in the inheritance of their anceftor.

Coparceners are fo either by *law*, or *cuftom*. Coparceners *by common law*, are the iffue female; which, in default of a male heir, come equally to the lands of their anceftor: thus, when a perfon feifed in fee-fimple or in fee-tail dies, and his next heirs are two or more females, his daughters, fifters, aunts, coufins, or their reprefentatives; in this cafe they fhall all inherit, and thefe co-heirs are then called coparceners or parceners.

Coparceners *by cuftom*, are thofe who, by fome peculiar cuftom of the country, challenge equal parts in fuch lands; as in Kent, by the cuftom of gavelkind, according to which lands defcend to all the males in equal degree, as fons, brothers, uncles, &c. In either of thefe cafes, all the parceners put together make but one heir, and have but one eftate among them. Co. Litt. § 241, 242, 265; and 163. The crown of England is not fubject to coparcenary.

COPARTNERSHIP. See Partnership.

COPAS, in *Ancient Geography*, a river of Afia Minor, in Caria.

COPATZ, in *Geography*, a town in the ifland of Cherfo; 8 miles N. of Cherfo.

COPE, an ecclefiaftical ornament, ufually worn by chantors and fub-chantors, when they officiate in the church-folemnity. It is alfo worn by the Romifh bifhops, and other ordinaries: it reaches from the fhoulders to the feet. The ancients called it *pluviale*.

In the trial of archbifhop Laud, one of the charges alleged againft him was his introducing the ufe of copes and church mufic into divine worfhip. To this charge he re-

plied, that the ufe of copes is prefcribed by the 24th canon of 1603, which fays, "that in all cathedrals and collegiate churches, the communion fhall be adminiftered on principal feaft-days, fometimes by the bifhop, if prefent, fometimes by the dean, and fometimes by the canon or prebendary, the principal minifter ufing a decent cope;" fo that in this refpect he had made no innovation.

To this defence it was replied, that neither the common-prayer book, nor book of ordination, nor homilies confirmed by parliament, nor queen Elizabeth's injunctions in her firft year, make any mention of copes, though they are evidently derived from the popifh wardrobe; and the laft common-prayer book of king Edward VI. exprefsly prohibits them. The 24th canon of 1603 enjoins only the chief minifter to wear a cope at the adminiftration of the facrament, whereas the archbifhop prefcribed them to be worn by others befides the chief minifter, and as well when the facrament was not adminiftered as when it was. But thefe canons not being confirmed in parliament, expired with king James, and therefore could be no warrant for their prefent ufe.

Cope, in *Biography*, a Flemifh fculptor of the 16th century, who refided at Rome, and is celebrated by Baglione for the beautiful baffo-relievos which he modelled, in a fmall fize, from the Fables of Ovid; and which were afterwards caft in gold and filver, for the purpofe of ornamenting the magnificent furniture of thofe times. The above-mentioned author informs us, that impreffions from thefe beautiful models were generally difperfed and much admired at Rome. From Baglione's defcription of thefe works, we might be led to conjecture, that many of thofe fmall baffo-relievos in bronze, which are ufually attributed to Benvento Cellini, are no other than cafts from thefe models of Cope. He is faid to have fucceeded in fome fmall productions in ivory; and, ultimately, to have attempted a ftatue of a larger fize in marble, which, however, after a long and fruitlefs labour, he left unfinifhed. He was not lefs remarkable for his talents, than for his morofe and unfocial difpofition, and he died miferably at about the age of 80, in the pontificate of Paul V. Baglione.

Cope, *St. Martin's*, was a relic formerly in great efteem among the French kings; and was often carried with them to war as their ftandard.

Cope, among *Miners*, is a cuftom or tribute due to the king, or lord of the foil, out of the lead mines in fome part of Derbyfhire. This duty amounted, according to Manlove, to fixpence a load, nine difhes making one load.

COPEC, in *Commerce*, a Mufcovite coin, valued at about a half-penny; fo that 100 copecs are equal to a ruble, which is valued at an average at 4*s*.

COPE-STAKE, a German coin, valued at 12*d*. fterling.

COPENHAGEN (in Latin *Hafnia*, in Danifh *Kiobenhavn*, originally *Kiobmandfhavn*, the *Merchants' harbour*), in *Geography*, is the capital of the kingdom of Denmark, fituated on the eaftern fhore of the ifland of Zealand, in a bay of the Baltic fea, about 24 Englifh miles from the Sound. E. long. 12° 35′ 15″. N. lat. 55° 41′ 4″, 160 miles N.E. of Hamburgh, and 240 S.W. of Stockholm. Its circumference is from 4 to 5 Englifh miles.

In the 11th century Copenhagen was only a mean fifhing place. It owed its increafe to a caftle, which protected its inhabitants againft the numerous pirates who infefted the Baltic fea. Leyre, or Lethra, of which fome remains have been found near Rofchild, had been the refidence of the Danifh kings till the year 950, when that diftinction was beftowed on Rofchild itfelf, from whence the feat of empire was transferred to Copenhagen, in 1443, during the reign of Chriftopher of Bavaria. From that time the kings of Denmark have conftantly refided at Copenhagen.

This city was always well fortified by nature and art, but the ftrong citadel of Frederickfhavn, between the harbour and the eaft gate, was only erected in 1663, previous to which time Copenhagen had often been attacked. In the year 1523 it was befieged by Frederick, duke of Gottorp, fupported by a fleet from Lubeck, confifting of ten fhips of war. Preffed by famine, and cut off from all hopes of relief, the citizens furrendered, after a clofe fiege of feven months. Thirteen years after, when, on the death of Frederick, the inhabitants attempted to replace their old and favourite king Chriftian II. on the throne, Copenhagen underwent the fame fate.

In 1658, Charles Guftavus, king of Sweden, having led his army over the ice, overran Denmark, and in the month of Auguft appeared before Copenhagen, whilft his fleet blockaded the harbour. Bombs and red-hot balls were thrown into the city, but the fire was immediately extinguifhed by the activity of the inhabitants. However, in the month of October of the fame year the Dutch fleet, under the command of admiral Opdam, came to the affiftance of the befieged, defeated the Swedifh fleet, and threw a large fupply of provifions into the town. Charles Guftavus at length ventured a general affault in the night between the 11th and 12th of February 1659, when the ditches about the ramparts were thickly frozen. The chief attack was directed againft the weftern rampart which the citizens and ftudents defended with fuch obftinacy, that the Swedifh monarch, giving up all hopes of taking the city, retired, and the year following concluded a peace. As a reward for their bravery, the citizens and ftudents obtained privileges which they enjoy at this day.

During the reign of Frederick IV. in the year 1700, Copenhagen was again befieged on the land fide by a Swedifh army under the command of the renowned Charles XII. and on the fea fide by the combined fleets of Holland, England, and Sweden. The Danifh king was in Holftein, but the queen dowager, Charlotte Amelia, having animated the citizens and ftudents to a brave refiftance, neither the numerous Swedifh army, nor the combined fleets, could make any impreffion on the town. The peace of Travendahl put an end to the fiege, and Copenhagen enjoyed a complete century of uninterrupted peace.

On the 2d of April, 1801, the Englifh vice-admiral, Nelfon, with 11 fhips of the line, 7 frigates, and 19 fmall veffels, attacked the line of defence before the port of Copenhagen, and, after a moft obftinate engagement of three hours and a half, unfurled the white flag, took poffeffion of 11 Danifh fhips, and, by an equally well-timed and fkilful negociation, detached Denmark from the maritime league into which fhe had entered with Ruffia and Sweden againft England. The harmony between the two countries was reftored, but continued only until the month of Auguft 1807, when a ftrong Englifh fleet encircled the ifland of Zealand, having previoufly difembarked an army of nearly 20,000 men, under the command of lord Cathcart, which invefted Copenhagen by land. After a vigorous bombardment of five days and nights, during which Copenhagen made a defence worthy of the acknowledged bravery of the Danes, and the citizens and ftudents difplayed the moft undaunted courage, a capitulation was agreed upon on the 7th of September, by which the Englifh troops were allowed to take poffeffion of the citadel for fix weeks, and the whole Danifh navy, confifting of 18 fail of the line, 15 frigates, 6 floops,

and

and 25 gun-boats, together with all the ftores of the naval arfenal of Chriftianfholm, were furrendered to the difpofal of the king of Great Britain.

On this occafion Copenhagen fuffered feverely. In the night of the 4th of September the grand fteeple of St. Mary's, or our lady's church, which was 380 feet high, and ftood on the higheft fpot in the city, was fet on fire, and after having blazed for four hours, fell with a moft tremendous crafh. From fix to feven hundred buildings, befides thofe of the univerfity and one hofpital, were burnt to the ground; thoufands were damaged, and no more than four hundred houfes efcaped unhurt. Several valuable libraries fell a prey to the flames, and five or fix hundred peaceable inhabitants were killed or maimed.

Anciently, Copenhagen had often been vifited by the plague. The laft which raged, in 1711, fwept away great numbers of the inhabitants. In more recent times, Copenhagen has been frequently expofed to terrible conflagrations. On the evening of the 20th of October 1728, a fire broke out in a low houfe, not far from the weft-gate, which fpread with fuch fury, that in eight-and-forty hours the moft elegant part of the city was laid in afhes; 1650 dwelling houfes, four churches, the univerfity buildings, and feveral other public edifices were burnt down to the ground. On the 26th of February 1794, the church of St. Nicholas, and the royal palace of Chriftianfburg, the gorgeous magnificence of which is fufficiently attefted by its ftupendous remains, were deftroyed by fire, and hardly had the private houfes, which fuffered in this dreadful calamity, been rebuilt, when another confiderable part of the city was reduced to afhes in 1795.

Thefe conflagrations contributed, however, to render Copenhagen one of the fineft cities in the north. The houfes, though moftly of brick ftuccoed, exhibit a beautiful and uniform appearance, the ftreets are furnifhed with lamps; well paved, with a foot way on each fide, and running in a ftraight line; but fome of the ftreets are rather too narrow.

Copenhagen is divided into the Old and New Town and Chriftianfhafen. The *Kongens nye Torge*, or king's New Market, which connects the Old with the New Town, is a fpacious, irregular area, embellifhed with an equeftrian ftatue in bronze of Chriftian V., and adorned with feveral handfome buildings, among which are the palace of Charlottenburg, devoted in part to the Royal Academy of painting, architecture, and fculpture; and the theatre, which, though fmall, is neat and elegantly decorated within. In the New Town is a beautiful octagon, containing four uniform and elegant buildings, in two of which the royal family refided ever fince the palace was burnt down. In the middle of the octagon ftands an equeftrian ftatue of Frederick V. in bronze.

Chriftianfhafen is built on the ifland of Amack, and connected with the Old Town by two bridges. Befides the fine dock-yards, where the men of war are refitted, Chriftianfhafen contains the great Weft India fugar houfe and the Eaft India houfe. The ifland of *Amack* itfelf is confidered as the kitchen garden of Copenhagen, and furnifhes the fame with greens, fruit, milk, butter, and cheefe in abundance. It is 9 miles long and about 2½ miles in breadth. It contains above 800 families or 4000 fouls, and is divided into two parifhes, Taarnebye which is inhabited by Danes and Dutchmen, and Hollanderbye inhabited only by the defcendants of a Dutch colony, which king Chriftian II., tranfplanted hither from North Holland, in 1516, at the requeft of his wife Elizabeth, fifter to Charles V. who was a native of the Low Countries. The language of the inhabitants of Amack is ftill a mixture of Danifh and Low Dutch. They have preferved their particular drefs, manners, and cuftoms. The men wear broad brimmed hats, black jackets, full glazed black breeches, loofe at the knee; the women black jackets, red petticoats, and a piece of blue glazed cloth bound round their heads. There is a particular market place at Copenhagen for the peafants of Amack, called the Amacker market.

The harbour of Copenhagen, formed by the ftraits of Kelleboe, between the iflands of Zealand and Amack, is capable of holding 500 fhips. It is protected by feveral batteries, of which that of the three crowns is the moft formidable. The naval arfenal, called Chriftianfholm, is much fuperior to that of Venice. The forges, workfhops, rope-walks, are upon an admirable conftruction. Each fhip has her feparate magazine, containing all the materials for her equipment. The feamen are regiftered and divided into two claffes; thofe who in time of peace are permitted to ferve on board the merchants' fhips, or to enter into foreign fervice, fubject to be recalled in cafe of war, and the ftationary failors who are always in the employ of the crown. The latter, 4000 in number, live in barracks at Copenhagen. The academy of marine cadets forms one of the palaces in the octagon of the New Town. It was founded in 1701, for the education of fifty young gentlemen, who are boarded and inftructed gratis; but more are admitted, on paying, to fhare in their inftruction. They have to pafs through feveral fevere examinations before they are entered as midfhipmen in the king's fhips.

Copenhagen is the chief commercial town of all Denmark. Its principal domeftic trade is with Norway, Iceland, the Faro iflands, and Greenland. Since the year 1754, the trade to the Weft Indies is free to all the Danifh ports; yet Copenhagen receives, almoft exclufively, the return cargoes from St. Croix, St. Thomas, and St. John. Copenhagen is alfo the feat of an Eaft India Company, a Jiro Bank, an Infurance Company; and its extenfive foreign trade is chiefly with Germany, the countries round the Baltic, and the Mediterranean feas, France, Portugal, and Spain. In the year 1792, Copenhagen had only 218 fhips of about 24,000 tons, but during the long wars between France and England their number has been nearly doubled.

The moft important manufactures of Copenhagen are the woollen cloth and ftuff, the calico-printing, filk, and China manufacture. The latter, though in its infancy, is thought to rival thofe of Drefden and Berlin.

Copenhagen is the feat of an univerfity founded in 1475. It is richly endowed, grants a fupport of 4 marks Danifh, or nearly 3 fhillings Englifh, a week to 180 poor ftudents, and fince the year 1791 diftributes eight premiums annually for the beft anfwer to eight prize queftions. There are four colleges, in which 168 ftudents are provided with lodging, fire wood, and pecuniary ftipends. The number of ftudents is generally between five and fix hundred.

Since the year 1742, feveral learned affociations have been formed at Copenhagen, the oldeft and moft known of which is the Royal Society, whofe refearches have thrown great light on northern hiftory. This fociety fuperintends alfo the geographical menfuration of the country, and the publication of new fpecial maps. It propofes four queftions annually, and the prize for each is a gold medal worth twenty pounds fterling. But befides the Medical Society, founded in 1772, that of Icelandic literature, founded in 1779,

1779, and that of natural hiftory, founded in 1789, the moft important is the Royal Economical Society, founded in 1768, whofe annual income of 6000 dollars, or 1200*l.* fterling, is expended in promoting the fine arts, fifheries, agriculture, and horticulture, and in encouraging every attempt that tends to benefit the country. It is now endeavouring to eftablifh a regular importation of coals from the Faro iflands. There is alfo a board of longitude and a repofitory for marine charts, founded in 1784, which has publifhed excellent charts of the entrance of the Sound, of the two Belts, the Sound and the Baltic as far as Bornholm, of the Cattegat, of part of the weftern coaft of Iceland, of part of the eaftern coaft of Iceland, of the Faro iflands, and fix charts of the coaft of Norway. Copenhagen has likewife acquired fome celebrity from its royal mufeum or cabinet of curiofities remarkable for Laplandifh dreffes, implements, and arms; from its excellent theatre of anatomy, founded in 1736, and from its public royal library, which, in 1797, was increafed with the celebrated Suhm's library of 50,000 volumes, collected by himfelf, and relating chiefly to the antiquities of northern Europe.

There is only one theatre at Copenhagen, which is partly fupported by the court. During the year 1806, it brought out nine tranflated pieces, and only one original Danifh comedy. The performances of the feafon amounted to 158. There has been no Italian opera of late; only occafionally, and for a fhort time, German and French plays are performed by itinerant companies.

Copenhagen is the feat of a fupreme tribunal, which is the higheft court of juftice for all the Danifh dominions. Its fittings are opened with great folemnity in the beginning of March, on the ancient *Herredag* or *Danehoev* (meeting of parliament) by the king himfelf. And befides the inferior courts of juftice there are *boards of conciliation*, or rather *conciliatory committees*, whofe duty it is to accommodate matters between the parties by all poffible means of perfuafion. If an accommodation takes place, the expences are very trifling, and the parties are bound to abide by it. From the 13th of Auguft, 1795, when the firft conciliatory committee was eftablifhed at Copenhagen till the 31ft of December 1801, 13,223 litigations were prevented at Copenhagen only in the courfe of fix years and a half.

The bifhop of Zealand, who is firft in rank among the twelve bifhops, of whom the Danifh hierarchy is compofed, refides at Copenhagen, which, befides the cathedral, counts 20 churches, one French proteftant church, and feveral fynagogues for the Jews, whofe number amounts to 1500. They are moft liberally treated at Copenhagen, and there is even a fociety eftablifhed by Chriftians for the purpofe of encouraging the inftruction of Jews in arts and handicraft-trades.

In 1714, Frederick IV. eftablifhed at Copenhagen a board of miffions or *Collegium de Curfu evangelii promovendo*, which fends miffionaries to Greenland, and to the Eaft Indies. The latter are alfo fupported in part by contributions collected at London. In the beginning of 1807, Copenhagen, with its fuburbs, counted 3156 houfes, and 104,000 inhabitants. The regifters for the year 1806, gave 3440 born, 3109 dead, and 930 couples married. In 1799, Copenhagen counted only 82,608 inhabitants, one-fixteenth, or 5163, of whom were paupers. Yet no beggars are feen in the ftreets. A board of alms watches over the poor, who are provided for by voluntary contributions. Copenhagen has twenty-two hofpitals, and thirty poor-houfes. In 1802, the principal infirmary admitted 2349 patients, 1813 of whom were cured, 218 died, and 318 remained in the houfe. The naval hofpital, or *Quætfch-houfe*, contains 300 invalid failors.

The police at Copenhagen is vigilant and good. A paper publifhed weekly, under the title of the *Friend of the Police*, has particularly contributed to render the police excellent, by pointing out the moft minute objects with regard to which it was thought deficient. Since the year 1804, the prifons have been rendered much more comfortable. They are all wainfcotted and boarded, provided with bedfteads, blankets, and mattreffes; and no perfon, whatever may be his crime, is ever confined in a dungeon or cellar. In the Rafp-houfe, where capital offenders are fhut up for life, the male convicts rafp and faw Brazil wood, the females fpin, and thus they all contribute towards their fupport by their labour. There is alfo a board of health, and a committee for promoting vaccination, under whofe fuperintendance 6489 individuals were inoculated for the cow-pox at Copenhagen, in the courfe of the year 1802.

Copenhagen is furrounded with country feats, which offer the moft enchanting fea-views. Its environs are beautiful, the country being finely varied with fmall forefts of beech and oak. Of the fummer-palaces in its neighbourhood, *Frederickfberg* is the moft remarkable for its delightful fituation.

Without the weftern gate, clofe to Copenhagen on the high road, ftands an interefting monument in commemoration of the emancipation of the peafants, which was effected under the prefent king. Four figures of white marble, reprefenting peace, plenty, content, and induftry, occupy the four corners of a pedeftal, from the centre of which rifes a pyramid. On one fide of the bafe are thefe words: "For Chriftian den fyvende de Danfkes og Norges Konge af eenige og taknemmelige Borgere." To Chriftian the Seventh king of the Danes and Norwegians from united and grateful citizens; and on the other, "Grund fteenen blev lagt af Frederik kongens fon, folkets ven 1792." The foundation ftone was laid by Frederic the king's fon, the friend of the people.

A. Anderfon's Tour in Zealand, in the year 1802. Bufching. I. 85. Coxe's Travels, fifth edition, vol. v. p. 97. Catteau's Tableau du Danemarck. Sir John Carr's Northern Summer, p. 42. Fr. Thaarup's Statiftik der Dænifchen Monarchie. 1796.

COPERARIO, Giovanni, or John Cooper, in *Biography*, an Englifh mufician, who, having refided for fome time in Italy, on returning to his native country, Italianized his name, and became a favourite performer on the lute and viol du gambe, and a voluminous compofer of *fantafie*, fancies, for viols, in three, four, five, and fix parts. He was appointed mufic-mafter to the children of James I.; and prince Charles, under his inftruction, made a confiderable progrefs on the viol. Some of his vocal compofitions were printed in the mufical publications of the times. In conjunction with Nicholas Laniere, and others, he compofed the fongs in a Mafque, written by fir Thomas Campion, on the marriage of Carr, earl of Somerfet, and lady Frances Howard, the divorced countefs of Effex, which was performed in the Banquetting Room at Whitehall, on St. Stephen's night, in the year 1604. Mr. Fenton, in his notes on Waller, fays, that Henry Lawes, having been educated under him (Coperario), "introduced a fofter mixture of Italian airs than had before been practifed in this country;" from which, and from his giving him the title of *Signor*, he feems to intimate, that he regarded him as an Italian. The following are the titles of his printed works, exclufive of the fongs which he compofed in conjunction with

with Laniere: "Funeral Tears for the Death of the Right Hon. the Earl of Devonſhire, figured in ſeauen Songes, whereof ſixe are ſo ſet forth that the Wordes may be expreſſed by a treble Voyce alone to the Lute, and baſe Viol, or elſe that the meane part may be added, if any ſhall effect more fulneſſe of parts. The ſeaventh is made in forme of a Dialogue, and cannot be ſung without two Voyces. Invented by John Coperario." Fol. London, 1606. 2. "Songs of Mourning, bewailing the untimely death of Prince Henry, worded by Thomas Campion, and ſet forth to bee ſung with one Uoice to the Lute or Violl, by John Coperario." Fol. Lond. 1613.

COPERNICAN Sphere. See Sphere.

Copernican *Syſtem*, is that ſyſtem of the world, wherein the ſun is ſuppoſed at reſt in the centre; and the planets, with the earth, to move in ellipſes round him.

The heavens and ſtars are here ſuppoſed at reſt; and that diurnal motion which they appear to have from eaſt to weſt, is imputed to the earth's motion from weſt to eaſt.

This ſyſtem was aſſerted by many of the ancients; and particularly Ecphantus, Seleucus, Ariſtarchus, Philolaus, Cleanthes Samius, Nicetas, Heraclides Ponticus, Plato, and Pythagoras; from the laſt of whom it was anciently denominated the *Pythagoric ſyſtem*.

It was alſo held by Archimedes, in his book De Granorum Arenæ Numero; but after him it became neglected, and even forgotten, for many ages; till above three hundred years ago, when Copernicus revived it; from whom it took the new name of the *Copernican ſyſtem*. See Copernicus.

COPERNICUS, Nicholas, or rather Copernick, in *Biography*, the celebrated aſtronomer, was born at Thorn in Pruſſia, near the Old Gate, on the 19th of February, 1473, in a houſe which was ſtill extant in 1797, and ſhewn to ſtrangers as one of the greateſt curioſities of that town. His father was a ſurgeon; his mother's brother, *Lucas Walzelrodt*, or, as he is ſometimes called, *Waiſſelrodt Von Alten*, was, ſome years after young Copernicus's birth, raiſed to the dignity of biſhop of Ermeland, in Latin, Epiſcopus Varmienſis: which circumſtance has betrayed moſt of the Engliſh biographers into a ſingular miſtake. They make Copernicus canon of Worms, in the ſouth of Germany, inſtead of Frauenburg in Pruſſia, which is the ſee of the biſhops of Ermeland.

Copernicus received his firſt inſtructions in the grammar ſchool of his native city, from whence he was ſent to ſtudy phyſic at the univerſity of Cracow, where he gained the academical honour of a doctor's diploma. But he never practiſed as a phyſician, though he readily gave his advice, and his medicines, without any fee, to thoſe friends who conſulted him. Mathematics were his favourite ſtudy: and he took particular delight in the ſtudy of perſpective; and this induced him to acquire the art of painting, in which he is ſaid to have excelled. From the inſtant he had heard Albert Brudzevius's mathematical lectures at Cracow, he was fired with the noble ardour of emulating the two greateſt mathematicians of his time, George Purbach, an Auſtrian, and John Regiomontanus, a native of Königſberg, in the Newmark of Brandenburg. To accompliſh this arduous deſign, he went to Italy, and was at firſt the pupil, but ſoon became the friend and aſſiſtant, of Dominicus Maria, of Ferrara, who was then teaching mathematics at Bologna, and whoſe hypotheſis about the variability of the axis of the globe, by exciting univerſal attention, gave Copernicus the firſt ideas of the motion of the earth. At Bologna, in the year 1497, Copernicus firſt obſerved the occultation of Palilitium by the moon.

He left Bologna to teach mathematics at Rome, where he obſerved an eclipſe of the moon in the year 1500; and ſuch was his dawning celebrity, that, even after his return to Pruſſia, he was conſulted by the clergy of Rome, in the year 1516, reſpecting the improvement of the calendar. In the mean time his uncle, the biſhop of Ermeland, had made him a canon of the chapter of Frauenburg; and the town of Thorn had named him to the archdeaconry of the church of St. John: yet he ſeldom lived in his native city, but made Frauenburg his principal reſidence. Zealouſly attached to the tenets of his church, he fulfilled the duties of his clerical offices with punctual care. The glorious Reformation, which he witneſſed, had no influence on his religious opinions: his mind purſued a different tract. Drawing and painting, the ſtudy of perſpective, and the making of mathematical inſtruments, filled his leiſure hours; and beſides his regular avocations, the conſtruction of ſome aqueducts abſorbed his time. That which feeds the mill of Graudentz with water has been completely preſerved; of another, which ſupplied the hill of Frauenburg, on which the canons reſide, nothing remains but the tower on the banks of the Paſſarge, to the top of which he raiſed the waters of that river, and which exhibits ſtill the following inſcription:

> "Hic patiuntur aquæ ſurſum properare coactæ,
> Ne careat ſitiens Incola montis ope,
> Quod natura negat tribuit Copernicus arte,
> Unum pro cunctis Fama loquatur opus."

Whenever the biſhop was abſent, Copernicus was entruſted with the government of the dioceſe; and after the death of two prelates, he was appointed general vicar during the vacancy. He was alſo frequently deputed to the provincial diets. Nothing, however, could divert him from his original purpoſe. He applied his ſtores of mathematical knowledge to the improvement of aſtronomy. The garret of his houſe at Frauenburg, which is ſtill ſhewn, and the ſteeple of the cathedral, were his obſervatories. The epicycles and eccentrics of Ptolemy embarraſſed and perplexed him; but the hypotheſis of the earth being the motionleſs centre of the univerſe, was generally received: it had been adopted by Plato and Ariſtotle, whoſe authority was conſidered paramount to that of the bible; and Joſhua's command to the ſun and moon confirmed it. To attack this ſyſtem was incurring the imputation of hereſy; and it required no ordinary courage to advance an opinion, for which Galileo ſuffered a century after.

In this perplexity, Copernicus aſſiduouſly ſearched the lore of antiquity. He found that the Egyptians taught the revolution of Mercury and Venus about the ſun; that Apollonius and Pergæus had aſſigned the ſame motion to Mars, Jupiter, and Saturn; that, according to his diſciples, Nicetas and Heraclides, Pythagoras, whoſe learning was derived from the Egyptians, aſſerted the earth's motion round its own axis; and that Ariſtarchus and Philolaus went ſtill farther, and maintained that the earth did not only move about its axis, but employed twelve months in revolving round the ſun.

On theſe foundations Copernicus raiſed a ſtructure, of which his intenſe and acute ſtudy furniſhed him with the moſt correct mathematical evidence. According to his ſyſtem, the ſun occupies the centre of the univerſe; the planets, in their motion round him, deſcribe ellipſes proportioned to their ſize; Mercury moves round the ſun within three months, Venus within eight, the earth within twelve, and within four-and-twenty hours it revolves round its own axis; the moon is a ſatellite of the earth, about which ſhe turns thirteen

thirteen times in a year; Mars takes two, Jupiter almoſt twelve, and Saturn nearly thirty, years to move about the ſun.

It was in the year 1530 that Copernicus laid the laſt hand to his ſyſtem, which he had begun to form about the year 1507; but he had not yet ventured to launch it into the learned world, when its ſame reached the biſhop of Capoua, cardinal Nicholas Schönberg, who, in 1534, by a letter which does honour to his ſentiments, invited Copernicus to publiſh his new ſyſtem. Other great men, particularly Tindemann Gieſe, biſhop of Culm, aſſailed him with their intreaties to the ſame purpoſe. But his modeſty was ſtill reſiſting their preſſing application, when Rheticus, profeſſor of mathematics at Wittenberg, excited by an ardent thirſt of learning, reſigned his chair, and viſited Copernicus at Frauenburg, in the year 1539. To him Copernicus at laſt truſted his work, which, in 1543, was printed at Marienburg, at the expence of cardinal Schönberg, under the title of "Nicolai Copernici de Revolutionibus Orbium Cœleſtium, Libri vi." But he did not live to read his book in print. A copy of it reached him only a few hours before his death, which happened at Frauenburg, on the 22d of May, 1543, three months and three days after he had entered the ſeventy-firſt year of his age. He was probably buried at the foot of the altar before which he uſed to celebrate maſs; for, 38 years after his death, Cromerus, biſhop of Ermeland, cauſed the following inſcription to be placed on his tomb-ſtone, which is now ſhewn in the chapter's room:

D. O. M.
R. D. Nicolai Copernico Torunenſi,
Artium et Medicinæ Doctori, Canonico Varmienſi,
Præſtanti Aſtrologo et ejus Diſciplinæ inſtauratori,
Martinus Cromerus Epiſcopus Varmienſis,
Honoris et ad Poſteritatem Memoriæ Cauſa poſuit,
MDLXXXI.

Others pretend that Copernicus, having requeſted to be interred near his relations, was buried at Thorn, in the church of St. John, where he is repreſented in his canonical dreſs, kneeling before a crucifix, and a globe on his ſide, with this inſcription:

"Non parem Pauli gratiam requiro,
Veniam Patri neque poſco, ſed quam
In crucis ligno dederas Latroni, ſedulus oro."

Nicolai Copernico Thorunienſi abſolutæ ſubtilitatis mathematico, ne tanti viri, apud exteros celeber, in ſua patria periret memoria hoc monumentum poſitum. Mort. Varmiæ in ſuo Canonicatu, anno 1543, die 4, ætatis LXXIII.

This painting was renovated, in the year 1733, by a poſtmaſter of Thorn, named Rubinkowſki. A print of it may be ſeen in Hartknock's Ancient and Modern Pruſſia.

It is ſuppoſed that Copernicus's manuſcripts were depoſited at Braunſberg, in the Jeſuits' library, with the books of which they may have been removed to Sweden by Charles XI. Whether they be ſtill extant in that country is uncertain. Ludwig von Baczko's Kleine Schriften, 1797, vol. ii. p. 135. Gaſſendi Opera, vol. v. p. 499. Bernoulli's Travels, vol. iii. p. 18.

See the order and diſpoſition of the heavenly bodies, as laid down by him, compared with thoſe in the other ſyſtems, under the head SYSTEM.

This ſyſtem has been eſtabliſhed by new arguments advanced by Kepler, Galileo, and Newton, in every ſucceeding age; and notwithſtanding the oppoſition it met with, from the prejudices of ſenſe againſt the earth's motion, the authority of Ariſtotle in the ſchools, the threats of ignorant bigots, and the terror of the inquiſition, it has generally prevailed. Galileo, after having demonſtrated the motion of the earth, was obliged, by the rancour of the Jeſuits, to go to Rome, and there ſolemnly renounce it. Beſides which cruel treatment, he was condemned to a year's impriſonment in the inquiſition, and the penance of repeating daily ſome penitential pſalms. As a ſpecimen of the authority of the Romiſh church in oppoſition to this ſyſtem, we ſhall only tranſcribe the declaration of the excellent commentators, Le Seur and Jacquier, on the Principia, prefixed to the third volume. "Newtonus in hoc tertio libro telluris motæ hypotheſim aſſumit. Autoris propoſitiones aliter explicari non poterant, niſi eadem quoque facta hypotheſi. Hinc alienam coacti ſumus gerere perſonam. Cæterum latis a ſummis pontificibus contra telluris motum decretis nos obſequi profitemur."

COPERNICUS is the name of an aſtronomical inſtrument, contrived by Mr. Whiſton, for the calculation and exhibition of eclipſes, and of the motions of the planets, both the primary and ſecondary ones, &c.

It was ſo called by the inventor, as being conſtructed on the Copernican ſyſtem; or as repreſenting the heavenly bodies agreeable to it.. It conſiſts of ſeveral concentrical circles of wood; upon which are inſcribed numbers, transferred hither from the aſtronomical tables: by the various diſpoſitions of theſe circles, which are made ſo as to ſlide within each other, queſtions are ſolved; and thus long calculations are ſaved, and the work of many hours brought into a few minutes.

For the exhibition of eclipſes there is a peculiar apparatus, conſiſting of a terreſtrial globe, ſo diſpoſed, as that, being turned round its axis, the light of the ſun, or a candle, is projected through a glaſs plane, marked out into concentric circles, expreſſing digits of the eclipſe: and thus is the path of the eclipſe, with its degree or quantity in any part of its path, agreeably and accurately repreſented.

The inſtrument not being very common, a particular deſcription would be ſuperfluous. The author of it has written a book to explain it.

COPHANTA, in *Ancient Geography*, a port of Carmania.

COPHANTUS, a mountain of Aſia, placed by Pliny in Bactriana.

COPHENES, a river of India, which ran between Alexandria, and the firſt ſcene of the military operations of Alexander, and which, as major Rennell conjectures, occurred pretty early in his march. In Alexander's arrangement of boundaries, the river Cophenes was the eaſtern limit of the province of Paropamiſus, of which Alexandria was regarded as the capital; and that province, according to the ideas of Ptolemy, lay between thoſe which the moderns name Koraſan and Cabul. The major therefore concludes, with ſome degree of confidence, that the river "Cow" of the Turkiſh geography, and the "Cow-mull" of Baber, which paſſes by Nughz, and whoſe principal branches are the rivers of Ghizni and Gurdaiz, is the Cophenes; and that we muſt look for Alexandria in the quarter of Bamian, though it is not poſſible to aſſign its particular ſituation. At all events, the proximity of Alexandria to the northern mountains, a fact which Arrian impreſſes very ſtrongly, renders it an impoſſible caſe, that Alexandria and Candahar can be one and the ſame place. Leaving Alexandria, at the foot of Caucaſus, Alexander came to the river Cophenes, and paſſed it in the higher part of its courſe. From Cophenes, Hepheſtion and Perdiccas, with

a strong detachment, were sent into the country of Peucelaotis (Arrian) or Peucolaitis (Strabo) near the Indus. Alexander marched from the banks of the Cophenes against the Aspii, Thyræi, and Arasaci, nations, whose situations and modern names are unknown, but supposed by Rennell to be inferior divisions of the modern Cabul, and situated between the rivers of Ghizni and Cabul, at the height of Irjab and Dukkah. In his march to Arigæus, Alexander crossed two rivers, the "Choe" and "Euaspla," and defeating the Aspians in a pitched battle, near the latter, passed through the territories of the Guræi, and crossed the river of the same name (see GUREUS.) The Choe and Euaspla may be two of the nine rivers of the Lumghanat. It is very difficult to determine the length of Alexander's march from the Cophenes to the Gureus; but it might possibly be 100 road miles. As Alexander had crossed the Indus, probably at Attock, when he came to the bridge (which was completed before his arrival), he made an excursion by land into the country adjacent to the western bank of the Indus, in order to view the city of Nysa (supposed by M. d'Anville to be Nughz, or Nagaz, the Nagara, or Dionysiopolis of Ptolemy); and he is then said to have entered the country, that lay between the two rivers, Cophenes and Indus. Admitting that the Cophenes is the river that runs by Nughz, and falls into the Indus, 30 or 35 miles below the city of Attock, and as the river Cabul joins the Indus in front of the city of Attock, it is clear that, till he came opposite to that city, he could not be between the Cophenes and Indus. And if it be said, that the Cabul river was the Cophenes, he had all along been between the Cophenes and Indus; and Arrian's words could have no meaning. Upon the whole we may conclude that the ancient Cophenes was the same with the modern *Cow*, which see. Rennell's Memoir, p. 170, &c.

COPHOS, a place of Greece, in Attica, situated before Piræa.

COPHOSIS, in *Medical Writers*, is used for deafness, whether beginning, or perfect, or from what cause soever.

The word is derived from κοφεω, *I am deaf.*

COPHRANTA, or COPHANTA, an ancient town of Asia, in Carmania. Ptolemy.

COPHSIS, SAMUEL, in *Biography*, a learned Jewish Rabbi of Spain in the eleventh century, was a native of Cordova, and published a commentary on the Pentateuch, the manuscript of which is still extant in the Vatican library. Those who have examined it commend it as an excellent work, except that it too much abounds with allegories. The author died A.D. 1034.

COPHTI, COPHTS, or COPTS, a name given to the Christians of Egypt; who are of the sect of Jacobites.

They derive the latter appellation from the learned Jacobus Zanzalu, bishop of Edessa, who, when the Coptic party had sunk in number and credit, appeared in defence of the Monophysite doctrine; and by his writings, as well as indefatigable travels through most parts of the East, succeeded to such a degree in reviving and disseminating it, that he hath been reverenced and esteemed by the whole sect, which, from respect to him have assumed the name of Jacobites: though the other Christians, as well as the Turks, call them by their old name Copts. By way of contempt some have called them "Kufti" or Girdlers, thus intimating that they are Christians only from the girdle upwards, but bear the scar of Judaism below it.

The critics are extremely divided about the origin and orthography of the word: some write it *Gophti*, others *Cophtites*, *Cophtitæ*, *Copts*, &c. Scaliger derives the name from *Coptos*, an anciently celebrated town of Egypt, the metropolis of the Thebaid, whither they retired from the tyranny of the Greeks. Kircher refutes this opinion, and maintains, that the word originally signifies *cut* and *circumscribed;* and was given these people by the Mahometans, by way of reproach, because of their practice of circumcising: but P. Sollier, another Jesuit, refutes this opinion. Scaliger afterwards changed his opinion, and derived the word from Αιγυπτος, the ancient name of Egypt, by retrenching the first syllable; but this opinion, too, F. Sollier disputes. Volney, concurring in opinion with Scaliger, observes, that the Arabic term *Kobti*, a Copt, seems to be an evident abbreviation of the Greek word *Ai-goupti-os*, an Egyptian; for the γ was pronounced *ou* among the ancient Greeks; and the Arabs, having neither *p* nor *g* before *a*, *o*, *u*, always substitute for those letters *h* and *b*. John de Leo and others say, that the Egyptians anciently called their country *Elchibth*, or *Cibth*, from Cibth their first king, whence *Cophtite*, &c. others say from Cobtim second king of Egypt. Vansleb derives the word *Copht* from Copt, son of Misraim, grandson of Noah. All these etymologies P. Sollier rejects, on this principle, that were they true, the Egyptians ought all equally to be called *Cophti;* whereas, in effect, none but the Christians, and among those none but the Jacobites, bear the name; the Melchites not being comprehended under it. Hence he chooses to derive the word from the name *Jacobite*, by retrenching the first syllable; whence *Cobite*, *Cobea*, *Copta*, and *Cophta*.

Several families of these Copts are to be found in the Delta; but the greatest number inhabit the Said, where they in some places occupy whole villages. Both history and tradition attest their descent from the people who were conquered by the Arabs, that is, from that mixture of Egyptians, Persians, and, above all, Greeks, who, under the Ptolemies and the Constantines were so long in possession of Egypt. Their name, according to the etymology given of it by Scaliger and by Volney, seems to indicate that they are the remains of the ancient Egyptians; and this is the more probable, since we find them in the Said before the time of Dioclesian; and it is certain the Greeks were less numerous in the Said than in the Delta. This opinion of their origin is rendered still more probable, by considering the distinguishing features of this race of people; and they are found to be all characterised by a sort of yellowish dusky complexion, which is neither Grecian nor Arabian; they have all a puffed visage, swoln eyes, flat noses, and thick lips, or, in short, the exact countenance of a Mulatto. Volney, when he saw the figure of the sphynx, and observed its features to be precisely those of a negro, recollected the remarkable passage of Herodotus, in which he says, (lib. ii.) "For my part, I believe the Colchi to be a colony of Egyptians, because, like them, they have black skins and frizzled hair." Hence he concludes, that the ancient Egyptians were real negroes, of the same species with all the natives of Africa; and though, as we might naturally expect, after mixing for so many ages with the Greeks and Romans, they have lost the intensity of their first colour, yet they still retain strong marks of their original conformation. "How are we astonished," says Volney, "when we behold the present barbarism and ignorance of the Copts, descended from the profound genius of the Egyptians, and the brilliant imagination of the Greeks; when we reflect that to the race of negroes, at present our slaves, and the objects of our extreme contempt, we owe our arts, sciences, and even the very use of speech; and when we recollect that, in the midst of those nations who call themselves the friends of liberty and humanity, the most barbarous of slaveries is justified

tified; and that it is even a problem, whether the underſtanding of negroes be of the ſame ſpecies with that of white men!" The language formerly ſpoken by the Copts furniſhes another argument in favour of the origin above aſcribed to them. 'On the one hand the form of their letters, and the greater part of their words, demonſtrate that the Greek nation, during the thouſand years it continued in Egypt, has left deep marks of its influence; but, on the other, the Cophtic alphabet has five letters, and the language a number of words, which are to be conſidered as the remains of the ancient Egyptian. Theſe, when critically examined, have a ſenſible analogy with the dialects of the ancient neighbouring nations, ſuch as the Arabs, Ethiopians, Syrians, and even thoſe who lived on the banks of the Euphrates; nor can it be doubted that all theſe languages are derived from one common ſtock. For upwards of three centuries, that of the Copts has fallen into diſuſe. The Arabs, diſdaining the language of the nations they ſubdued, impoſed on them, together with their yoke, the neceſſity of learning that of their conquerors. This obligation became even a law, when, about the end of the firſt century of the Hegira, the Caliph Waled I. prohibited the Greek tongue throughout his whole empire. From that time the Arabic became univerſal; and the other languages, confined to books, ſubſiſted only for the learned, who neglected them. Such has been the fate of the Cophtic. The prieſts and monks no longer underſtand it, in their ſcriptures and books of devotion in which alone it exiſts.

Mr. Browne, a late traveller in Africa, (p. 71.) does not admit this hypotheſis of Volney; for he obſerves, that the Copts, or original inhabitants of Egypt, have no reſemblance of the negro features or form; though they have ſome peculiarities of feature common to them all. Their hair and eyes are of a dark hue, and the former is often curled; but not in a greater degree than is occaſionally ſeen among Europeans. The noſe is often aquiline; and though the lips be ſometimes thick, they are by no means generally ſo; and on the whole, a ſtrong reſemblance may be traced between the form of viſage in the modern Copts, and that preſented in the ancient monuments, paintings, and ſtatues. Their complexion, like that of the Arabs, is of a duſky brown; it is repreſented of the ſame colour in the paintings, ſeen by Mr. Browne in the tombs of Thebes. The Coptic women have intereſting features, large black eyes, and a genteel form.

The Copts differ from the Arabs by their religion, which is Chriſtianity, and which they embraced at an early period; but they are again diſtinct from other Chriſtians by their opinions, which are thoſe of the Eutychians or Monophyſites. Their adherence to theſe opinions has expoſed them to the perſecution of the other Greeks, and thus they are rendered irreconcileable enemies. When the Arabs conquered the country, they took advantage of theſe animoſities, to enfeeble them both. The Copts, however, have at length expelled their rivals; and as they have been always intimately acquainted with the interior of the country, they are become the depoſitaries of the regiſters of the lands and tribes. Under the name of "Writers," they are at Cairo the intendants, ſecretaries, and collectors of government. Theſe writers, deſpiſed by the Turks whom they ſerve, and hated by the peaſants whom they oppreſs, form a kind of ſeparate claſs, the head of which is the writer to the principal Bey. He diſpoſes of all employments in that department, which, according to the ſpirit of the Turkiſh government, he beſtows on the beſt bidder.

The Copts endured many ſeverities, and were reduced to extreme poverty and diſtreſs by the intolerance and perſecution of the Greeks; but when Amrou invaded Egypt, A. D. 638, the Copts availed themſelves of the opportunity which was afforded by their voluntary ſubmiſſion to the conqueror for retaliation on their perſecutors. The Saracens were received by them as the deliverers of the Jacobite church; and during the ſiege of Memphis a ſecret and effectual treaty was opened between a victorious army and a people reduced to the moſt abject diſtreſs and bondage. "The Greeks," ſaid Mokawkas, a rich and noble Egyptian, connected with the Coptic ſect, in his firſt conference with Amrou, "are determined to abide the determination of the ſword; but with the Greeks I deſire no communion, either in this world or in the next; and I abjure for ever the Byzantine tyrant, his ſynod of Chalcedon, and his Melchite ſlaves. For myſelf and my brethren, we are reſolved to live and die in the profeſſion of the goſpel and unity of Chriſtians. It is impoſſible for us to embrace the revelations of your prophet; but we are deſirous of peace, and cheerfully ſubmit to pay tribute and obedience to his temporal ſucceſſors."

The tribute was aſcertained at two pieces of gold for the head of every Chriſtian; but old men, monks, women, and children, of both ſexes, under 16 years of age, were exempted from this perſonal aſſeſſment; the Copts above and below Memphis ſwore allegiance to the caliph, and promiſed an hoſpitable entertainment of three days to every muſſulman who ſhould travel through their country. By this charter of ſecurity, the Copts obtained a triumph over their enemies, and the ſacred edifices, with the patrimony of the church, were reſtored to the national communion of the Jacobites, who enjoyed without moderation the moment of triumph and revenge. From the ſuperiority thus acquired, and the conduct by which it was obtained, and by which it was ſucceeded, proceeded that permanent and invincible animoſity, which hath ſubſiſted between the Copts and the Greeks ever ſince their ſubjection to the Turks; and which the Romiſh miſſionaries have endeavoured to terminate, by uſing every method likely to reconcile both theſe ſects to the church of Rome. In the 17th century attempts were made for uniting the Monophyſites of Aſia with the Romiſh church, and they were attended with a partial and temporary ſucceſs; but the African Monophyſites, and more eſpecially the Copts, notwithſtanding that poverty and ignorance which expoſed them to the ſeductions of ſophiſtry and gain, maintained their principles with firmneſs, and made an obſtinate reſiſtance to the promiſes, preſents, and attempts, employed by the papal miſſionaries to bring them under the Roman yoke. The Copts, ever ſince the Saracen conqueſt above-mentioned, have had churches, prieſts, biſhops, and a patriarch, who fixed his ſeat of reſidence at Cairo, when that city became the capital. In their worſhip they blend a number of ſuperſtitious cuſtoms, which have been tranſmitted to them from their anceſtors and which they obſtinately retain. In other reſpects, ſays Savary (Letters on Egypt, vol. ii.) the Copts are gentle, humane, and hoſpitable. Paternal tenderneſs and filial love conſtitute the happineſs of their families. They honour and cheriſh all the ties of blood. The internal commerce, the art of hatching chickens, and that of bringing up bees, form almoſt their only ſcience. They often acquire conſiderable wealth in the management of the affairs with which they are entruſted, but they are never allowed to enjoy the fruit of their labours in tranquillity. The Bey, who ſees their opulence, ſtrips them without pity;—happy if they can ſecure their lives by the ſacrifice of their fortune. Theſe vexations, however, never excite them to revolt.

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Their want of energy keeps them chained down to fervitude and mifery, which they endure without murmuring. Mr. Browne reprefents the Copts as an acute and ingenious people, who get money fteadily without oftentation, confidering, that, under an arbitrary government, obfcurity is fafety. In their temperament, he fays, they are melancholic, but, if called into action, induftrious and laborious. However, they are fond of their diftilled liquors, and rather licentious in their amours. They are zealous in their faith, this writer adds, and their ecclefiaftics are numerous. The populous city of Cairo, as we have faid, affords a refidence, or rather a fhelter, for their indigent patriarch, and a remnant of 10 (fome fay 12 or 13) bifhops; 40 monafteries have furvived the depredations of the Arabs; and the progrefs of fervitude and apoftacy has reduced the Coptic nation to the defpicable number of twenty-five or thirty thoufand families; a race of illiterate beggars, whofe only confolation is derived from the fuperior wretchednefs of the Greek patriarch and his diminutive congregation.

The Coptic patriarch, though he refides at Cairo, takes his title from Alexandria; and the body of the inferior clergy, whether fecular or regular, is compofed of the orders of St. Antony, St. Paul, and St. Macarius, who have each their monafteries.

Befides the orders of priefts, deacons, and fubdeacons, the Copts have likewife archimandrites, the dignity whereof they confer with all the prayers and ceremonies of a ftrict ordination. This makes a confiderable difference among the priefts; and befides the rank and authority it gives them with regard to the religious, it comprehends the degree and functions of archpriefts. By a cuftom of about feven hundred years, if a prieft elected bifhop be not already archimandrite, that dignity muft be conferred on him before epifcopal ordination.

The fecond perfon among the clergy, after the patriarch, is the titular patriarch of Jerufalem, who alfo refides at Cairo, becaufe of the few Copts at Jerufalem; he is, in effect, little more than the bifhop of Cairo: only he goes to Jerufalem every Eafter, and vifits fome other places in Paleftine near Egypt, which own his jurifdiction. To him belongs the government of the Coptic church, during the vacancy of the patriarchal fee.

To be elected patriarch, it is neceffary the perfon have lived all his life in continence: it is he confers the bifhoprics. To be elected bifhop, the perfon muft be in the celibate; or, if he have been married, it muft not be above once.

The priefts and inferior minifters are allowed to be married before ordination; but are not obliged to it, as Ludolphus erroneoufly obferves. They have a great number of deacons, and even confer the dignity frequently on children. None but the loweft rank among the people commence ecclefiaftics; whence arifes that exceffive ignorance found among them: yet the refpect of the laity towards the clergy is very extraordinary. Their office is longer than the Roman office, and never changes in any thing: they have three liturgies, which they vary occafionally.

The monaftic life is in great efteem among the Copts; to be admitted into it, there is always required the confent of the bifhop. The religious Copts make a vow of perpetual chaftity; renounce the world, and live with great aufterity in deferts: they are obliged to fleep in their cloaths and their girdle, on a mat ftretched on the ground; and to proftrate themfelves every evening a hundred and fifty times, with their face and breaft on the ground. They are all, both men and women, of the loweft clafs of the people; and live on alms. The nunneries are properly hofpitals; and few enter but widows reduced to beggary.

The prefent habitation of the Coptic cœnobites is fituated in the defert of Nitria, called alfo after the name of a famous faint denominated Macarius, and is diftinguifhed by the appellation of "Zaïdi el Baramous," and called by the Arabs, "Kafr Zaïdi." It is an enclofure of high walls without any gate, unlefs that name fhould be given to a fmall wicket, which is opened only twice or thrice in the courfe of a year. Perfons entering or leaving it are hoifted up and lowered down by means of a ftrong rope and a pulley. The building is entirely conftructed of foft calcareous ftones, feveral of which contain foffile fhells. Within the walls there is a kind of fmall fort, furrounded by ditches, over which is built a drawbridge. Here the monks retire, when the Arabs fucceed in forcing the outer walls. In this little fort are a church, a ciftern, and provifions; in fhort, every thing for enabling the monks to fuftain a long fiege. Here they alfo keep their books, written in the Coptic language; which they cannot on any confideration be prevailed on to part with, although they never read them, and fuffer them to lie on the ground, eaten by vermin and covered with duft. The cells of the monks are vaulted and very low, and are indeed no better than a fort of dens, not unfuitable to the ignorant and flothful wretches who inhabit them. The church is fimple in its conftruction, and has no other ornament befides a few oftrich's eggs, and bad pictures of faints. It is impoffible, fays Sonnini, (Travels in Upper and Lower Egypt, p. 354.) to give an idea of the confufion that fometimes prevails in their church: they often know not what they are to fing; one will have a particular anthem or pfalm, and another a different one: they then difpute and come to blows; in the mean time a third chaunts a prayer, which is followed by the choir, and thus the quarrel terminates. Their finging confifts of Turkifh and Arabic airs, accompanied by cymbals, the noife of which, mixed with their fqualling voices, and their difcordant mufic, makes the church re-echo with a medley of jarring founds. The prieft celebrates mafs with water. They confecrate common bread; which the prieft cuts in pieces and mixes with water, which is likewife confecrated. This makes a kind of foup, of which he eats a few fpoonfuls; and afterwards adminifters the facrament, alfo with a fpoon, to all that are prefent. After the communion the prieft wafhes his hands, and ftanding at the door of the chancel, extends them to ftroke the face of every one who paffes. During mafs, the prieft alfo bleffes little loaves which are diftributed at the clofe of the fervice. The prieft who celebrates mafs is dreffed in a kind of white fhirt, made with a cowl, and covered with little croffes. During the other prayers, he only wears a large fillet of white linen, with fimilar little croffes, half twifted round his head in the form of a turban, with the two ends hanging down before and behind. In this convent there were only three priefts and fome friars, with a fucceffion of perfons who come hither from time to time to do penance, and who bring the monks the means of fubfiftence. Their fare confifts of bread, or rather bifcuit, made of flour of lentils, and rice boiled in falt and water, bad cheefe, and a little honey; and their only beverage is a brackifh and ill-tafted water. Their fupplies are conveyed to them from the alms of the rich Copts at Cairo. In thefe monafteries, feveral of which are found in this defolate country, the Coptic travellers through the defert are fure of finding neceffaries for themfelves and their horfes; which they obtain by ringing a

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ſmall bell, the cord of which hangs down on the outſide.

F. Roderic reduces the errors and opinions of the Copts to the following heads: 1. That they put away their wives, and eſpouſe others while the firſt are living. 2. That they have ſeven ſacraments; *viz.* baptiſm, the euchariſt, confirmation, ordination, faith, faſting, and prayer. 3. That they deny the Holy Spirit to proceed from the Son. 4. That they only allow of three œcumenical councils; that of Nice, Conſtantinople, and Epheſus. 5. That they only allow of one nature, will, and operation, in Jeſus Chriſt, after the union of the humanity with the divinity: in other words, they are Monophyſites, Monothelites, or Eutychians. Mr. Browne (*ubi ſupra*) ſays, that they embrace tranſubſtantiation; in which, and other points, the Catholics of Cairo think they approach their faith nearer than the Greeks. As to their errors in diſcipline, they may be reduced, 1. To the practice of circumciſing their children of both ſexes before baptiſm, which has obtained among them from the twelfth century. 2. To their ordaining deacons at five years of age. 3. To their allowing of marriage in the ſecond degree. 4. To their forbearing to eat blood: to which ſome add their belief of a baptiſm by fire, which they confer by applying a hot iron to their forehead or cheeks.

Others palliate theſe errors, and ſhew that many of them are rather abuſes of particular perſons, than doctrines of the ſect. This ſeems to be the caſe with regard to their polygamy, eating of blood, marrying in the ſecond degree, and the baptiſm of fire: as for circumciſion, it is ſaid not to be practiſed as a ceremony of religion, nor as of any divine appointment, but merely as a cuſtom which they derive from the Iſhmaelites; and which, perhaps, may have had its origin from a view to health and decency in thoſe hot countries.

The Copts have adopted, from the Mahometans, the cuſtom of frequent proſtrations during divine ſervice; of ablution after the conjugal rites, &c. In many reſpects their faith, diſcipline, and worſhip, reſemble thoſe of the Abyſſinians; ſee that article.

The Copts, at different times, have made ſeveral re-unions with the Latins; but always in appearance only, and under ſome neceſſity of their affairs. In the time of pope Paul IV., a Syrian was diſpatched to Rome from the patriarch of Alexandria, with letters to that pope; wherein he acknowledged his authority, and promiſed obedience; deſiring a perſon to be diſpatched to Alexandria, to treat about a re-union of his church to that of Rome: purſuant to which, Pius IV., ſucceſſor to Paul, choſe F. Roderic, a Jeſuit, whom he diſpatched in 1561, in quality of apoſtolical nuntio.

But the Jeſuit, upon a conference with two Copts deputed for that purpoſe by the patriarch, was made to know, that the titles of *father of fathers*, *paſtor of paſtors*, and *maſter of all churches*, which the patriarch had beſtowed on the pope in his letters, were no more than mere matters of civility and compliment; and that it was in this manner the patriarch uſed to write to his friends: they added, that ſince the council of Chalcedon, and the eſtabliſhment of ſeveral patriarchs independent of one another, each was chief and maſter of his own church. This was the anſwer the patriarch gave the pope, after he had received a ſum of money remitted to him from Rome, by the hands of the Venetian conſul.

COPHTIC, or Coptic, the language of the Copts, the ancient language of the Egyptians, mixed with a great deal of Greek; its alphabet being manifeſtly nothing elſe but Greek, with the addition of ſome few letters, to expreſs ſounds, which the Grecians had not, and which probably came to be uſed in Egypt after the time of Alexander; though we know that the Greek language, and perhaps alſo the Greek letters, were taught there long before, in the reign of Pſammetichus. Of this affinity the reader may judge, by the following table of the Cophtic alphabet:

Figure.	Name.	Power.	Figure.	Name.	Power.
Ⲁⲁ	Alpha	A.	Ⲡⲡ	Pi	P.
Ⲃⲃ	Bita	B. V.	Ⲣⲣ	Ro	R.
Ⲅⲅ	Gamma	G.	Ⲥⲥ	Sima	S.
Ⲇⲇ	Dalda	D.	Ⲧⲧ	Tau	T.
Ⲉⲉ	Ei	E.	Ⲩⲩ	Ypſilon	Y. U.
Ⲋⲋ	So	S.	Ⲫⲫ	Phi	Ph.
Ⲍⲍ	Zita	Z.	Ⲭⲭ	Chi	Ch. Græc.
Ⲏⲏ	Hita	I. Æ.	Ⲱⲱ	O	O long.
Ⲑⲑ	Thita	Th.	Ϣϣ	Shei	Sh.
Ⲓⲓ	Iauda	I.	Ϥϥ	Fei	F.
Ⲕⲕ	Kappa	K.	Ϧϧ	Khei	Kh.
Ⲗⲗ	Lauda	L.	Ϩϩ	Hori	H.
Ⲙⲙ	Mi	M.	Ϫϫ	Janja	J.
Ⲛⲛ	Ni	N.	Ϭϭ	Shima	Sh.
Ⲝⲝ	Xi	X.	Ϯϯ	Dhei	Dh.
Ⲟⲟ	O	O ſhort.	Ⲯⲯ	Epſi	Pſ.

The old Cophtic, which Kircher maintains to be a mother-tongue, and independent of all others, had been much altered by the Greek; for beſides that it has borrowed all its characters from the Greek, with a very little variation, a great number of the words are pure Greek.

Voſſius, indeed, aſſerts, that there was no Cophtic language till after Egypt became ſubject to the Arabs. The language, according to him, is a mixture of Greek and Arabic: the very name thereof not being in the world till after the Arabs were maſters of the country. But this, M. Simon obſerves, proves nothing; except that what was anciently called Egyptian, has ſince by the Arabs been called Cophtic, by a corruption of ſpeech. There are, it is true, Arabic words in the Cophtic; yet this by no means proves but that there was a language before that time, either Cophtic or Egyptian. Pietro de la Valle obſerves, that the Copts have entirely loſt their ancient tongue; that it is now no longer underſtood among them; that they have nothing extant therein but ſome ſacred books; and that they ſtill ſay maſs in it.

All their other books have been tranſlated into Arabic, which is their vulgar tongue; and this has occaſioned the originals to be loſt: it is added, that they rehearſe the Epiſtles and Goſpels in the maſs, twice; once in Arabic, and once in Cophtic.

Indeed, if we believe F. Vanſl b, the Copts ſay the maſs in Arabic, all but the Epiſtles and Goſpels, which they rehearſe both in that and Cophtic.

It ſufficiently appears, that, after the conqueſt by the Saracens, the ancient language ſo far continued to be that of religion, that it was uſed in the divine ſervice; and in the country of the Copts, the goſpel, according to Niebuhr, is even now read in Cophtic: but he obſerves, that this tongue is not underſtood even by the prieſts, and that the ſervice is afterwards read in the Arabic, which is the preſent language of Egypt. Mr. Browne ſays, that in the Cophtic monaſteries, the prayers are read in Arabic, and the epiſtle and

and gofpel in Cophtic; but the prieft is a mere parrot, repeating a dead letter.

The Cophtic tongue, at prefent, confifts chiefly of the old Egyptian and Greek, ftill bearing evident marks of primitive antiquity in its ftructure and conftitution, with regard to which it differs fo much from all the Oriental and European languages, that it is impoffible to conceive it derived from any of them. For the Copts neither decline their nouns, nor conjugate their verbs, (not even thofe of foreign extract,) otherwife than by prefixing particles fometimes of one or more fyllables, and fometimes of a fingle letter, which denote the cafe, gender, number, and perfon; feveral of them being often joined together in one word, and the primitive word ufually placed laft. Hence the difficulty of this tongue confifts in the incredible combination of the words and particles, in the change of the vowels, and in tranfpofing the middle part of the word, and in adding fuperfluous letters; fo that it requires great labour and fkill to diftinguifh them.

From numerous and minute refearches, Mr. Browne is led to affirm, that the Cophtic language may be confidered as extinct: although in Upper Egypt, they unknowingly retain fome Cophtic words.

F. Kircher is the firft who publifhed a grammar and vocabulary of the Cophtic. There is not known any book extant in the Cophtic, except tranflations of the Holy Scriptures or of ecclefiaftical offices; or others that have relation to thefe, as dictionaries, &c.

Dr. Woide, who began his Coptic ftudies at Leyden, and was affifted in them by Saholtz, the editor of La Croze's Coptic lexicon, returned his obligations by the fervices which he rendered to him in that publication. He fuperintended the impreffion of the abridgement of it, which was publifhed at Oxford, and there applied himfelf to the ftudy of the Sahidic dialect, or that of the Upper Egypt. In 1778, he publifhed the celebrated Coptic and Sahidic grammar of Saholtz, under the following title: "CHRIS. SAHOLTZ *Grammatica Egypti utriufque Dialecti, quam breviavit, illuftravit, edidit* C. G. WOIDE." An excellent Coptic grammar was alfo publifhed at Parma, in 1783, under the title, "*Didymi Taurinenfis Literaturæ Copticæ Rudimentum.*"

COPHTIC, or COPTIC *Bible*. See *Coptic* BIBLES.

COPHTIC *Liturgies* are three; one attributed to Bafil; another to St. Gregory, and the third to Cyril: they are tranflated into Arabic for the ufe of the priefts and people.

COPHTOS, in *Geography*. See COPTOS.

COPIA CLAUDIA AUGUSTA COLONIA, a name given to the modern Lyons.

COPIA *Cornu*. See CORNUCOPIA.

COPIA *libelli deliberanda*, in *Law*, a writ that lay where a man could not get the copy of a libel at the hand of a judge ecclefiaftical, to have the fame delivered to him. Reg. Orig. 51.

COPIÆ, in *Ancient Geography*, a town of Italy, in the gulf of Tarentum; called alfo *Sybaris*.

COPIÆ *Militares*, *military forces*, a military body inftituted particularly by Auguftus, for the defence of the Roman empire. It was divided into three claffes or defcriptions. The firft, called *copiæ clafficæ*, was deftined to defend the feas and rivers againft the incurfions of pirates, and to protect navigation; the fecond, called *copiæ provinciales*, defended the frontiers, and encamped or fojourned in the frontier towns, as neceffity or occafion required; and the third, called *copiæ urbanæ*, remained at Rome, as a guard for the capital, and alfo for the emperor, in cafe of need.

COPIÆ *Provinciales*. See COPIÆ *Militares*.

COPIÆ *Urbanæ*. See COPIÆ *Militares*.

COPIAPO, in *Geography*, one of the thirteen provinces into which the kingdom of Chili in South America is divided. It is fituated in the moft northern part of the kingdom, and is one of the richeft metallic countries in the world. In this province are two mountains entirely compofed of cryftallized fulphur, fo pure that there is no occafion for refining it. It has alfo mines of gold, filver, iron, copper, and lead. The whole foil is impregnated with falgem; and falt-petre is common. It furnifhes alfo turquoifes, that is, teeth or bone coloured green by metallic vapours. In this province and that of Coquimbo little rain falls; and earthquakes are feldom known in either of them. It has two ports; one of the fame name, and another which lies 30 leagues further to the fouth, and confifts only of a few huts.

COPIAPO, a town of Chili, in the fore-mentioned province, to which it gives name; fituated about 12 leagues from the fea-coaft, very irregularly built, but containing between three and four hundred families. S. lat. 26° 50'. W. long. 70° 18'.

COPIAPO, a river of S. America, in Chili, which runs into the Pacific Ocean, a little to the north of the town of Copiapo.

COPIATA, under the *Weftern Empire*, a *grave-digger*. In the firft ages of the church, there were clerks deftined for this employment. In the year 357, Conftantine made a law in favour of the priefts *copiatæ*, *i. e.* of thofe who had the care of interments; whereby he exempts them from the luftral contribution which all other traders paid.

It was under him alfo that they firft began to be called *copiatæ*, *q. d.* clerks deftined for bodily labour, from κοπος, of κοπτω, *fcindo*, *cædo*, *ferio*, *I cut*, *beat*, &c. Before that time they were called *decani* and *lecticarii;* perhaps, becaufe they were divided by decads or tens, each whereof had a bier or litter for the carriage of the dead bodies. Their place among the clerks was the next in order before the chantors.

COPING OVER, in *Carpentry*, a fort of hanging over, not fquare to its upright, but bevelling on its under fide till it end in an edge.

COPING, among *Builders*, fignifies the top or covering of a wall. The beft copings are of hewn ftone, where it can readily be procured: in other fituations, where large paving-bricks are made of a good and durable quality, thefe may with propriety be ufed flat for coping. Bricks of particular fhapes are often made for coping, either to be ufed fingly, or firft a courfe of two bricks in width, to form a projection for fhooting the wet off the faces of the wall, and then a half cylindrical brick for completing the coping. Several years ago, Mr. Peter Wych communicated to the Society of Arts in London (Doffie's Memoirs, vol. ii. p. 16.) a method of making a durable coping for garden walls, of a mixture of baked gypfum and coal-afhes. We lately obferved on the Grand Junction Canal, that feveral of their bridges have been repaired, where the coping ftones were broken by accidents, with Parker's Roman cement; and that others of their bridges and walls were wholly coped with this compofition, which appeared little inferior to ftone in hardnefs, and lefs brittle than moft kinds of coping-ftones are. See CANAL. In ftony diftricts, where the fields are feparated by rough and dry ftone walls, the fame are ufually coped by a row of rough and triangular ftones, fet edgeways on the top of the wall. The cementing of thefe together with a little good mortar is a good practice. Where the ftone is lefs hard or durable, thefe kinds of dry walls are fometimes coped with a circular ridge of good but very coarfe mortar, prepared for the purpofe. The practice of properly fecuring and

and attending to the coping of dry-built walls cannot be too much enforced, for want of which the rubbing of cattle and other accidents foon make breaches in fuch walls, that are very expenfive to repair. In fome counties, where ftone is very fcarce, and fuel for burning bricks very dear, garden and other walls are made of mud or temp-red clay, with a mixture of chopped ftraw or ftubble to hold them together; and fuch are fometimes thatched with ftraw, by way of coping: for both thefe, and the *pisé* walls, compofed of dry earth rammed together in a mould, which have lately been introduced in England, muft be carefully preferved from the wet by a fecure coping, or they foon moulder into their original dirt.

COPLAND, in *Geography*, the name of a clufter of fmall iflands in the north Channel, nearly oppofite to Donaghadee, in the county of Down, Ireland. One of them has a few cabins upon it; and another has a light-houfe, which is very ufeful to thofe going to Belfaft, or croffing the Channel between Donaghadee and Portpatrick. That which has the light-houfe on it is in W. long. 5° 24'. N. lat. 54° 39'.

COPLE, a vicarage in Bedfordfhire, in Wixamtree hundred, is remarkable for being formerly the refidence of fir Samuel Luke, and of Butler, the author of Hudibras, which celebrated poem is fuppofed to have been written at Wood-End houfe, in this parifh. The Oufe navigation paffes the northern extremity of this parifh; and fome years ago, a cut was made, a mile or more in length, for conveying barges up to a new houfe and premifes, intended as a wharf, (now the Dog ale-houfe;) but for want of previous confent on the part of the owner of this part of the Oufe navigation, it was not permitted to be ufed. See CANAL. The fubfoil or ftrata in this parifh is clay throughout, with lime-ftone at a confiderable depth beneath the furface: for a confiderable width next the Oufe the clay is covered with gravel, and produces good turnip land.

COPOS, from κοπος, *labour*, in *Medical Writers*, is ufed for a wearinefs of the body, when the mufcles, or their fibres rather, are loaded and obftructed with vifcous humours, fo as to render them unfit for motion.

COPPA, IL CAVALIER, called *Ant. Giarola*, in *Biography*, an hiftorical painter, who was born at Verona about the year 1595, and became fucceffively the fcholar of the celebrated Bolognefe mafters, Guido and Albano. He is confidered one of the beft imitators of the graceful and delicate manner of the former, although in his compofitions he is fometimes too crowded; and he was ranked by his fecond mafter, Albano, amongft his moft favoured difciples. He was fome time painter to the court of Mantua, the churches of which city are enriched by many of his principal works. He died in the year 1665. Lanzi. Storia Pitt.

COPPA, in *Law*, a cop or cock of grafs, hay, or corn, divided into titheable portions; as the tenth cock, &c. This word in ftrictnefs denotes the gathering or laying up the corn in copes or heaps, as the method is for barley or oats, &c. not bound up, that it may be the more fairly and juftly tithed: and in Kent they ftill retain the word, a *cop* or *cap* of hay, ftraw, &c.

COPPARBERG, in *Geography*, one of the twenty-eight governments into which the kingdom of Sweden is divided, comprizing the province of Dalecarlia, is alfo called *Fahlun*, and *Gamla Copparberger*, old copper mines. It is a large, populous mine town, fituated between two lakes and two mountains; 36 miles W. of Gefle, 24 N.E. of Hedemora, in N. lat. 60° 30'. The ftreets are regular, but the houfes are all of wood, except the town's hall and two churches, the roofs of which are covered with copper. It is the fifteenth among the towns that vote in the Swedifh diet. The governor refides at *Noor*, a royal manor near the town. The famous copper mine, which Guftavus Adolphus ufed to call the Swedifh exchequer, lies a little to the weft. It has been worked one thoufand years, and its copper is ftill reckoned the beft in Europe. From 1633 to 1761 it yielded 1,180,724 Swedifh fhippounds. Its greateft produce was in the year 1650, when it gave 20,321 fhippounds. Since the year 1780, it yields nearly 6000 fhippounds annually; but the expences increafe in proportion, as the miners muft go to a greater depth. In 1801, the mine was faid to be 1080 feet deep, and to give employment to 1200 workmen. The copper is found in large maffes. Catteau Tableau de la Suede. Schlözer's Briefwechfel.

COPPAY, one of the fmall weftern iflands of Scotland; 2 miles W. from the S.W. extremity of the ifland of Lewis.

COPPEL, COPEL, or CUPPEL, in *Chemiftry*. See CUPPELL.

COPPELLING. See CUPPELLATION.

COPPENBRUGGE, in *Geography*, a town of Germany, in the circle of Weftphalia, and county of Spiegelberg; 19 miles S.W. of Hanover.

COPPER, *Kupper*, Germ. *Cuivre*, Fr. *Cuprum*, *Aes*, Lat. *Venus*, Alchem.

Copper is a ductile and malleable metal, of a pale yellowifh red colour. It is foluble in moft acids, and is precipitable from them in the metallic ftate, by iron or zinc: its oxyd is foluble in ammonia, to which it communicates a bright blue purple colour.

§ 1. *Ores of Copper.*

Sp. 1. Native copper. *Gediegen Kupper*. *Cuivre natif*.

Its colour is a clear copper-red, often tarnifhed, externally yellowifh, blackifh, or whitifh.

It occurs in mafs, diffeminated, in leaves and grains, alfo capillary, mofs-like, dendritical and cryftallized. The regular forms that it prefents, are the cube, the octohedron, and the pyramidal dodecahedron often with a fhort fix-fided prifm interpofed.

The cryftals are fmall, and generally implanted in each other, forming cluftered maffes. Its luftre internally is gliftening and metallic; its fracture is hackly: when cut or rubbed, it acquires a high metallic luftre. It is not very hard, is malleable and flexible, but not elaftic, is tough and difficultly frangible. Sp. gr. 7.72.—8.58.

It is fufible before the blow-pipe, and appears to be pure copper.

It occurs in veins and beds in various primitive and fecondary mountains, accompanied by many of the other ores of copper, alfo by galena, horn filver, native filver, calcareous, heavy, and fluor fpars.

It is very extenfively, but not very abundantly, diffufed; the largeft maffes appear to be procured from the copper mine river, within the arctic circle in North America; it is alfo of frequent occurrence in Japan and Brazil, in Siberia, Hungary, Norway, Sweden, Saxony, and Cornwall.

Sp. 2. Vitreous copper. *Kupferglas*. *Cuivre vitreux*.

Its colour is dark lead-grey, paffing into blackifh-grey; it is often covered fuperficially by a fteel-coloured tarnifh. It occurs in mafs, diffeminated or cryftallized. The forms of its cryftals are the cube, the octohedron, and a hexahedral prifm, fometimes terminated by trihedral fummits. The cryftals are fmall; externally they are fhining, internally they exhibit a gliftening metallic luftre. The fracture is fine-grained, uneven, paffing into conchoidal. It gives a fhining

ſhining ſtreak, is blackiſh when pulverized; is ſomewhat brittle, and eaſily frangible. Sp. gr. 4.1.—5.4.

It effervеſces with nitrous acid, and when expoſed to the blow-pipe, gives a metallic button of a ſteel-grey colour, and generally attractible by the magnet.

When pure, it appears to be a ſimple ſulphuret of copper, conſiſting, according to Chenevix, of

81	Copper
19	Sulphur
100	

It is generally however mixed with iron in the proportion of from 3 to 6 *per cent.* A ſpecimen from Siberia was analyzed by Klaproth, and afforded

78.5	Copper
18.5	Sulphur
2.25	Iron
0.75	Silex
100.	

It occurs in veins and beds in primitive and ſecondary mountains, accompanied by copper pyrites, and other ores of this metal. It is not very abundant, but is found in various places, eſpecially Cornwall, Hungary, Saxony, Norway, and Siberia.

Sp. 3. Variegated copper. *Buntkuppererz.*

Its colour is intermediate between copper-red, and Tombac brown; by expoſure to the air it acquires a ſuperficial tarniſh, which is firſt reddiſh, then violet, afterwards blue, and laſtly green. It occurs in maſs, diſſeminated, ſuperficial, or cryſtallized in octohedrons. Internally it is ſhining, with a metallic luſtre. Its fracture is ſmall, and imperfectly conchoidal, paſſing into fine-grained, uneven. It takes a poliſh by friction, and gives a reddiſh coloured ſtreak. It is ſoft, ſomewhat brittle, and eaſily frangible. Sp. gr. 4.9. 5.4.

It effervеſces with nitrous acid, and melts readily before the blow-pipe, without vapour or odour. Two ſpecimens, the one from Hitterdahl in Norway, and the other from Rudelſtadt in Siberia, have been analyzed by Klaproth, with the following reſults.

Hitt.	Rud.	
69.5	58.	Copper
19.	19.	Sulphur
7.5	18.	Iron
4.	5.	Oxygen
100.	100.	

This ore occurs in beds, veins, and diſſeminated through rocks, for the moſt part belonging to the claſs of primitive. It is uſually accompanied by vitreous copper, and copper pyrites. It is found in Cornwall, in Hungary, Saxony, Norway, and Sweden.

Sp. 4. Copper pyrites. *Kupferkies. Pyrite cuivreuſe.*

Its colour is deep braſs-yellow, paſſing into gold-yellow. Its ſurface is often irideſcently tarniſhed. It occurs in maſs, diſſeminated, ſuperficial, ſtalactitical, cluſtered, reniform and cryſtallized in tetrahedrons, and the derivative octohedron, and dodecahedron. The cryſtals are uſually very ſmall and imperfect. The ſurface of the cryſtals is ſmooth and ſhining; that of the other varieties is rough and glimmering. The fracture is coarſe or fine-grained, uneven, paſſing into conchoidal, and imperfectly foliated. It is brittle, and with difficulty gives a few feeble ſparks with the ſteel; it may be readily cut by a knife. Sp. gr. 4.—4.1.

When expoſed to the blow-pipe on charcoal, it decrepitates, emits a ſulphureous vapour, and melts into a black globule, which, by further application of the heat, acquires the colour and luſtre of copper. It does not appear that the cryſtallized varieties of this ore have been regularly analyzed, and the proportion of its conſtituent parts cannot be eſtimated from the other varieties, on account of the iron pyrites, with which they are always more or leſs mixed. A ſpecimen analyzed by Lampadius afforded

41.	Copper
17.1	Iron
45.1	Sulphur
103.2	

The richer this ore is in copper, the ſofter it is, and its colour approaches the more to that of gold. It ſeldom, however, in the large way, affords more than 20 *per cent.* of copper. It may readily be diſtinguiſhed from iron pyrites (the only ſubſtance with which it is likely to be confounded) by the pale braſs yellow colour, and ſuperior hardneſs of the latter.

Copper pyrites is the moſt abundant, and moſt generally diffuſed of any of the ores of this metal. It occurs in veins and beds in primitive, tranſition, and ſecondary rocks, in moſt countries of the world.

Sp. 5. White copper. *Weiſs Kuppererz. Mine de cuivre blanche.*

Its colour is intermediate between ſilver-white and braſs-yellow. It occurs in maſs or diſſeminated. Internally it has a ſlight metallic luſtre. Its fracture is ſmall, and fine-grained uneven. It yields readily to the knife, is brittle, and eaſily frangible. Sp. gr. 4.5.

Before the blow-pipe it yields a white ſmoak, and an arſenical odour, and melts into a blackiſh ſlag. According to Henckel it yields about 40 *per cent.* of copper, the reſt being iron, arſenic, and ſulphur.

It occurs in veins and beds, in primitive mountains, and is generally accompanied by copper pyrites and vitreous copper.

It is found in Cornwall, Saxony, Sileſia, Hungary, Siberia, and Chili in South America.

Sp. 6. Grey copper. *Fahlerz. Cuivre gris.*

Its uſual colour is ſteel-grey, which paſſes into iron-black and lead-grey; ſome varieties incline towards yellow and others again preſent ſuperficial irideſcent colours. It occurs in maſs, diſſeminated or inveſting, or cryſtallized in regular tetrahedrons and their modifications. The cryſtals are ſmall, with ſhining ſurfaces. Internally it is gliſtening, or ſhining with a metallic luſtre. The fracture is coarſe, and ſmall-grained, uneven, inclining to imperfectly conchoidal. It gives a black or reddiſh-brown powder. It is moderately hard, brittle, and eaſily frangible. Sp. gr. 4.46.—4.36.

The only neceſſary ingredients of this ſpecies (as appears from an analyſis by Chenevix; of the cryſtallized variety) appear to be copper, iron, and ſulphur in the following proportions, *viz.*

52	Copper
33	Iron
14	Sulphur
99	

The uncryſtallized varieties, however, generally contain alſo antimony, ſilver, and lead, but in very variable proportions.

tions. In several varieties from Germany, Mr. Chenevix found antimony varying in proportion from 5 to 38 *per cent.* but neither lead nor silver. Two specimens, the one from Andreasberg, and the other from Crannitz, have been analyzed by Klaproth with the following results.

Copper	31.36	16
Iron	3.3	13
Sulphur	11.5	10
Antimony	34.09	16
Silver	14.77	2.25
Lead	0.	34.
Silex	0.	2.5
	95.02	93.75

Finally, a specimen from Piedmont has been examined by Napione, and found to consist of

Copper	29.3
Iron	12.1
Sulphur	12.7
Antimony	36.9
Silver	0.7
Arsenic	4.
Alumine	1.1
	96.8

Those specimens that give a reddish-brown streak, are generally the most abundant in silver.

It occurs in veins in slate, and some other of the newest primitive rocks, and in beds in the transition and floetz rocks. It is accompanied by copper pyrites, galena, manganese, spathose iron, and rarely by malachite. When it contains a notable proportion of silver, it is considered and worked as an ore of this metal.

It is found in Cornwall, and in the county of Ayr in Scotland; also in Bohemia, Hungary, Transylvania, Saxony, Hesse, the Hartz, France, Spain, Piedmont, Sweden, Norway, Siberia, and Chili.

Sp. 7. Black copper. *Kupperchwartze. Cuivre noir.*

Its colour is intermediate, between blueish and brownish black. It occurs in mass, disseminated or investing. It is composed of dull moderately cohering particles. It is friable, slightly soils the fingers, is meagre to the feel, and heavy.

Before the blow-pipe it emits a sulphureous odour, and melts into a slag that colours borax green. It has not been regularly analyzed, but is said to contain from 40 to 50 *per cent.* of copper.

It occurs with other ores of copper, particularly copper pyrites, malachite, mountain green, and vitreous copper.

It is found of remarkable beauty, at Kupperberg, in Silesia, also in Saxony, Hungary, Norway, and Siberia.

Sp. 8. Ruby copper. *Roth. Kuppererz. Cuivre oxydé rouge.*

Of this species, there are the three following varieties.

Var. 1. Lamellar.

Its colour is dark cochineal red, inclining sometimes to lead-grey; when crystallized it is often of a full carmine red. It occurs in mass, disseminated and crystallized in cubes, and aluminiform octohedrons. The crystals are small, and for the most part laterally aggregated; their surfaces are smooth and shining. Its internal lustre is more or less shining, and is intermediate between metallic and adamantine. Its fracture is imperfectly foliated, passing into granular uneven. When in mass it is usually opake, or at most translucent on the edges; the crystals are transparent, verging into translucent. It gives a brownish brick-red streak, is moderately hard, brittle, and easily frangible. Sp. gr. 3.95.

By exposure to the blow-pipe on charcoal, it is easily reducible to a metallic bead, without emitting either odour, or smoak. It dissolves in the nitrous and muriatic acids, in the former with, and in the latter without, effervescence. According to Mr. Chenevix, it consists of

88.5	Copper
11.5	Oxygen
100.	

It is met with chiefly in veins, and appears to be peculiar to primitive mountains. It is accompanied by native copper and other ores of this metal. It is found in Cornwall, in Hungary, Saxony, the Hartz, Siberia, Peru, and Chili.

Var. 2. Capillary.

This variety differs from the preceding in being of a somewhat lighter colour, superior lustre, and being composed of small capillary crystals and thin flakes.

Var. 3. Compact.

It occurs in mass and disseminated, but never crystallized. Its internal lustre is glimmering, semi-metallic: its fracture is even; and it is opake. In other respects it agrees with var. 1.

Sp. 9. Tile-red copper. *Ziegelerz.*

This species presents two varieties, indurated and earthy.

Var. 1. Indurated.

Its colour is intermediate between hyacinth and brownish-red, passing on the one hand into lead-grey, and on the other into reddish-brown. It occurs massive and disseminated. The reddish kind has a glimmering lustre and flat conchoidal fracture; the browner kind has a somewhat resinous lustre and a small conchoidal fracture. It acquires a lustre by friction, is moderately hard and brittle.

When exposed to the blow-pipe it becomes black, and is infusible without addition. Borax is tinged by it of a dirty green. It appears to be an intimate mixture of compact ruby copper with brown iron ochre, and its produce of copper varies from 10 to 50 *per cent.*

It occurs in veins with ruby copper, malachite, copper pyrites, and iron ochre.

Var. 2. Earthy.

Its colour is hyacinth-red, passing into reddish or yellowish brown. Its texture is between friable and solid. It occurs in mass, disseminated, and investing copper pyrites. It is without lustre, has an earthy fracture, and slightly soils the fingers. In its other characters it agrees with the preceding variety.

Sp. 10. Mountain blue. *Kupperlazar. Cuivre carbonaté bleu.*

Of this there are the two following varieties.

Var. 1. Radiated.

Its principal colour is sky-blue, which passes into Prussian and indigo-blue. It occurs in mass, disseminated or investing, more frequently botryoidal, stalactitic, and cellular, but most frequently crystallized in oblique rhomboidal prisms or octohedral prisms with dihedral summits. The crystals are generally very small and aggregated into globular masses or bundles. The crystallized varieties are externally shining, but the rest are dull. Internally it is shining or glittering, with a lustre between vitreous and resinous. Its fracture is straight or divergingly radiated, rarely lamellar. The crystals are translucent and semi-transparent, the other varieties are

are opake, or at moſt tranſlucent on the edges. When pulverized it is of a ſky-blue colour. It is ſoft, brittle, and eaſily frangible. Sp. g. 3.2.—3.4.

It is very difficult of fuſion before the blow-pipe, *per ſe;* but with borax it gives a bright green glaſs, and a metallic globule.

According to Pelletier it conſiſts of

66	to	70	Copper
18	—	20	Carbonic acid
8	—	10	Oxygen
2	—	—	Water

Var. 2. Earthy.

Its colour is ſmalt-blue: it occurs rarely in maſs, generally diſſeminated or ſuperficial: it is compoſed of fine pulverulent cohering dull particles. Its fracture is fine-grained earthy, paſſing into even and imperfectly conchoidal. It is opake, ſlightly ſtains the fingers, and is eaſily frangible.

Before the blow-pipe it becomes black, but does not melt. In borax it diſſolves with great ebullition, and forms a green glaſs.

Mountain-green occurs in the newer primitive rocks, but more commonly in floetz mountains. It accompanies other ores of copper, eſpecially malachite, grey copper, and copper pyrites. The moſt beautiful ſpecimens come from the Bannat in Hungary, and from Siberia. In the Tyrol it is found in ſufficient plenty to be manufactured into the pigment called mountain-blue.

Sp. 11. Malachite.

Of this there are the two following varieties.

Var. 1. Fibrous.

Its common colour is graſs-green paſſing into emerald-green, and ſometimes into dark leek-green. It ſeldom occurs maſſive or diſſeminated, but generally inveſting, and often cryſtallized in ſhort capillary needles, diſpoſed in divergent bundles, or ſtars. Externally they are ſhining, but internally only gliſtening with a ſilky luſtre. Its fracture is delicate, diverging fibrous, paſſing into coarſe fibrous. It is opake or tranſlucent on the edges; the cryſtals are for the moſt part tranſlucent. When pulverized it retains its colour, only the tint is ſomewhat lighter. It is very ſoft, brittle, and eaſily frangible. Sp. gr. 3.5.

It effervеſces with acids, and forms a blue ſolution with ammonia. Before the blow-pipe it blackens and decrepitates, but is infuſible, *per ſe.* With borax it melts into a green glaſs. Its conſtituent parts, according to Klaproth, are

58	Copper
18	Oxygen
12.5	Carbonic acid
11.5	Water
100	

It occurs uſually in the newer primitive and floetz mountains, accompanied by other ores of copper, alſo by carbonat of lead, calcareous ſpar, brown ſpar, and quartz. The fineſt ſpecimens of this variety of malachite are found in the Siberian and Hungarian mines; it occurs alſo in Saxony and other mining diſtricts in Germany, in Norway, and in Shetland, and the counties of Cornwall and Derby in Britain.

Var. 2. Compact.

Its colour is emerald-green paſſing into graſs and verdegris-green, the ſame ſpecimen exhibiting different ſhades of colour: its external ſurface is commonly overſpread with a greeniſh-white cruſt. It occurs maſſive and diſſeminated, but moſt frequently reniform, botryoidal, mamillated, ſtalactitic, or globular. Externally it is rough and dull; internally it is, according to the fracture, either dull, gliſtening, or ſhining. Its fracture is conchoidal, or fine-granular uneven, or minutely fibrous. It generally occurs in thin lamellar concentric diſtinct concretions, each of which has uſually a different ſhade of colour. It is opake, ſoft, brittle, and eaſily frangible. Sp. gr. 3.5.—3.6.

Its chemical characters and component parts are nearly the ſame as thoſe of the preceding variety, with which it alſo agrees in its geognoſtic and geographical ſituation.

Its beautiful colour, luſtre, and the high poliſh that it is capable of receiving, render it much ſought after for various ornamental purpoſes: it would however be much more eſteemed if it was harder.

Sp. 12. Mountain-green. *Kuppergrün. Vert de cuivre.*

Its colour is verdegris-green, paſſing occaſionally into emerald-green and ſky-blue. It occurs in maſs, diſſeminated or inveſting. Internally it is ſhining paſſing into glittering, with a reſinous luſtre. Its fracture is ſmall conchoidal. It is tranſlucent and ſemi-tranſparent; is ſoft and eaſily frangible.

Its chief chemical character is that of giving little or no effervеſcence, while diſſolving in acids. It has not been analyzed. It is found in ſimilar ſituations with malachite, but is of much rarer occurrence.

Sp. 13. Emerald copper. *Kupferſchmaragd. Dioptaſe* of Hauy.

Its colour is emerald-green. It occurs cryſtallized in lengthened dodecahedrons. It is ſhining both externally and internally, and has a vitreous luſtre. It is tranſlucent, paſſing to ſemi-tranſparent; ſcratches glaſs feebly, and with difficulty; is brittle. Sp. gr. 3.3.

Before the blow-pipe it becomes of a cheſnut-brown colour, and is infuſible, *per ſe.* With borax it gives a bead of copper. According to an analyſis by Vauquelin it conſiſts of

25.57	Oxyd of copper
42.85	Carbonat of lime
28.57	Silex
96.99	

It has hitherto been found only in Daouria on the Ruſſian and Chineſe frontiers in a vein accompanied by malachite.

Sp. 14. Micaceous copper. *Kupferglimmer.*

Its colour is deep emerald-green paſſing to verdegris-green. It occurs maſſive, diſſeminated, and cryſtallized in hexahedral tables. Externally it is ſmooth and ſhining with a pearly luſtre. Its fracture is foliated. It is tranſlucent paſſing into ſemi-tranſparent. It is ſofter than calcareous ſpar. Sp. gr. 2.54.

It decrepitates ſtrongly when ſuddenly heated, and is compoſed, according to Chenevix, of

58	Oxyd of copper
21	Arſenic acid
21	Water
100	

It is found in Huel Gorland mine in Cornwall, in veins accompanied by vitreous copper, copper pyrites, arſenical pyrites, and iron ochre.

Sp. 15. Octohedral arſeniat of copper. *Linſenerz* of Werner.

Its colour is deep ſky-blue, paſſing into Pruſſian-blue, blueiſh-white, apple-green, and graſs-green. It occurs in obtuſe pyramidal octohedrons. The cryſtals are ſmall and aggregated into cluſters; they have a ſhining vitreous luſtre, and

and a lamellar fracture, are femi-tranfparent paffing into tranfparent. In hardnefs they are inferior to fluor fpar. Sp. gr. 2.88.

It is compofed, according to Chenevix, of

49	Oxyd of copper
14	Arfenic acid
35	Water
98	

It is found in the fame mine as the preceding fpecies.

Sp. 16. Foliated arfeniat of copper. *Blattriges olivenerz* of Werner.

Its colour is olive-green, paffing to oil and leek-green. It occurs rarely maffive, and generally cryftallized in acute rhomboids and oblique quadrilateral prifms. The furfaces of the cryftals are fmooth and fhining. Internally it is gliftening and fhining, with a diamond luftre. Its fracture is imperfectly foliated. It is tranflucent paffing into tranfparent. It is fomewhat harder than calcareous fpar. Its component parts, according to Chenevix, are,

54	Oxyd of copper
30	Arfenic acid
16	Water
100	

It is found in the fame mine with Sp. 14.

Sp. 17. Fibrous arfeniat of copper. *Fafriges olivenerz.* Werner.

Its colour is brownifh, or dark bottle green, paffing into yellowifh; when capillary it is of a lighter and brighter colour. It occurs cryftallized in an irregular acute octohedron, or a long compreffed hexahedral prifm, or capillary. Sometimes the cryftals are regular at one extremity, and terminate in capillary brufhes at the other. The cryftals are fmall and laterally aggregated. It has a confiderable luftre between vitreous and refinous, is tranflucent paffing to tranfparent; is harder than fluor fpar, but will not fcratch glafs. Sp. gr. 4.28. It paffes into the two following varieties.

1. Amianthiform.

Its colour varies from blueifh-green to grafs-green, brown-green, ftraw-yellow, and white. It occurs in extremely minute parallel, or diverging flexible fibres, or thin dufty flexible laminæ, with more or lefs of a fattiny luftre.

2. Hæmatitiform.

Its colour is brownifh or whitifh-yellow. It occurs in flat or mamillated layers, either fmooth or varied with fmall rough cryftalline points.

Its texture is fibrous but very compact, refembling wood-tin.

The above fpecies, with its varieties, has been analyzed by Mr. Chenevix, with the following refult:

Prifmatic.	Capillary.	Hamatiff.	
60.	51.	50.	Oxyd of copper
39.7	29.	29.	Arfenic acid
0.	18.	21.	Water
99.7	98.	100.	

It is found in Huel Gorland mine, in Cornwall.

Sp. 18. Phofphat of copper.

Its colour is, externally, greyifh-black; internally, between emerald and verdegris-green. It occurs in mafs, diffeminated and cryftallized in rhomboids. The cryftals are fmall and very fmall; their luftre is externally vitreous and fhining. Internally, it is gliftening with a filky luftre. Its fracture is fine and diverging fibrous. It is opake, and moderately hard. It confifts, according to Klaproth, of

68.13	Oxyd of copper
30.95	Phofphoric acid
99.08	

It has hitherto been found only at Firneberg in Cologne, in white drufy quartz.

Sp. 19. Sandy copper. *Saltzkuppererz.* Werner.

Its colour is emerald-green, paffing into leek and olive-green. It occurs maffive, diffeminated, and cryftallized in extremely minute fix or four-fided prifms. The furface of the cryftals is fmooth and brilliant; and their fracture lamellar. The maffive variety is opake; the cryftals are tranfparent. It is foft and eafily frangible. Sp. gr. 4.43.

Before the blow-pipe on charcoal, it tinges the flame of a bright green and blue colour, and a metallic globule remains behind. It is foluble in nitrous acid, without effervefcence. The following are its conftituent parts, according to Prouft and Klaproth.

Prouft.		Klaproth.	
From Peru.	Chili.	Chili.	
76.595	70.482	73.	Oxyd of copper
10.638	11.446	10.1	Muriatic acid
12.767	18.072	16.9	Water
100.	100.	100.	

It is found loofe in the bed of a river at Kernolinos, in Chili, and elfewhere, though rarely in Spanifh South America.

§ 2. *Affay and Analyfis.*

The affay of copper ores, (though by no means fo accurate a method of afcertaining their metallic contents as a regular analyfis) being the method by which the market price of the ore is always determined, requires the firft notice. The beft method, upon the whole, of conducting it, is as follows.

Firft, expofe a fmall piece of the ore, under examination, to the action of the blow-pipe, and by the appearance and odour of the vapour given out, it is eafy to difcover whether it contains any arfenic or fulphur. It may very probably contain both, in which cafe, take 300 grains of the ore coarfely pulverized, mix it with half its weight of fawduft, and keep it at a moderate red heat in an earthen crucible, till the difengagement of arfenical vapour entirely ceafes. Then pour the contents of the crucible into an iron mortar, and reduce them carefully to a fine powder. Transfer this powder to a teft, and expofe it to a good red heat, with occafional ftirring, till both the charcoal and fulphur are burnt off. The refidue is then to be accurately mixed with $\frac{1}{12}$ of its weight of lamp-black, half its weight of *pulverized* glafs of borax, and a drop or two of oil; the mafs thus formed, is to be put into a found earthen crucible, a cover is to be luted on, and the whole is to be placed in a good wind furnace. The heat fhould be moderate for the firft quarter of an hour, to allow the borax time to combine with the earthy impurities of the ore; then a moderate white heat is to be applied for about twenty minutes. After this, the crucible being withdrawn and cooled, is to be carefully

fully broken, and will be found to contain a button of copper, covered by vitreous fcoriæ. The purity of the copper thus procured, is to be eftimated from its colour, foftnefs, malleability, and tenacity; after which, a part of it may be cupelled with pure lead, in order to afcertain whether it holds any filver or gold. If the ore contains fulphur, but no arfenic, it may be mixed with half its weight of charcoal, and roafted on a teft, without being previoufly heated in the crucible. If the ore contains neither fulphur nor arfenic, it fhould be firft moderately ignited in a covered crucible, to drive off any moifture, and may then be treated with borax and lamp black, as already defcribed.

The proper analyfis, by means of liquid menftrua, is however much more accurate than even the moft carefully conducted affay, and the general mode of proceeding with the ores of copper is, upon the whole, very fimple. The copper, together with the other metals with which it may happen to be mixed, is to be feparated from the filex and fulphur, by means of an acid, the other metals are then to be got rid of by their appropriate reagents, and the copper is then to be procured either in the ftate of green carbonat, of black oxyd, or of pure metal; of the firft, 180 parts are equivalent to 100 of metallic copper; and of the fecond, 100 parts contain 80 of metal.

Previoufly to undertaking an analyfis, a part of the fpecimen, under examination, fhould be fubjected to the ufual reagents, in order to afcertain not indeed the proportion, but the nature of the ingredients of which it confifts; and, in few cafes is this more neceffary than in the analyfis of the ores of copper, both as they are fo numerous and fo various in their compofition. This previous examination being duly performed, the analyfis may be conducted in the following manner:

For the analyfis of the *pyritical,* and other *fulphurized ores of copper,* provided they contain neither filver nor lead, take 200 grains of the pulverized ore, and digeft it at a boiling heat with muriatic acid, (adding occafionally a few drops of nitric acid) till every thing foluble in this menftruum is taken up. Of the infoluble portion, a part, confifting chiefly of fulphur, will be found floating on the liquor; and this being wafhed, dried, and weighed, is to be ignited on a teft, by which the fulphur will be burnt off, and its amount may be eftimated from the lofs of weight fuftained by the procefs. The incombuftible refidue is to be digefted in a little warm muriatic acid, and what remains infoluble, is to be added to the other infoluble refidue. The muriatic folutions being mixed together, the whole is to be decompofed by carbonated potafh, and the precipitate, hence refulting, is to be digefted in repeated portions of cauftic ammonia, as long as this latter acquires any blue tinge. The whole of the copper, and nothing elfe, will thus be taken up by the ammonia, from which it may be obtained in the ftate of black oxyd, by the addition of a little cauftic potafh, and a boiling heat. The refidue, infoluble in ammonia, confifts of oxyd of iron, with perhaps a little alumine, which may be feparated by cauftic potafh, the alumine alone being foluble in this fluid. Finally, the portion infoluble in muriatic acid, may be confidered as little elfe than filex.

The ores which, befides *copper*, *fulphur*, and *iron*, contain *filver*, *lead*, and *antimony*, may be thus analyzed. The ore, reduced to fine powder, is to be repeatedly digefted with moderately diluted nitric acid, as long as any thing continues to be taken up by this menftruum. To the nitric folution is then to be added muriat of foda, which will throw down the filver in the ftate of luna cornea; this being feparated, the lead is to be precipitated in the form of fulphat, by fulphat of foda; the folution is now to be fuperfaturated with ammonia, which will diffolve the copper, and leave behind the oxyd of iron, with probably a little alumine and filex. The copper is to be procured from the ammoniacal folution, in the manner directed in the preceding paragraph; and the oxyd of iron may be feparated from the admixed earths, by cauftic potafh. That portion of ore, infoluble in nitric acid, is to be digefted in muriatic acid, which will take up every thing except the fulphur, filex, and probably a little luna cornea. Of this infoluble refidue, the fulphur is to be burnt off by gentle ignition, and the remainder is to be fufed with twice its weight of pearlafh, by which the filver in the luna cornea will be reduced to the metallic ftate. The muriatic folution being concentrated by evaporation, and then poured into a confiderable quantity of water, will depofit the antimony in the form of a white oxyd.

The fimple *oxyds of copper,* are beft analyzed by digeftion in nitric acid, and then fuperfaturating the folution with ammonia, by which any cafual admixture of iron will be feparated.

The *carbonats of copper* are to be thus treated. One portion is to be gently calcined in a covered crucible, and the lofs of weight fuftained, indicates the united amount of the water and carbonic acid. A fecond portion is to be thrown into a known quantity of dilute fulphuric acid, and the lofs of weight, by the effervefcence which enfues, fhows the amount of carbonic acid. The fulphat of copper thus obtained, may be fubfequently decompofed, either by a ftick of zinc, or by liquid ammonia.

The *arfeniats of copper* are moft conveniently analyzed by firft moderately heating them, in order to drive off and thus eftimate the water, and then digefting the refidue in dilute nitric acid, by which it will be entirely diffolved; nitrat of lead is then to be dropped in as long as it occafions any precipitate, and this latter being removed, the fluid is to be evaporated nearly to drynefs, after which, warm alcohol is to be added, which will take up the whole, except a white powder; this powder, and the precipitate on the addition of nitrated lead, are arfeniat of lead, 33.66 *per cent.* of which is arfenic acid. The alcoholic folution is then to be evaporated nearly to drynefs, and then to be digefted with ammonia, which will take up the copper, leaving behind any oxyd of iron that may have happened to be contained in the ore. The ammoniuret of copper, being decompofed by cauftic potafh, gives the copper in the ftate of black oxyd, which is that in which it exifts in the ore.

The analyfis of *muriat of copper* is very fimple. It was thus effected by Klaproth. The ore, being pulverized, was diffolved in cold nitric acid, with the exception of 1.5 *per cent.* of oxyd of iron; the folution being then diluted, nitrat of filver was added, till it occafioned no further precipitate; the luna cornea thus obtained, indicated, according to the known proportions of this falt, the amount of muriatic acid in the ore. The nitrous folution was then decompofed, and the copper obtained in the metallic form, by means of a bar of iron.

Phofphat of copper was thus analyzed by Klaproth. On digeftion in nitric acid, the whole was taken up except a few grains of quartz; the excefs of acid in the folution was then faturated by potafh, and acetite of lead was poured in till it had quite ceafed to occafion any precipitate; the phofphat of lead, thus obtained, was feparated from the folution, and fulphat of foda was added to decompofe and precipitate

precipitate the fmall excefs of acetite of lead which had been made ufe of. A little fulphuric acid was then added to the folution, and the copper was precipitated in the ufual way, by means of a bar of iron.

§ 3. *Reduction of Ores.*

The only ores of copper that are in fact wrought in the large way, and from which the copper of commerce is for the moft part fupplied, are the fulphureous and arfenical ores of this metal. The method of reducing them, though confifting of a great number of proceffes, on account of the powerful affinity, both of the arfenic and fulphur, is yet upon the whole very fimple, being little more than repeated roaftings and fufions, till the metal has acquired the neceffary ductility, for it is never brought to a ftate of abfolute purity, and the commoner forts contain both arfenic and antimony, in fuch proportions, as to be wholly unfit for alloying with either gold or filver.

The rough ore, if fimply fulphureous, is broken into pieces not larger than an egg, and feparated as much as poffible from the adhering earthy impurities; after which, it is piled in large kilns, and heat being applied at the bottom, the whole mafs becomes gradually heated, and a large portion of the fulphur fublimes out, and may be either collected by proper flues, or allowed to efcape; this firft procefs occupies about fix months, at the expiration of which time, the evaporation of the fulphur ceafes, and when the ore has cooled fufficiently, it is in a fit ftate to be fmelted.

If, however, the ore is largely combined with arfenic, it is not capable of keeping up a long combuftion of itfelf, nor is the heat thus generated adequate to the expulfion of the arfenic; a fomewhat different method, therefore, of roafting muft be had recourfe to. For this purpofe the ore is ftill more carefully dreffed than in the former cafe, and is reduced to pieces not larger than a hazle-nut. It is then fpread on the floor of a large reverberatory furnace, and expofed to a dull red heat, with frequent ftirring, in order to offer frefh furfaces to the action of the flame. The arfenic and fulphur by this treatment are rapidly driven off, and in about twelve hours the roafting is completed.

The ore is now transferred into the fufing furnace, which is a reverberatory of the common conftruction; a little bruifed lime-ftone is generally added by way of flux, and in the courfe of four or five hours the fufion is ufually complete; the flag, now of the confiftence of foft dough, is raked off, and the copper is difcharged through a plug-hole into water, by which it is reduced into fmall drops or grains.

The copper, however, though in the metallic ftate, is ftill very impure, being largely mixed with fulphur and arfenic, which give it a grey colour, and render it perfectly brittle. In order to feparate thefe impurities, it is re-melted and granulated twice more or oftener, a confiderable quantity of flag being feparated at each fufion; but as this flag contains fome copper it is not thrown away, but worked over again with the next charge of calcined ore. The number of fufions and granulations entirely depend on the quantity of impurities, and the obftinacy with which they combine with the copper; but when thefe proceffes have been repeated the requifite number of times, the granulated mafs is melted and caft into pigs. Thefe again are broken to pieces, and roafted for one or two days in a low red heat, and again melted and roafted feveral times, till the metal approaches to the ftate of malleable copper. It is now caft into oblong maffes, about 14 inches in length, and is fit for the refining furnace. In this it is again melted, with the addition of a little charcoal, till it acquires the neceffary degree of malleability, and thus becomes falcable copper.

Sometimes lead is employed with good effect in the refining of copper, as it combines with, and fcorifies iron, and the other eafily oxydable metals in preference to copper. For this purpofe the rough copper is fpread on the floor of a furnace, and when it is in complete fufion, about 6 or 8 *per cent.* of lead is thrown in, and well mixed with the reft. In a fhort time the furface of the melted metal becomes covered with a femi-vitreous blackifh-brown fcoria, confifting of the mixed oxyds of lead, iron, and other impurities, together with a little copper. The firft fcoria being removed, a fecond is formed, which is in like manner fcummed off, and fo on fucceffively, till, after ten or twelve hours, the copper is fufficiently purified: this is afcertained by the thinnefs of the film with which the melted copper is covered, and by its being of a brick-red colour, alfo by the circumftance that if a rod of polifhed iron is dipped into the fufed mafs the portion of copper that adheres to it immediately falls off when the rod is dipped in cold water.

§ 4. *Chemical and Phyfical Properties.*

The colour of copper is yellowifh-red; its hardnefs is fuperior to that of filver, but fomewhat inferior to that of platina; it is very tough, ductile, and malleable; hence it may be beaten into plates or drawn into wire of great ftrength and compactnefs. It breaks with a hackly fracture. When rubbed, it emits a difagreeable odour; to the tafte it is naufeous and ftyptic. The fpecific gravity of Swedifh copper, which is the pureft that is met with in commerce, amounts to about 8.89: that of the commoner forts does not exceed 8.6; while that of the Japanefe copper, on the other hand, amounts, according to Bergmann, to 9.0.

The fufing point of copper is nearly the fame as that of gold, namely, a low white heat; before it melts, changeable prifmatic colours appear on its furface. When in fufion, or even at a full red heat, if expofed to the air, it is foon covered with a thin brittle plate of brownifh oxyd, that readily feparates from the metal when cold.

This fubftance is an imperfect oxyd, and was formerly called *copper afhes*, *æs uftum*, or *cinis æris*, and by repeatedly heating and cooling a bar of this metal, the whole may be thus changed. Thefe fcales, according to Prouft, are compofed of about 62 *per cent.* of perfect or black oxyd, and 38 of copper nearly in the metallic ftate; hence, when they are digefted in cold dilute fulphuric acid, only the former portion is taken up. By fubfequent calcination, the fcales are wholly converted into black oxyd, the weight of which is one-fourth more than that of the original copper. At a very high heat, this oxyd runs into a bright reddifh-brown opake glafs.

Copper, when in high fufion, and in contact with the air, like all the other eafily oxydable metals, is actually combuftible; it burns with a beautiful light green flame; the fame delicate tinge is vifible when a little of the oxyd, or of any of the falts of this metal, is ftrewed on burning coals. The green flame thus produced depofits a fmall portion of greenifh-grey pulverulent oxyd, and hence it gradually collects as a kind of foot in the chimnies of furnaces employed in fmelting this metal.

Copper foon rufts in a damp air, and becomes covered with a green cruft of carbonated oxyd, but this coating, by its ftrong adhefion to the metal beneath, long preferves it from further alteration; hence it requires a length of time, and the concurrence of circumftances peculiarly unfavourable to prefervation, in order to corrode entirely a thick plate of this

this metal. Water is not decompofed by copper even at a white heat.

With the exception of a few cafes, that will be mentioned prefently, copper appears to unite very uniformly with the fame proportion of oxygen, forming (when uncombined with water and every other fubftance) a brownifh-black oxyd, of which one-fifth, or 20 *per cent.*, is oxygen, and the remainder copper. This oxyd is produced, as has been already mentioned, by boiling the precipitate from any of the cupreous falts by an alkali, or the ammoniuret of copper, with cauftic potafh or foda.

Copper, or rather its oxyd, combines with every acid, forming falts, many of which are both curious and important.

Sulphuric acid acts upon metallic copper only when concentrated and boiling hot. For this purpofe take copper filings, or thin fheet copper, put it into a glafs veffel with twice its weight of ftrong fulphuric acid, and heat the mixture. As foon as it begins to boil, much fulphureous acid gas is given out, and at length the whole diffolves into a dark-coloured liquor, which, by dilution with water, becomes of a fine blue. If common copper is ufed for this purpofe, there always remains a black fediment, which confifts for the moft part of fulphuret of copper. If the pure carbonated oxyds are employed, inftead of the metal, they will be found to be foluble even in cold and diluted fulphuric acid. The folution, in whichever way it is formed, depofits, by evaporation and gradual cooling, rhomboidal cryftals of a deep fky-blue colour, which are fulphat of copper, the *blue* or *Roman vitriol* of the fhops.

The fame falt is alfo met with native in copper mines, partly cryftallized, but more generally diffolved in the water which drains more or lefs into all mines. When native, it appears to be formed in confequence of the iron pyrites being firft vitriolized, and the refulting fulphat of iron re-acting on the copper.

Sulphat of copper has a very ftrong, ftyptic, fomewhat acidulous, and exceffively naufeous tafte. It is foluble in about four times its weight of water. When dried at a heat not exceeding that of boiling water, it lofes, according to Prouft, about 36 *per cent.*, which is mere water, after which the refidue, which is a white pulverulent mafs, is again foluble and cryftallizable, as at firft. But if it is calcined with a ftrong white heat, the acid itfelf is expelled without undergoing decompofition, and at length there only remains black oxyd of copper, in the proportion of 32 *per cent.* of the original cryftallized falt. Hence 100 parts of fulphat of copper confift, according to Prouft, of

Copper 25.6, Oxygen 6.4	forming black oxyd	32
	Sulphuric acid	32
	Water	36
		100

Bergmann's analyfis of this falt nearly agrees with that of Prouft in the proportion of copper (26 *per cent.*); but of the other ingredients he reckons 28 of water, and 46 of acid.

Befides the common fulphat, Prouft defcribes a *fub-fulphat* of copper. This is prepared by adding to the common fulphat fome cauftic potafh, but not fufficient entirely to decompofe it. A green precipitate is in confequence depofited, which is the fub-fulphat in queftion. This falt lofes by diftillation only 14 *per cent.* of water. The refidue, boiled with cauftic potafh, gives 68 *per cent.* of black oxyd; hence its component parts are

Copper 54.4, Oxygen 13.6	68
Sulphuric acid	18
Water	14
	100

Sulphat of copper is decompofed by the alkalies, whether pure or carbonated. If either of the fixed alkalies in their cauftic ftate is made ufe of, the precipitate is not, as might be fuppofed, a fimple oxyd of copper, but that peculiar combination firft difcovered by Prouft, and named by him *hydrat of copper*. It is thus prepared: to a cold folution of fulphat of copper add liquid potafh, alfo cold, to complete faturation; a *blue* precipitate falls down, which, when thoroughly wafhed with boiling water, is the pure hydrat. Its confiftence, when dried at a heat not exceeding 212° Fahr., is nearly that of Pruffian-blue; at a fomewhat higher temperature it fhrinks, and is gradually converted into black oxyd, by the evaporation of its water. By dry diftillation it is found to give out about 24 *per cent.* of water, and 1 of carbonic acid, which it probably has abforbed from the air while drying: there remain behind 75 parts of black oxyd. If this latter is again moiftened with water, it does not return to the ftate of hydrat. Hence it appears that the hydrat is a true chemical combination of water and oxyd of copper, in the proportion of about one part of the former to three of the latter, and as fuch enters into the compofition of the cupreous falts. The hydrat is decompofable not merely by heat, but alfo by *boiling* with either of the fixed alkalies.

Carbonic acid and oxyd of copper unite together without difficulty. This combination is found native, forming the mountain-blue, the malachite, and fome of the other ores of copper. It may be prepared artificially by expofing the metal to a damp confined air, in which cafe it conftitutes ruft of copper; or more expeditioufly by decompofing any of the acid falts of copper by a carbonated alkali. A copious bulky precipitate falls down, which, when well wafhed and gently dried, is a fine powder, of a beautiful pale apple-green colour. One hundred parts of copper diffolved in any acid, and precipitated by carbonated potafh or foda, produce invariably 180 of the green carbonat, dried at a boiling-water heat. This carbonat, when diftilled by itfelf, with a heat gradually increafed to rednefs, gives out 10 parts of water, and 46 of carbonic acid; the black oxyd, remaining behind in the retort, amounts to 125 parts, of which 100 are copper, and 25 oxygen.

When hydrat of copper is gently heated with a folution of fuper-carbonated potafh, a portion is diffolved, forming a greenifh-blue liquor, whilft the undiffolved refidue becomes almoft as dark in colour as the black oxyd. The folution, if flowly evaporated, yields a fingular falt, confifting of 52 *per cent.* potafh, 43 carbonic acid, and 5 oxyd of copper. It is cryftallizable and flightly deliquefcent. A fimilar falt, with a bafe of foda, is produced, when this latter alkali is employed inftead of potafh.

Copper is very readily foluble in nitric acid, even when cold and confiderably diluted. Much heat is excited, and a torrent of nitrous gas given out, the liquor becoming of a bright blue colour in proportion as the copper is diffolved. The oxyds of copper are equally foluble in this acid as the metal is, but without the evolution of nitrous gas. When this folution is haftily evaporated to a certain point, and

and then ſuffered to cool, it congeals into a deep blue ſaline maſs, which deliquiates rapidly when expoſed to the air. By a ſlow and careful evaporation this ſalt may be obtained in the form of hexahedral priſms, but equally deliqueſcent as the former amorphous variety. If this blue nitrat be evaporated beyond the point at which it would cryſtallize when cold, nitrous gas begins to be produced, and a green ſcaly concretion ſeparates from the thick blue liquor. If the evaporation is here ſtopped, this green matter may be ſeparated by water, either hot or cold, which diſſolves only the undecompoſed blue nitrat. This green ſubſtance is conſidered by Prouſt as a ſubnitrat of copper; that it ſtill contains nitric acid is proved by its ſtill giving out this acid when mixed with ſulphuric acid and heated. By thorough calcination all the acid and water are expelled, and the black oxyd of copper only remains. The proportions of the ſubnitrat, according to the above-mentioned chemiſt, are

Black oxyd of copper	67
Nitric acid - -	16
Water - - -	17
	100

The blue or perfect nitrat, on the other hand, contains only 27 *per cent.* of black oxyd.

Nitrat of copper is very ſoluble in alcohol, to the flame of which it communicates a very delicate green colour.

The decompoſition of this nitrat by tin is ſo violent as in certain caſes to produce actual combuſtion. This forms an amuſing experiment, and was, we believe, firſt diſcovered by Dr. Higgins. It is thus performed; ſpread out a piece of tin-foil four or five inches ſquare, lay in the middle a ſmall heap of the ſolid blue nitrat, ſprinkle the ſalt with a few drops of water, ſpread over it a little tow, then double up the tin-foil round it on all ſides, twiſting it as tight as may be without breaking. In a ſhort time the maſs will feel burning hot, ſmall bubbles of blue liquor will be ſeen oozing through, and will preſently be ſucceeded by a copious eruption of nitrous gas, attended by minute ſparks of fire and deflagration.

A fine blue pigment is prepared from nitrated copper, called *verditer (cendres blues, Fr.)* It is made in quantity by the refiners, who, after the proceſs of ſeparating ſilver from gold by aquafortis, recover the ſilver from its ſolution by means of copper, and thus obtain a reſidue of nitrat of copper. This ſolution is decompoſed by lime (the preciſe method of doing which is kept ſecret), and the produce being made into cakes and dried ſlowly conſtitutes the beſt kind of verditer.

This pigment has been analyzed by Pelletier with the following reſults. It was totally ſoluble in nitric and muriatic acids, with a copious effervescence of carbonic acid: when diſtilled by itſelf 600 hundred grains loſt 200, and afforded 2 French pints of carbonic acid together with ſome water. The calcined reſidue was a black powder, which, being fuſed with a reducing flux, yielded a button of pure copper, amounting to about half the weight of the original verditer. A freſh parcel was then treated with ſulphuric acid, which afforded ſulphat of lime, the earth of which formed about 7 *per cent.* of the original verditer. Of the 200 grains loſt by diſtillation, Pelletier conſiders 180 as carbonic acid. Hence 100 parts of verditer contain

Copper	50
Carbonic acid	30
Water -	$3\frac{1}{3}$
Lime -	7
	$90\frac{1}{3}$
Remains for oxygen	$9\frac{2}{3}$
	100

But in this eſtimate the amount of carbonic acid is by ſome overſight greatly overrated. The quantity obtained from 600 grains was about 2 French pints, the weight of which, according to Lavoiſier, would be only 66 grains; conſequently 100 grains would yield only 11 grains of this acid. The water was obviouſly only eſtimated at random, and as the copper was in the ſtate of hydrat, certainly amounted to much more than Pelletier has allowed for it. The corrected reſults of the above analyſis therefore would be

Copper	50	83.3	Hydrat of copper
Oxygen	12.5		
Water	20.8		
Lime	-	7.	
Carbonic acid		11.	
		101.3	

which correſponds very cloſely with the quantity analyzed.

The muriatic acid diſſolves copper with difficulty except when concentrated and boiling, and then hydrogen gas is given out. The oxyds, however, of this metal, and eſpecially the green carbonat, are very readily ſoluble in this acid. The colour of muriat of copper when hot or highly concentrated is brown, but by dilution becomes of a graſs-green. By careful evaporation and cooling it cryſtallizes in lengthened rhomboids, and when haſtily evaporated in feathery cryſtals. This ſalt is commonly deliqueſcent, but when both the copper and acid are quite free from iron is permanent in the air. It is readily ſoluble both in water and alcohol; the latter takes up its own weight when boiling, a part of which afterwards ſeparates in a cryſtalline ſtate as the liquor cools. The compoſition of the cryſtallized ſalt is, according to Prouſt,

Black oxyd of copper	40
Muriatic acid -	24
Water - -	36
	100

A dilute ſolution of muriated copper in water makes a kind of ſympathetic ink, which is colourleſs in the cold, becomes yellow by warming, and again loſes its colour on cooling. Beſides the common muriat, the ingenious reſearches of Prouſt have diſcovered a ſecond muriat, in which the copper appears to be at a lower ſtate of oxydation than in the former ſalt. It affords a nearly colourleſs ſolution, and when ſolid is of a greyiſh white; it may therefore without impropriety be called the white muriat of copper. It is prepared from the common muriat by means of muriat of tin, a ſalt remarkable for the eagerneſs with which it abſorbs oxygen from almoſt all the other metallic ſalts. If therefore ſome of this latter is poured into common muriat of copper, a precipitate falls down which is at firſt white, but by ſubſequent expoſure to air paſſes

through

through different fhades of violet and blue to black. This precipitate is for the moft part a muriated fub-oxyd of copper. On expofure to a moderate heat it melts like luna cornea. If digefted in warm muriatic acid it readily diffolves, and is depofited, on cooling, in the form of tetrahedral cryftals. With nitrous acid fome nitrous gas is given out, which fhews that the metal was not previoufly faturated with oxygen. Another remarkable character of this white muriat is, that when diffolved in ammonia the folution is colourlefs, though, on expofure to the air, it gradually acquires the fky-blue colour of common ammoniuret of copper. Its compofition, according to Prouft, is

Muriatic acid		24.75
Oxyd of tin		1.
Copper	-	63.
Oxygen	-	11.25
		100.

Affuming this analyfis as correct, it is obvious that the copper exifts in a much lower ftate of oxygenation in this falt than in any hitherto mentioned, for in this the oxyd of copper is compofed of 63 of metal and 11.25 of oxygen, or (reduced to the hundred) of 84.84 copper, and 15.16 oxygen, whereas the black copper, to which all the common cupreous falts are reducible by lofs of their acid and water, confifts of 80 *per cent.* copper, and 20 oxygen.

There appears to be yet another ftate of combination of muriatic acid and oxyd of copper, alfo firft noticed by Prouft. It is the *fubmuriat of copper*, differing from the common muriat not by a lower degree of oxygenation in the metal, but in a fmaller proportion of acid. It is produced by adding a little potafh (lefs than required for faturation) to the green muriat. A green powder falls down, which is the fubmuriat in queftion. This falt when boiled with potafh lofes about 28 *per cent.* of its weight, and is reduced to the black oxyd. A fimilar fubmuriat is faid by the fame chemift to be fpontaneoufly depofited when copper is diffolved in nitro-muriatic acid. The compofition of this laft is as follows:

Black oxyd of copper		79.
Muriatic acid	-	12.5
Water	- -	8.5
		100.

The native green muriat of copper from Peru appears to be nearly in this ftate.

Copper feems to have a ftronger affinity for muriatic acid than even for the nitric or fulphuric. Thus, if either the folid nitrat or fulphat of copper be digefted in muriatic acid a folution takes place, and then, on the application of heat, the liquor immediately lofes the blue colour, characteriftic of thefe two falts, and acquires the green of the muriat: alfo by flow evaporation muriat of copper is obtained in cryftals.

Acetous acid has no action on reguline copper, but its oxyd is eafily foluble in this fluid, to which it communicates a beautiful grafs-green colour. There are two fpecies of acetited copper, the one with an excefs of bafe, the common verdegris of the fhops, and the other in which the acid and oxyd are in a ftate of mutual faturation, forming the cryftallized or diftilled verdegris.

The manufacture of verdegris is carried on to a confiderable extent in moft of the fouthern provinces of France, and a very exact account, apparently, of the procefs has been publifhed by Chaptal, from which the following particulars are extracted.

The materials for this manufacture are the *marc* or cake that remains in the wine-prefs, after the greater part of the juice has been fqueezed out; and plates of copper of convenient fize and hammered well, in order to fmooth the furface, that the corroded portion may be readily detached from the reft.

The marc of the grape is firft fermented by being laid as lightly as poffible in a large barrel and moiftened with common wine, and then fet in a warm airy place. In a few days, varying according to the heat of the weather, it begins to fwell, grows hot and exhales a ftrong odour of vinegar; the fermentation then declines and the marc is fit for ufe. A layer of this is then put into an earthen pot and a plate of copper, previoufly made fcorching hot, is laid upon it; to this fucceeds another layer of marc, and then a plate of copper, in regular alternation till the pot is filled, obferving that both the top and bottom layers are of marc. The mouth of the pot is then loofely ftopped with ftraw, and the whole is left at reft from ten to twenty days.

When the marc begins to whiten the pots are unpacked, and, if the procefs has gone on well, the copper-plates are found covered with a green cruft, interfperfed with filky green cryftals. The marc is thrown away; the plates are fet on end on wooden racks in a cellar, and when dry are dipped in water and again fet to dry; this is repeated once a week for fix or eight times, which makes the cruft of oxyd fwell and increafe both in quantity and quality: after which it is fcraped off by a knife without difficulty. Each pot yields about 5 or 6lbs. of rough verdegris, and the plates will ferve again repeatedly till they are corroded quite through.

This rough verdegris is further prepared for market by being ground in wooden mortars, and expofed to the air till it is fufficiently dry; and in fo doing it lofes about half its weight.

Verdegris thus prepared, may be confidered as copper oxydated by the action of the acetous acid, and combined with water, with carbonic acid, and with part of the extractive or mucilaginous part of the marc. It is nearly infoluble in water and its colour is blueifh green. If this verdegris is digefted in diftilled vinegar it diffolves readily in this fluid, and by evaporation and cooling a cryftallized falt of a deep green colour may be obtained, which is known in the fhops by the name of *diftilled verdegris*. The method in which this valuable falt is prepared at Montpellier is as follows. Common vinegar is firft diftilled in a copper alembic, and the acid thus produced is put with common verdegris into a copper boiler; when a hot faturated folution is thus made, it is ftrained and transferred to another copper evaporating veffel, where it is boiled down till a faline cruft begins to collect on its furface; a light frame of crofs fticks is now funk into the liquor and the fire is put out. On cooling, the acetite of copper crufts round the fticks in clufters of rhomboidal cryftals of a deep blueifh-green colour. It requires about 3lbs. of verdegris to make 1lb. of the cryftallized acetite.

The compofition of common verdegris is fubject (as might be expected from the method in which it is prepared) to a confiderable variation, and this difference is ftill further increafed by variations in the way of manufacturing this falt. Thus, at Grenoble, verdegris is made merely by difpofing plates of copper in a proper room, and moiftening their

 furfaces

furfaces repeatedly with diftilled vinegar, till the incruftation of oxyd acquires a proper thicknefs. Hence this latter is purer, and approaches nearer to the ftate of cryftallized acetite, than that of Montpellier.

A hundred parts of the verdegris of Grenoble yield, according to Chaptal, by dry diftillation,

Carbonic acid	- - -	9.1
Water weakly acidulous	-	13.05
Strong, and coloured acetous acid		53.95
Left in the retort	Copper - -	20.9
	Charcoal - -	3.
		100.

A like quantity of the Montpellier verdegris afforded

Carbonic acid - - -	8.
Acetous acid, weak and empyreumatic,	65.15
Copper - - - -	22.5
Charcoal - - - -	4.35.
	100.

To the above particulars may be added fome obfervations, by Prouft, on the properties and compofition of this falt.

When common verdegris is put into cold water, it gradually falls to pieces and nearly half of it is diffolved, the remainder is a fine green powder which diffufes itfelf through the liquor and fubfides very flowly. This green powder appears to be pure fubacetite of copper, and when wafhed and dried weighs about 42 *per cent.* of the original verdegris. When fulphuric acid is poured on it, pungent vapours of vinegar are given out. Boiled with potafh it affords 63 *per cent.* of black oxyd; and when diftilled, after all the volatile products have paffed over, there remains about 52 *per cent.* of copper, principally in the metallic ftate. From thefe data therefore the fubacetite appears to confift of

Copper	50.4	forming black oxyd	63
Oxygen	12.6		
	Remains for acid and water		37
			100

With regard to the cryftallized acetite, Prouft found that 39 parts of black oxyd produce, with diftilled vinegar, 100 parts of acetite; and on the other hand, that 100 parts of this falt, when decompofed by boiling with potafh, yield 39 or 40 parts of black oxyd. Hence it is compofed of

Copper	31.2	forming black oxyd	39
Oxygen	7.8		
Acetous acid	- - - - -		61
			100

The diftillation of the cryftallized acetite furnifhes the moft pungent acetic acid, or radical vinegar, as has been already defcribed under Acetous Acid. Acetite of copper, befide being made by direct combination of its ingredients, may be prepared in various ways by double affinity; of thefe the beft upon the whole is the following: Make a cold folution of fugar of lead *(acetite of lead)* in diftilled water, to which add, by degrees, a cold folution of blue vitriol *(fulphat of copper)*, as long as any precipitation takes place; then pour the whole on a filter, and a green liquor paffes through, the fulphat of lead remaining on the filter, in the form of a white powder. The green liquor, being concentrated by evaporation, depofits, by cooling, very pure and beautiful cryftals of acetite of copper.

The natural combinations of copper with arfenic and arfenic acid have already been noticed. With regard to the artificial arfeniats, Scheele difcovered that when arfenic acid is digefted with copper filings, a green folution is formed, and a blue powder, which is alfo an arfeniat, is precipitated. The fulphat, nitrat, and muriat of copper undergo no apparent change, when added to arfenic acid; but the acetite is decompofed, and arfeniat of copper is precipitated. All the cupreous falts, however, are decompofed by arfeniated alkali, and a blue arfeniat falls down. To thefe facts Mr. Chenevix has added the following: If arfeniat of ammonia and nitrat of copper are added, there falls down a blue cryftalline arfeniat of copper. On evaporating the fupernatant liquor, and adding alcohol, another copious depofition of cryftals took place, of a deeper colour than the former, and of a rhomboidal fhape. Each of thefe arfeniats was examined feparately, firft by calcination at a low red heat to expel the water, then by potafh for the black oxyd of copper, and laftly by nitrat of lead for the arfenic acid. By this method, the firft arfeniat was found to confift of

Oxyd of copper -	50
Arfenic acid -	27
Water - -	22
	99

The fecond arfeniat afforded

Oxyd of copper -	35.
Arfenic acid -	39.5
Water - -	24.
	98.5

Arfenic, in the ftate of white oxyd, combines with oxyd of copper into a pale green powder, called, from its difcoverer, *Scheele's green.* It is prepared in the following manner: Diffolve 24 ounces of fulphat of copper in water, and heat the folution in a copper veffel; alfo boil in another veffel 24 ounces of pearlafh, 11 ounces of white arfenic, and about 3 pints of water: when the whole is diffolved, ftrain each folution feparately through linen, and then add the arfenicated potafh, little by little, to the fulphat of copper, with conftant ftirring: an effervefcence will take place, and then a green powder will be depofited. When the whole is mixed, let it ftand fome hours, then feparate the precipitate by the filter, edulcorate it well with clear hot water, and dry it very gently in a warm room. The above quantity of ingredients will afford about 18½ ounces of the powder, which may be ufed as a pigment.

Phofphat of copper may be prepared by adding phofphat of foda to the nitrat, or any other readily foluble falt of copper, a blueifh-green fediment falls to the bottom, which dries to a powdery femi-cryftalline mafs. A low red heat turns it brown, and drives off about 15.5 *per cent.* of water: there remains a phofphat of copper, compofed of 35 parts of phofphoric acid, and 49.5 of oxyd of copper.

A ftriking decompofition of nitrat of copper alfo takes place, when a ftick of frefh melted phofphorus is immerfed in a folution of this falt, and expofed to the light. By degrees the copper is precipitated on the furface of the phofphorus, in the metallic falt, and in the form of cryftalline grains.

All the falts of copper are decompofed by the alkalin pruffiats, and the refult is a fediment of a reddifh-brown colour, which, by drying and expofure to the air, acquires a dark

dark chocolate hue. This pruffiat of copper mixed well with oil, and has been employed with fome fuccefs as a pigment.

Tincture or infufion of galls throws down from all cupreous folutions a precipitate of a dirty yellow colour.

Oxyd of copper is foluble in all the other acids, forming with them, however, falts little known, and of little importance: the predominating colour in all of them is green.

Of the alkalies, neither potafh nor foda have any action on copper or its oxyds, except that already mentioned, of taking away from the hydrat its water of combination, and reducing it to black oxyd.

Ammonia has no action on metallic copper, but diffolves its oxyds without difficulty. The ufual colour of this folution is a deep blue-purple. The moft direct method of preparing it is by digefting together liquid ammonia and any oxyd, or carbonated oxyd of copper: the liquor becomes blue almoft immediately, and its colour deepens till faturation takes place. By flow and careful evaporation, blue filky cryftals of ammoniuret of copper may be procured. This falt, by expofure to the air, gradually lofes its alkali, and abforbs carbonic acid, fo that at length it is wholly converted into green carbonat. The *aqua fapphirina* of pharmacy and furgery confifts, for the moft part, of ammoniated copper, to which its colour is owing: it is made chiefly in two ways. The firft is to digeft in a glafs veffel quick-lime, muriat of ammonia, verdegris, and water; the lime decompofes the muriat of ammonia, difengaging the alkali, which, in its turn, decompofes the verdegris, and diffolves the oxyd of copper: hence the clear liquor confifts of ammoniated copper and muriat of lime. The fecond method, where a weaker folution is wanted, is to employ lime-water inftead of lime. Another way of producing ammoniated copper immediately is to fuperfaturate with this acid any of the falts of copper, in confequence of which the firft portions of alkali decompofe the cupreous falt, throwing down an oxyd, and the fucceeding portions rediffolve the oxyd, forming a dark-blue folution. As there is no other metal befides copper and nickel which produces this particular colour, and as the latter of thefe metals is not common, the production of this beautiful tinge, by the addition of ammonia, may be confidered as a very probable indication of the prefence of copper.

A fingular circumftance takes place with regard to ammoniated copper. If a bottle be filled with liquid ammonia, and a few clean copper filings be added, no folution enfues, as long as the bottle is kept clofe corked. But if the bottle be opened for a while, and then fhut again, a folution indeed of part of the copper takes place, but without any change of colour in the liquor: but when the bottle is again opened, the characteriftic blue tinge appears firft at the furface of the folution, and gradually fpreads down to the bottom. If now a few more copper filings be added, and the bottle again corked, the folution will in a fhort time again become colourlefs, and continue fo till it is again expofed to the air. The reafon of thefe changes appears to be the following: copper requires fome, but only a very fmall quantity, of oxygen to be foluble in ammonia; and when in this loweft ftate of oxydation, it forms with ammonia a colourlefs folution, as it forms with muriatic acid a white fub-muriat: but if this folution is expofed to the air, the metal abforbs oxygen, and is thus brought to that ftate in which it tinges ammonia blue; being again fhut up with a few copper filings, the oxygen is partly abforbed by the recently added metal, and reduces the whole to the ftate of white oxyd.

Many of the neutral falts, efpecially the muriats, are capable of oxydating, and, in part, of diffolving copper: this is efpecially the cafe with muriat of ammonia, which, when made into a mafs with copper filings and a little water, and kept warm, prefently converts the copper into a green muriated oxyd.

Copper and fulphur readily unite. If equal parts of copper filings and flowers of fulphur are mixed and heated in a crucible, much of the fulphur burns off; but the remainder melts into a blueifh-black mafs, which is fulphuret of copper. According to Prouft, 100 parts of copper take up in this way 28 of fulphur; fo that the fulphuret is compofed of about 79 of metallic copper, and 21 of fulphur. No oxygen appears to be prefent. This fubftance is more fufible than copper, melting readily at a red heat. By roafting in the open air, the fulphur is expelled: the laft portions, however, adhere with great obftinacy. According to Dr. Thomfon, fulphur and copper filings unite together, by being merely mixed together with or without water, and expofed for a long time to the air.

Hydrofulphureted water, or any of the liquid hydrofulphurets, when added to the folutions of copper, produce a deep blueifh-black precipitate, which is a hydrofulphuret of copper.

Phofphorus is capable of intimate combination with copper. If 8 parts of this metal in filings, 8 of vitreous phofphoric acid, and 1 of charcoal powder, are intimately mixed together, and then put into a crucible, and expofed to an intenfe heat, the phofphoric acid is decompofed by the action of the charcoal, and the phofphorus in part burns off, and in part unites with the copper, forming a hard, fteel-grey, brittle alloy, capable of a high polifh. A fimpler way of preparing the fame is to make copper filings red hot in a crucible, and project upon them fmall pieces of phofphorus, which combines with the metal, and melts down into a grey mafs, fimilar to the former. One hundred parts of copper may thus be increafed to about 120; but if this phofphuret is kept for fome time melted under charcoal powder, or melted glafs, part of the phofphorus burns off. When this excefs is thus got rid of, the ingredients of the remaining phofphuret appear to be in a ftate of mutual faturation, no more phofphorus being diffipated by a continuation of the fufion. In this ftate the mafs appears to confift of 92.3 of copper, and 7.7 of phofphorus: it retains the grain and colour of fteel, is fufceptible of a high polifh, and does not readily tarnifh in the air, but is brittle. With a ftill lefs proportion of phofphorus, it becomes malleable, and of a yellowifh-white colour. Phofphuret of copper, if kept in fufion, with free expofure to the air, lofes gradually moft of its phofphorus, which burns away with the bright flame and odour peculiar to this fubftance.

The fixed oils, when kept long in contact with copper, oxydate it, and diffolve a portion, by which they acquire a green colour.

The ufes of copper, in its various ftates, are fo numerous and important, as to be fcarcely inferior to thofe of iron. All the falts of copper are more or lefs poifonous, producing violent naufea, with fevere pain and inflammation of the inteftinal canal. Yet from the fudden vomiting that they excite, a large dofe may be given with fafety; and this is fometimes done, when there is an immediate neceffity of emptying the ftomach. Copper, however, is very little ufed medicinally in any form.

§ 5. *Alloys of Copper.*

The alloys of copper are, upon the whole, of more importance than thofe of any other metal: we fhall, therefore, treat of them with fome minutenefs.

Copper with gold and filver.

Copper,

Copper, when added in fmall quantity to either of thefe metals, greatly increafes their hardnefs, without materially debafing their colour or malleability: hence it has been generally adopted as the alloy for that portion of the precious metals which is employed with current coin, and for plate.

Copper with arfenic.

On account of the volatility of arfenic fome precautions are required in the preparation of this alloy. The beft way, upon the whole, is to melt fome copper in rather a large crucible, and then to wrap up in paper fome reguline arfenic, or white arfenic, either with or without a mixture of charcoal powder, and to immerfe the paper, with its contents, in the melted copper, either by means of a pair of long tongs, or by ramming the paper into a fmall crucible, and then inverting the crucible in the fluid metal. The arfenic prefently rifes through the copper in denfe white fumes, and is in a great part diffipated; a portion however is retained by the copper, and by repeating the procefs once or twice more, the alloy will be fully faturated with arfenic.

This alloy is of a filvery white colour and a clofe texture; it is however very brittle, and, in proportion to the perfect whitenefs of its colour, liable to tarnifh in the air. As foon as it is brought to fufion the arfenic begins to efcape, and the copper regains its malleability: the laft portions however of arfenic are not driven off even by long continued heat, and although the copper regains its malleability, its colour remains of a dingy yellow.

Vauquelin has difcovered that if to an alloy of copper and filver, in equal proportions (the colour of which is a pale yellow), there be added 2 *per cent.* of arfenic, the refult is a perfectly white ductile and malleable alloy. If this latter ingredient exceeds 5 *per cent.* the alloy begins to be brittle.

Copper with iron.

Thefe two metals only unite when the former of them is greatly in excefs. The refult is a hard, grey, and fomewhat brittle alloy. According to Mr. Keir, the *tutenag* of the Chinefe is a white alloy of copper, zinc, and iron: it is hard, tough, and fufficiently malleable to be wrought into candlefticks and various other articles of domeftic furniture, which take a high polifh, and are fcarcely to be diftinguifhed from filver. The inferior fort of tutenag has, however, a very perceptible braffy tinge.

According to Dizé, the alloy of iron and copper only ceafes to be acted on by the magnet, when the proportion of the former is lefs than $\frac{1}{76}$ of the whole mafs. Iron is much inferior in its power of whitening copper to tin or even to arfenic.

Copper with lead.

Thefe metals unite, to appearance, very intimately by fufion; but when a mafs of this alloy is expofed to a very low red heat, the greater part of the lead, with a fmall portion of copper, fweats out, leaving the reft in a porous honey-combed ftate. When the copper holds a little filver, the lead carries the latter out with it: this procefs is called *eliquation,* and will be treated of more at large in the article SILVER. Copper, with about a fourth of its weight of lead, forms *pot-metal.* The Roman pot metal was compofed, according to Pliny, of 100 parts copper, 2 lead, and 2 tin. The fame ingredients, but with larger proportions of the two latter, were the materials of many of the ancient Greek and Sicilian coins, as appears from analyfes of them by Klaproth.

Copper with zinc.

Copper, when nearly faturated with zinc, that is, when the latter amounts to about one-fourth of the alloy, forms *brafs,* of which an account has been already given. With a fmaller proportion of zinc, the colour of the alloy approaches more nearly to that of gold, and its malleability increafes. Mixtures, chiefly of thefe two metals, are employed to form a variety of gold coloured alloys, known by the names of *tombac, Manheim* or *Dutch gold, tinfel, fimilor, prince Rupert's metal, pinchbeck,* &c. the precife compofition of which varies according to the fancy or experience of different artifts. The Dutch gold may be beaten into extremely fine leaves, which when frefh are a cheap and good imitation of gold leaf; but they tarnifh very foon. The mixture may be made either by melting together copper and zinc, or copper and brafs. In either cafe the copper fhould be melted firft, and the other ingredient added afterwards: being then carefully ftirred together with a ftick, the alloy is to be poured out into proper moulds without lofs of time, left the zinc fhould burn off.

A fine malleable tombac may be made with 16 parts of copper, one of zinc, and one of tin; if a larger proportion of this latter is added, the alloy becomes harder and brittle. Several Roman coins ftruck, during the firft century of the emperors, have been analyzed by Klaproth, and appear to confift, fome of nearly pure copper, others of copper, with from a fifth to a fixth of zinc. A little tin and lead were found in fome, but in fuch fmall proportions as to appear only an accidental impurity.

Copper with tin.

The alloy of copper and tin are extremely important in the arts, and curious as chemical mixtures. Tin added to copper makes it more fufible, lefs liable to ruft or be corroded by the air and other common fubftances, harder, denfer, and more fonorous. In thefe refpects the alloy has a real advantage over unmixed copper; but this is in many cafes more than counterbalanced by the great brittlenefs which even a moderate portion of tin imparts, and which is a fingular circumftance, confidering how very malleable both metals are before mixture.

The fenfible qualities of the different mixtures of thefe two metals are the following: Copper, alloyed with from one to five *per cent.* of tin, is much harder than before; its colour is yellow, with a caft of red, and its fracture is granular: it is ftill confiderably malleable. This appears to be the ufual compofition of many of the ancient edged tools and weapons before the ufe of iron; whence it appears that the ancients did not poffefs (as has often been fuppofed) any peculiar art of hardening pure copper, otherwife than by mixture. An alloy in which the tin is from $\frac{1}{10}$ to $\frac{1}{8}$ of the whole is hard, brittle; but ftill a little malleable, clofe-grained, and yellowifh-white. When the tin is as much as $\frac{1}{6}$ of the mafs, it is entirely brittle, and continues fo in every higher proportion. The yellownefs of the alloy is not entirely loft till the tin amounts to $\frac{7}{23}$ of the whole.

Copper (or fometimes copper with a little zinc) alloyed with as much tin as will make from about $\frac{1}{10}$ to $\frac{1}{5}$ of the whole, forms an alloy which is principally employed for bells, brafs cannon (fo called), bronze ftatues, and various other purpofes. Hence it is called *bronze* or *bell-metal,* and is excellently fitted for the ufes to which it is applied by its hardnefs, denfity, fonoroufnefs, and fufibility. For cannon a lower proportion of tin is commonly ufed. According to Dr. Watfon, the metal employed at Woolwich confifts of 100 parts of copper, and from 8 to 12 of tin; hence it retains fome little malleability, and therefore is tougher than it would be with a larger portion of tin. A common alloy for bell-metal is 80 of copper and 20 of tin; fome artifts add to thefe ingredients zinc, antimony, and filver, in fmall

ſmall proportions, all of which certainly improve the ſonorouſneſs of the compound.

When in an alloy of copper and tin, the latter metal amounts to about ⅓ of the maſs, the reſult is a beautifully white alloy, with a luſtre almoſt equal to that of mercury, extremely hard, very cloſe-grained, and perfectly brittle. It takes an exquiſite poliſh, which well adapts it for the reflection of light for all optical purpoſes. It is called *ſpeculum metal*, and, beſides the above ingredients, generally contains a little arſenic, zinc, or ſilver. The application of an alloy, ſimilar to the above, to the conſtruction of mirrors, is of great antiquity, being mentioned by Pliny. From the actual analyſis, by Klaproth, of a portion of an ancient ſpeculum, it appeared to conſiſt of

Copper	62
Tin	32
Lead	8
	102

Of theſe ingredients the laſt is conſidered by Klaproth, with high probability, as only a caſual adulteration of the tin.

When the amount of the tin exceeds that of the copper, the alloy begins to loſe its ſplendid whiteneſs, and acquires a blueiſh-grey hue; its texture likewiſe becomes rough-grained, and, as it were, rotten and incapable of receiving a poliſh.

A perfect ſpeculum metal ſhould be quite white, without ſhewing any caſt of yellow when poliſhed, not very liable to tarniſh, quite free from pores, even when examined by a lens, of a certain coherence or toughneſs to bear the grinder, and, for the convenience of working, as ſoft as may be conſiſtent with the other requiſites.

Mr. Mudge, whoſe ſpecula were celebrated for their goodneſs, obſerves, that the extreme of whiteneſs is given by 32 parts of copper and 16 of tin, but this compound is too hard and brittle; 32 parts of copper with 14½ of tin form an alloy quite white, and as hard as can be wrought. In order that the metal ſhould turn out free from pores, it ought to be twice fuſed, once for mixture of the ingredients, and afterwards, with as little heat as poſſible, for caſting.

The following obſervations on the ſame ſubject are extracted from an elaborate paper by Mr. Edwards, publiſhed in the Nautical Almanack for 1787.

The quality of the copper ſhould firſt be tried by adding ſucceſſively from ſo much ſhort of half of its weight of tin, that the mixture proves a little yellow, to the full half of tin, and by compariſon of the various ſamples aſcertaining the *maximum* of whiteneſs. When this is found, take 32 parts of copper, melt it, then add one part of braſs and the ſame of ſilver, with a little black flux to cover the ſurface; when theſe are melted ſtir them together with a wooden rod, and pour in from 15 to 16 parts of tin (as aſcertained by previous experiment) fuſed in a ſeparate crucible, at a low heat; then ſtir the mixture again, and immediately pour it into cold water. Re-melt, with as little heat as poſſible, the alloy thus formed, and for every 16 parts take one of white arſenic, wrap it in paper, thruſt the packet to the bottom of the fluid metal with a wooden rod, and ſtir it well as long as any arſenical vapours ariſe; when theſe ceaſe pour the metal into a mould of ſand, and as ſoon as it has ſolidified lay it in a pot full of very hot embers, and cool it very ſlowly: unleſs this precaution is particularly obſerved, the metal will fly in pieces when cold, or will ſplit in the poliſhing.

The braſs, the ſilver, and the arſenic in this compoſition appear to have their diſtinct uſe; the braſs makes the mixture tougher, and ſomewhat ſoftiſh, the ſilver improves its colour, and the arſenic renders the texture remarkably finer, cloſer, and leſs porous; a larger proportion of this however would make the metal liable to tarniſh.

Sir J. Newton's ſpecula were compoſed of 6 parts of copper, 2 tin, and 1 arſenic; they are upon the whole very good; but after being poliſhed exhibit a rather yellow caſt.

The other alloys of copper are not of much importance, and will be found under the reſpective metals to which they belong.

Copper, *white*, a kind of metal white as ſilver, frequently brought from China, and ſuppoſed by many to be natural. But it is only an allay of copper, zinc, and arſenic, in certain proportions. It is made with difficulty, becauſe of the volatility of the two ſemi-metals; and, as its quality is noxious, it is not much uſed.

Copper, in *Military Affairs*. No other metal is allowed in magazines, or for barrels of gun-powder.

Copper, in *Calico-Printing*, a veſſel in which the operations of dyeing, dunging, rinſing, &c. are performed, and which derives its name from the material it is generally conſtructed of. As theſe veſſels are uſed indifferently for any of the above purpoſes, their ſize, form, and arrangement, are generally the ſame, and vary little throughout the whole kingdom. They are always circular, from 4½ to 5 feet diameter at the top; 3½ to four feet deep, and about the ſame in width, acroſs the bottom, which is the thickeſt and ſtouteſt part of the veſſel. This circular form, though in general uſe, is perhaps the worſt that could have been deviſed for the purpoſe of calico-printing. It is no doubt the firſt that was employed, and has advantages in point of ſolidity of form, and eaſe of tranſportation from one place to another, over any other. For the purpoſe of dyeing, however, or any operations where goods are kept for a long time at a boiling heat, and turned over the winch, it is the moſt inconvenient that could have been adopted.

In a veſſel of this ſize and form, it is cuſtomary to dye from ſix to twelve pieces of twenty-eight yards each, at one operation. The goods are diſpoſed either in two lengths of four or ſix over the winch; or, when quick turning is neceſſary, in one length only, in which caſe, ſix pieces, or at moſt eight, are diſpoſed equally over the whole ſurface of the winch. In this latter caſe, the inconvenience of the circular form is particularly felt. It is evident that when ſix or more pieces are crowded upon a winch, thoſe which are at the extremities will have little or no ſpace in which to float, without diſturbing thoſe which are nearer the centre; whilſt, on the other hand, thoſe which are in the middle will have more than ſufficient, and will float in the copper, ſcarcely ever touching its ſides. In conſequence of this, the pieces at the extremities of the winch, being crowded, will preſs along the ſides of the copper, and thus be expoſed to greater heat and hazard of copper-marking, than thoſe which are in the middle. Their diſpoſition on the winch will alſo be deranged, and the copper-man, with all his care and attention, will be unable to preſerve that order and regularity in the diſtribution of their folds, ſo eſſentially requiſite in good dyeing. When the copper is in a ſtate of ebullition, theſe evils increaſe, and it rarely happens that the moſt experienced dyer can keep his goods diſengaged, or prevent their getting completely faſtened, when he has two lengths of ſix over the winch, and keeps them twenty or thirty minutes at an actual boil.

By

By adopting a ſquare, or, what is ſtill better, an oblong veſſel of the ſame capacity as the former, theſe inconveniences are in a great meaſure done away; the goods have all equal ſpace to float in, are equally removed from the centre and ſides of the veſſel, and preſerve their order and diſpoſition on the winch, even in a ſtate of ebullition, with eaſe, certainty, and comparatively trifling attention.

Dye-coppers are generally ſet up in brick work, with each their ſeparate and diſtinct fire-place, chimney, &c.

The ſame principles apply to the heating of theſe veſſels as to all other boilers, but we need not enter here upon a ſubject which will be more fully treated of in another part of this work. The recent improvements in the application of ſteam, as a vehicle of heat, are however of ſuch importance, and have at this moment excited ſuch general intereſt amongſt dyers, and calico-printers, as to claim a ſhort notice in this place.

Mr Gott, of Leeds, was the firſt who applied ſteam in the large way, to the heating of dye-coppers, and the ſucceſs of his experiment was ſo complete, as to induce many others to follow his example. This mode, which is the ſimpleſt and moſt economical that can be employed, conſiſts in throwing the ſteam directly into the dyeing veſſel. One ſteam boiler, ſituated at the extremity of the building, ſupplies his numerous coppers which are diſpoſed promiſcuouſly about the dye-houſe, unincumbered with fire-places, aſh-pits, chimneys, &c. and ſimply ſurrounded with a caſing of brick, to ſupport the copper, and confine the heat.

The ſteam is conveyed in horizontal pipes, carried along the ceiling of the dye-houſe, from which deſcend vertical tubes of from $\frac{3}{4}$ of an inch to $2\frac{1}{2}$ inches diameter, according to the ſize of the copper they belong to. Theſe ſteam tubes all paſs down on the outſide of their coppers, and enter them horizontally at the level of their bottoms; and are furniſhed with braſs cocks for regulating the admiſſion of the ſteam, or entirely interrupting it when the copper is not wanted.

The rapidity with which theſe coppers are heated, is truly aſtoniſhing. One of the largeſt in Mr. Gott's dye-houſe of 1800 gallons capacity, according to count Rumford, was brought to the boiling point in half an hour. The ſaving of fuel, though in general over-rated, is another advantage gained by this mode of applying heat. Mr. Gott ſtates this at two-thirds of the quantity conſumed when the coppers are heated by ſeparate fire-places; but this is evidently too much. The ſaving conſiſts in the application of fire to one veſſel only of large dimenſions, inſtead of to a number of ſmall ones; and though this is certainly accompliſhed with leſs expence of fuel, yet, if the fire has been well and properly applied in the latter caſe, the ſaving will amount nearer to one-third than to two.

The burning of the copper ſides and bottoms, when heated by a naked fire, is a heavy expence in a large eſtabliſhment, and often a ſource of ſerious inconvenience. By the application of ſteam, this is entirely done away, and even copper veſſels themſelves, for many operations, rendered wholly unneceſſary. Wooden veſſels have been ſubſtituted, with great advantage, in their ſtead, and when the uſe of copper cannot be diſpenſed with, it may be employed in thin ſheets, ſupported by a frame work of brick or wood. Important as theſe advantages are in an economical point of view, the ſyſtem of ſteam-heating has, if poſſible, ſtill more powerful recommendations. The eaſe, elegance, and regularity, with which the heat can be tranſmitted by a ſteam tube, are of themſelves ſufficient to entitle it to decided preference.

By the adjuſtment of the ſteam-cock, the rate of heating is ſo regulated, that the copper may be brought to the boiling point in any given time, with an exactneſs as well as celerity, unattainable by the other mode. The heat may in an inſtant be withdrawn, or rendered ſtationary at any fixed point, by a ſingle turn of the cock, the firſt of which is impracticable, and the latter extremely difficult, when the coppers are heated by ſeparate fire-places. The ſides and bottom of a dyeing copper, expoſed to a ſtrong and naked fire, are always much hotter than the dye-liquor, and occaſion copper-marks and unevenneſs in the goods, in ſome caſes difficult to avoid. This inconvenience is entirely removed by the uſe of ſteam, ſince the dyeing-veſſel deriving all its heat from the heated liquor within it, can never, it is evident, acquire a higher temperature.

The ſucceſs of Mr. Gott's experiments was ſuch, that many of his neighbours, at firſt much prejudiced againſt it, immediately adopted the plan. With a liberality worthy of imitation, his dye-houſe was open to all inquirers; and ſuch was the intereſt excited by this new and extraordinary mode of applying heat, that experiments were immediately inſtituted in different parts of the country, with a view of extending this improvement to other branches of the art of dyeing. Mr. Gott had proved and eſtabliſhed the practice as far as the dyeing of woollen goods was concerned, and little more remained to be done; in its application to calico-printing and the dyeing of lighter goods, however, difficulties occurred, of ſuch a nature, as wholly to diſcourage many whoſe trials were made in a haſty ill-concerted manner, and conſiderably to embarraſs thoſe whoſe experiments were conducted with greater ſkill and patience.

The great, and only well-founded, objection aroſe from the agitation into which the water was thrown when it approached the boiling point, by which the goods were entangled and faſtened, much more than in the ordinary mode. This inconvenience was not felt in Mr. Gott's dye-houſe, where the goods being woollen, and of much greater weight and ſubſtance, were leſs liable to be toſſed about by the aſcending currents from the ſteam-tubes than the thin and lighter goods manufactured from cotton. The evil was often increaſed by want of ſufficient attention to the regulation of the ſteam-cock; thrice the quantity of ſteam neceſſary to maintain the copper at the boiling point being admitted, which, retaining its elaſtic form at that temperature, paſſed through the copper uncondenſed, and threw the goods into the greateſt confuſion.

To diminiſh the agitation, it has been found neceſſary to break the force of the current, by introducing the ſteam in ſmall quantities, through two or three different openings, or in ſome caſes by introducing a falſe bottom, pierced full of holes, between the goods and the end of the ſteam-tube; by this means, and ſtill more by carefully admitting only the neceſſary quantity of ſteam, the agitation may be ſo far reduced, as to be no longer troubleſome.

The accumulation of condenſed water in the dye-copper, is a neceſſary conſequence of this mode of applying ſteam, and cannot be avoided. Where it is an object to diminiſh this as much as poſſible, it may be accompliſhed by uſing ſtrong, or which is the ſame thing, very hot ſteam; but it does not appear that any great inconvenience reſults from this trifling increaſe, which ceaſes when the copper has attained the boiling point, due allowance being made for it in the firſt inſtance, when the veſſel is filled with cold water.

When ſtrong ſteam is rapidly thrown into a veſſel filled

 with

with cold water, the condenfation is inftantaneous, and attended with a loud noife, and violent fhock.

We have feen a ftone ciftern of large dimenfions, and firm joinings, nearly fhaken to pieces by the incautious admiffion of fteam, and many of the early experimenters complained that their coppers were nearly knocked to pieces, and that few would hold water after being heated once or twice.

This inconvenience may be corrected by ftopping the end of the fteam tube, and piercing the fides full of fmall holes, or, which is ftill better, by turning up the end of the pipe, and fixing a valve in it. In either cafe the fteam is emitted through the openings in ftreamlets, or fheets of fmall volume, whofe condenfation is attended with trifling noife, and little agitation of the veffel. Several dye-houfes in Lancafhire and Chefhire have been fitted up on thefe principles, and, the coppers, thus heated, are ufed, with few exceptions, for every purpofe of calico-printing.

Mr. Gott, as we have before ftated, was the firft who introduced this improvement on a large fcale, the idea of which, count Rumford informs us, was derived from the perufal of his feventh Effay. We know not what fhare the count's publication might have in deciding the trial, but the idea of heating water by fteam had occurred long before that time to Mr. Watt; and, if we miftake not, a warm bath at Soho had been heated in this way, and feen by Mr. Gott, and many others, to whom the idea of its application to more ufeful purpofes had naturally occurred.

For fome few purpofes we believe this mode of applying heat, by throwing fteam directly into the dye-copper, is lefs advantageous. When goods, for example, are kept a long time at a low heat and never boiled, the accumulation of condenfed water, in this cafe, continues to the end of the operation, and weakens confiderably the effect of the dye. All the advantages of this mode may, however, be obtained without any of the inconveniences we have before alluded to, by furrounding the dyeing-veffel with a cafing of caft iron, and throwing the fteam in between this and the copper. The heat in this cafe is tranfmitted through the fides of the copper, as in the ordinary mode of heating by a naked fire, and the condenfed water is carried off from the cafing either by a reverfed fyphon, eight or nine feet long, or, when the fituation will not admit of this, by a floating valve. In this way the noife and fhock, from the rapid condenfation of fteam in cold water, the agitation in the dye-copper, and the condenfed water, are all completely got rid of. The apparatus is, however, lefs fimple and much more expenfive than the former.

A ftrong fteam is neceffary to produce the boiling heat in a dye-copper cooled by the continued expofure of the goods on the winch, and the veffel and joints muft be found and ftrong to fupport this preffure. Both modes have their advantages, and will, we have little doubt, in a few years entirely fuperfede the ordinary mode of heating by feparate fire-places.

COPPER-*mark*, is a ftain, difcolouration, and unevennefs in dyed goods, caufed by contact with the fides of a *hot* or *dirty* copper, during the operation of dyeing. In the ordinary mode of heating, as has been obferved in the foregoing article, the bottom and fides of a dyeing-veffel, when expofed to a ftrong and naked fire, are much hotter than the dye-liquor. When this is the cafe, and the colours pale and delicate, fimple contact with the hot copper is fufficient to caufe unevennefs, either by affecting the hue by the excefs of heat, or enabling the mordant to combine with an extra portion of colouring matter. This inconvenience is in general remedied by placing a bafket of wicker work within the copper, which prevents the goods from touching the fides of the veffel; it is ftill more completely guarded againft by heating the copper with fteam, in the manner already defcribed.

The fides of a copper will often occafion marks or ftains when the veffel has been negligently wafhed out, and efpecially when it has not been ufed for fome time. A dye-copper not in ufe fhould always remain filled with clean water. It prevents the formation of a ruft on its furface, which fimple wafhing will not remove, and which acts as a mordant, and fixes the dye whenever it touches the cloth.

COPPER *Ifland*, in *Geography*, otherwife called MEDNOI *Oftroff*, *i. e.* Mednoi ifland, lies in the fea of Kamtfchatka, which feparates the two continents of Afia and America. It takes its name from large maffes of native copper found upon the beach; and as it lies full in fight of Beering's ifle, it was eafily and fpeedily difcovered by thofe who fucceeded Beering. Thefe two uninhabited fpots, to which the fea-otters and other marine animals were accuftomed to refort in great numbers, and which were firft vifited in 1745, were for fome time the only iflands that were known, until a fcarcity of land and fea-animals, whofe numbers were greatly diminifhed by the Ruffian hunters, occafioned other expeditions. Befides the native copper which is found on the coaft of this ifland, the true right camphor-wood, and another fort of wood, very white, foft, and fweet-fcented, are found among the floating bodies which the fea cafts upon the fhore. The copper lies on the fhore in fuch abundance, that many fhips might be loaden with it; and an Indian trader might make a profitable voyage from thence to China, where this metal is in high demand. This copper is moftly in a metallic or malleable ftate, and many pieces of it feem as if they had been formerly in fufion. The ifland is not high, but has many hillocks, each of which has the appearance of having formerly been the funnel of a volcano. This ifland, as well as the others in its vicinity, are fubject to frequent and violent earthquakes, and abound in fulphur. (Coxe's Ruffian Difcoveries.) From the account in captain Cook's Third Voyage (vol. iii. p. 347.) we learn, that, on Mednoi and Beering's ifland, fcarcely a fea-otter is now to be found; though it appears from Muller, that in his time they were exceedingly plentiful.

COPPER-*Plates for Engraving.* We are favoured with the following account of the method of preparing copper-plates, as practifed at prefent in London, by Mr. Harris, fon-in-law and fucceffor to Mr. Whittow of Shoe-lane.

A fheet of copper muft be chofen as free as poffible from flaws, and of a fomewhat greater thicknefs than the finifhed plate is intended to be: it is then to be fcraped all over with a *fcraper*, in fhape fomething like the head of a fpear, and fixed in a handle long enough to go under the arm, the other hand holding the tool near the cutting part. When it has been perfectly freed from the outward cruft, fcales, or ruft, it muft be carefully examined to fee if there are any holes or flaws in it; if there are (which is almoft always the cafe), they muft be fcooped out by a tool called a *fcooper*. This being done, it is next to be well and regularly hammered all over on an anvil, of a confiderable degree of convexity, in order to harden it; and afterwards on a broad and nearly flat anvil, to flatten and planifh it. After this has been performed, it is to be cut to the fize wanted, and the edges a little chamfered or bevilled, and is now to be ftoned, that is, rubbed all over with a faft cutting, but not very coarfe, grit ftone, care being taken to ufe a great quantity of water, to float off the particles mutually abraded from the copper and ftone. When it is judged that all the marks of the fcooper and

nad hammer are rubbed out, a ftone of a fine grit is to be ufed in the fame manner, and after this a third.

The two firft-mentioned ftones are fold at the ironmongers in London, under the name of "Carpenters' ftone;" the beft kind are brought principally from the coal fields in the neighbourhood of Bilfton in Staffordfhire. The ftone laft ufed is called "Water of Aye ftone," and brought from Dumfriesfhire. All the three kinds contain a confiderable quantity of argil in their compofition. Lately, a very fine grained argillaceous grit, brought from the neighbourhood of Sheffield, has been ufed inftead of the Bilfton ftone.

After the operation of ftoning has been performed, the plate is to be "coaled." This is done by rubbing it firft with charcoal of birch-wood, or alder, and water, and then with charcoal of willow: the latter gives the finer polifh, particularly if oil inftead of water be ufed. Sometimes the plates are finifhed by burnifhing, but this is not now often done.

The charcoal is not prepared by the copper-plate makers, but is procured from the dealers in that article by the workmen, who take a plate of copper, and by trial difcover which pieces are fit for their purpofe.

Copper-*Plate Printing*. See *Rolling-prefs* Printing.

Copper-*Plate Work*, in *Calico-Printing*. The application of engraving has given birth to a new and important branch of calico-printing. It firft introduced thofe machines whofe fubfequent improvement has fo much contributed to the perfection of the art, and which furpafs the ordinary mode of block-printing, not only in neatnefs, accuracy, and precifion, but ftill more in the economy and activity with which the labour is performed.

Thefe machines are of two kinds, the flat prefs, and the rolling or cylinder prefs.

The flat prefs, in its original form, was merely a modification, confiderably enlarged, of the prefs for ornamental prints or engravings; to which was added a contrivance for *joining*, with accuracy, the numerous and fucceffive impreffions neceffary to cover a piece of cloth. It was confined at firft to one colour, but later improvements have extended it to two and even three. The fingle colour preffes are, however, principally in ufe.

The cylinder, or rolling-prefs, is of later invention, and differs from the former chiefly in the fubftitution of an engraved cylinder for a flat plate. With the latter the cloth is printed by *fucceffive* impreffions, in which the accuracy of the joining is of great importance: in the rolling-prefs, the revolution of the engraved cylinder forms one *continued* impreffion, from one end of the piece to the other, in which there are confequently no joinings. This is a great advantage, efpecially in fmall and delicate patterns, where a variation of a hair's breadth in the joint is readily perceived; but its great fuperiority over the flat prefs confifts in the economy of time and labour. With a well-conftructed cylinder-prefs, and proper arrangements for accelerating the work, one man and a boy will print 200 pieces, of 28 yards each, in the fame time that a flat prefs man will print 12 pieces, or a block printer 8; that is, in one day. They are conftructed to work one, two, and even three colours, but are generally confined to one; the difficulty and delay in adjufting the feveral cylinders to each other, when more than one colour is worked, counteracting, in great meafure, the chief advantage of the machine. For a defcription of thefe preffes, and the mode of working them, fee Press. See alfo the article Engraving.

COPPERAS, a term employed popularly and by the old chemifts as fynonymous with vitriol. Of Copperas there are three kinds, the *Green* or Sulphat of Iron, the *Blue* or Sulphat of Copper, and the *White* or Sulphat of Zinc, which fee.

The former is diftinguifhed in common by a variety of names, as Martial vitriol and Roman vitriol, but moft commonly by the names of green copperas or green vitriol. It is feldom made by the direct combination of fulphuric acid with the oxyd of iron, which conftitutes this fubftance, except for the purpofes of experiment in the laboratory of the chemift. The common, as well as the refined, is manufactured on the large fcale, as an article of commerce, in the neighbourhood of collieries, and is in fome inftances found native. It was known to the ancients, as Pliny informs us, (N. H. l. xxiv. c. 12.) and denominated by them Mify, Sory, or Calcanthum. Concentrated fulphuric acid has fcarcely any action on iron; when it is heated the acid is decompofed, part of its oxygen combines with the iron and fulphurous acid gas is evolved, but when diluted fulphuric acid is added to iron filings, a violent effervefcence takes place, and hydrogen gas is difengaged; in this procefs the water, with which the acid is diluted, is decompofed, the oxygen of which combines with the iron; and converts it into an oxyde; whilft the hydrogen efcapes in the form of gas, the folution is of a green colour, and by evaporation affords cryftals of fulphat of iron which are tranfparent, of a fine green colour, in the form of rhomboidal prifms, having an acrid aftringent tafte; this falt almoft always reddens vegetable blues, is very foluble; two parts of cold water, or lefs than its weight of boiling water, being fufficient for its folution.

The mode of preparing it, as an article of commerce, is purfued principally, as before obferved, in the neighbourhood of coal pits, in many of which a fubftance is found in great abundance, which, though injurious to the coal, forms neverthelefs a valuable material as being the bafis of copperas, known by the name of pyrites or braffes; thefe are carefully feparated from the coal, and the expence which this labour occafions, is amply repaid by the produce of the manufacture; the procefs is at once fimple and economical, and does honour to the intelligence of thofe who firft fuggefted it. A large area of ground is inclofed, to which a gentle but fenfible declivity is given; the furface is made quite equal, and covered with an unctuous clay, which is every way extended and fmoothed, as if plaiftered, in order to prevent the water from filtrating into the earth; at the fame time a furrow is formed in the midft of the area, for collecting all the water in one point, and conveying it to a refervoir; the area being thus prepared, the pyrites are fpread all over its furface, in layers one above another to the height of feveral feet; care is taken in placing the different pieces to leave intervals for the admiffion of the air: now as thefe pyrites contain iron in combination with fulphur, when they are expofed to the alternate action of water and the atmofphere, they undergo a material change, the water is decompofed, one of its conftituent parts, namely, the oxygen, combines with the fulphur, and forms fulphuric acid, or oil of vitriol; the hydrogen efcapes into the atmofphere, by this means a faline powdery mafs is formed, the tafte of which is auftere and ftyptic; the decompofition is materially affifted by occafionally turning the pyrites with rakes having long iron teeth, like thofe ufed in Glafgow and neighbouring places, for ftirring the boiling ingredients of the glue maker, by which means new furfaces are prefented to the action of the atmofphere. In fummer, when it is long dry weather, it is neceffary to fprinkle the braffes frequently with water, to wafh away the falt which is already formed, and alfo to produce that humid warmth which accelerates ftill further the decompofition; gentle fhowers are therefore excellent for bringing forward this part of the operation. The water loaded with vitriol,

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finding a clay bottom, which prevents its lofing itfelf in the earth, flows down the inclined plane, and falls into the refervoir, in which a quantity of old iron is placed, purchafed principally from the fmiths and the coopers, as their refufe. It is well known that, during the decompofition of the pyrites, more fulphuric acid is produced, than the iron contained in them will neutralize; the refufe iron is therefore placed in the refervoir and the liquor run upon it, in order to combine with the fuperabundant acid. The natural evaporation which takes place here adds to its ftrength, and, when it is conceived to be properly prepared, it is drawn off into a fecond refervoir, attached to the workhoufes of the manufactory; from thence it paffes into leaden boilers, where it is made to boil and evaporate by a large fire, formed of the moft inferior kind of coal; when the liquor is brought to a proper ftate, it is run out by fyphons, or drawn out by pumps, into long wooden troughs, where it is cryftallized by the operation of cold, the cryftals attaching themfelves to twigs and branches of trees, which are fufpended in the troughs for the purpofe by being hung over pieces of wood, feveral of which are laid acrofs the top of each trough; from thefe branches they are taken and dried, and are then ready for the market.

Refined Copperas is an improvement in the mode of preparing copperas, and was difcovered by the late Mr. Thomas Barnes, of Walker, near Newcaftle-upon-Tyne, a coal viewer of the firft eminence in that neighbourhood; this is effected by merely evaporating ftill further than in the common mode the water of cryftallization, and attending throughout the whole procefs to a little more cleanlinefs and exactnefs in the manipulations.

Two or three men are fufficient to manage a manufactory of either kind, and to produce a great quantity of the articles; confidering which, and the rate it fells at, at prefent (1806) from 10 to 14*l. per* ton, it ranks with the moft beneficial manufactories.

Amongft the few places in which this falt is found native, we fhall only notice that at Hurlet near Paifley, in a ftratum of fchiftus, funk through in 1786 to a feam of coal, pyrites abound fo much, that native copperas is fometimes found; it does not in this inftance lie in any regular bed, but is interfperfed through the ftratum, and feparated from the coal by the workmen. Thefe works were eftablifhed in 1753 by a company of gentlemen from Liverpool, for the fole purpofe of making alum, but finding both pyrites and native copperas, they added the manufacture of that article alfo.

Copperas *ftone*. See Pyrites.

Copper-*Mine*, in *Geography*, a large river in the central parts of N. America, reckoned to be the moft northern in the American continent. Purfuing a northern courfe, it falls into the fea in N. lat. 72°, and W. long. 120°, according to Mr. Hearne, and 113° according to the pofition affigned it by Mr. Arrowfmith. In 1771 Mr. Hearne arrived at this river, who found that it flows into the Arctic ocean, or rather, as he intimates in the preface to his book, publifhed in 1795, into an inland fea like that of Hudfon. From his journies, performed in 1769—1772, we may infer, with a great degree of confidence, that the fearch after a N. W. paffage is not likely to fucceed. Upon his arrival at the copper river, on the 14th of July 1771, the favages who attended him murdered, in a fhocking manner, fome Ifkimo families. On the 17th he was within fight of the fea; and commencing his furvey, purfued it to the mouth of the river, which he found fo full of fhoals and falls, that it was not navigable even for a boat, and that it emptied itfelf into the fea over a ridge or bar. As the tide was out, he perceived by marks on the edge of the ice, that it flowed about 12 or 14 feet, and of courfe could reach but a little way within the river's mouth, and he found the water perfectly frefh. He concluded that this river ran into the fea, or fome branch of it, by the quantity of whalebone and feal-fkins which the Ifkimos, (or Efquimaux) had at their huts, and alfo by the number of feals which he faw on the ice. It has been fuggefted that, as he did not tafte the water, which feems fomewhat furprifing, this fea, or branch of it, as he conceived it to be, might have been a frefh water lake. Seals, it is obferved, are not uncommon in the fea of Baikal; and the whalebone might have been procured in barter. The fuppofed tide is not unknown on occafion of high winds in the fouthern lakes. However this be, Mr. Hearne fays, that he had an extenfive view of the fea, and that, from the mouth of the river, it was full of iflands and fhoals, as far as he could fee with the affiftance of a good pocket telefcope. The ice was not then broken up, but was thawed for about ¾ of a mile from the main fhore, and to a little diftance round the iflands and fhoals. The Ifkimos here were of a dirty copper colour, and rather fhorter in ftature than thofe to the fouth. Their kettles were made of lapis ollaris, of a mixed brown and white; and their hatchets and knives were of copper. The dogs have fharp erect ears, fharp nofes, and bufhy tails, being a fine breed of that fort. Many kinds of fea-fowl were obferved: and in the ponds and marfhes fwans, geefe, curlews, and plovers. The quadrupeds are mufk cattle, rein-deer, bears, wolves, wolvereens, foxes, Alpine hares, fquirrels, ermins, mice. Mr. Hearne, in the profecution of his furvey, vifited one of the copper mines, about 30 miles S.E. from the mouth of the river, which was merely a hill that feemed to have been rent by an earthquake, or perhaps by fubterraneous water. The copper is found in lumps, and is beaten out by the help of fire and two ftones.

Copper-*Mine hills*, hills of N. America, in N. lat. 68° 30'. W. long. 112°.

COPPET, a fmall town of the Pays de Vaud, in Switzerland, delightfully fituated on the banks of the lake of Geneva, 12 miles N. of Geneva. It is an ancient Swifs barony, comprifing eight villages befides the town; its territory produces excellent red wine. The caftle which commands the lake fuftained an obftinate fiege in 1536 againft the troops of Berne, who at laft reduced it to afhes. In the year 1657, the barony of Coppet was bought by Frederick, count of Dohna. He rebuilt the caftle in a modern ftyle, but his fon fold the eftate to an inhabitant of St. Gall, from whofe defcendants it was purchafed fome time before the French revolution by the celebrated Necker, who expended large fums in embellifhing a feat, the fituation of which is truly enchanting, and where he clofed his chequered career. He left it to his daughter, the baronefs of Stahl Holftein, whofe name is dear to French literature, and who was banifhed to this eftate in 1807, for having produced the interefting novel of Corinna. *Durand.* Statiftique Elementaire de la Suiffe 1795.

COPPI, Jacopo, in *Biography*, confidered by Lanzi the fame perfon with *Jacopo del Meglio*, was born in the Florentine ftate in 1523, and was employed, in concurrence with the other expert mannerifts of his fchool, in the large altar pictures of the church of Santa Croce at Florence. If, however, we may judge from the critiques of Borghini and other writers, his merit upon this occafion appeared lefs confpicuous than in fome fmall pictures of fabulous fubjects, which formed part of the ornament of an efcrutoire executed, under the infpection of Vafari, the chief of the Florentine fchool of that period, for the prince Francefco de Medici: but his mafterpiece is a picture reprefenting the crucifixion in

in the church of St. Salvatore at Bologna, which, according to Lanzi, is nowife inferior to the fineft works of Vafari himfelf, and may indeed rank with the beft productions of the Bolognefe artifts prior to the Caracci. It is dated 1579. The artift died in 1591. Lanzi, Storia Pittorica.

COPPICE, in *Rural Economy*, a low fort of inclofed wood, which is cut over at ftated periods, for different purpofes.

Thefe forts of woods, wherever there is much demand for the various fmall ftuff which they are capable of affording, yield confiderable returns to their owners; particularly where proper care is taken in fencing and preferving them againft live ftock.

In cafes where new coppices are to be raifed, it is neceffary to beftow great attention on the nature of the foil, and the expofure of the land; adapting the trees and plants to the nature of thefe, as much as poffible; and at the fame time, taking into confideration the forts that are the moft ufeful, and moft in requeft in the particular diftrict or vicinity: as this fort of wood is in general difpofed of to the greateft profit and advantage, where there is little trouble of carriage. The ground fhould be well drained, where it is inclined to be wet, and alfo well inclofed from the cropping of cattle. Some likewife advife, that where it is covered with bufhes or briars, that they fhould remain to fhelter the young growth of wood; and that if there happen to be a moderate quantity of young oak and afh-trees on the fpot, to let them ftand by all means: always keeping in mind how neceffary fhelter is for the growth of wood of all kinds and forts. But that in newly planted coppice-woods, where all the plants are of the fame age, there is not the fame reafon for letting them ftand before they are ftooled off for underwood, as for young trees planted to fill up old woods. Thofe which are intended for underwood may, in fuch newly planted woods, be cut off when planted, or at any age from eight to fourteen years, without injury. Indeed, young woods fhould not ftand too long previous to the firft cutting. It is obferved in the feventh volume of the Letters and Papers of the Bath Society, that the kinds of wood to be planted in coppices, either in making new ones, or filling up old ones, fhould be regulated partly by the demands of the country, but chiefly by the peculiar aptitude of the foil and fituation to produce particular forts. Let nature be the guide, fays the writer, in planting, and you will feldom do wrong. Particular foils and particular fituations will always favour particular kinds of trees: we need not look for the reafon, but only for the fact.

The chalk hills of Hampfhire are peculiarly proper for beech; the flinty loams and clays of the fame county, for oak and afh; the moffy fteep fides of the Wiltfhire downs, for hazel; and the fands of the fame diftrict, for afh; the rugged and almoft naked rocks of Mendip, in Somerfetfhire, produce the lime tree and the walnut in the greateft luxuriance; and on the higheft parts of the fame Mendip hills, where no other tree can ftand the fea-breeze, fycamore flourifhes as well as in the moft fertile valley. Taking the general demand of counties, and the peculiarities of different foils, into confideration, it is afferted that there is no kind of wood fo generally proper for planting in coppices as afh: the value of afh-poles being at leaft one-third more, and frequently as much again, *per* hundred, as that of other poles, as being applicable in all fizes to fome ufeful purpofe or other; the timber being always in requeft, and faleable at any age or fize, at almoft the price of oak; and the wood itfelf being as quick a grower as any, and quicker than moft; and, above all, there being but few foils, from the blackeft and wetteft bogs to the higheft and moft expofed mountains, where it will not grow, are reafons why afh is one of the moft profitable woods to plant in fuch coppices as are favourable to its growth. In foils and fituations where afh does not grow kindly, let fuch other forts of wood be planted as appear to thrive beft in fimilar foils and fituations in the fame county. Spanifh chefnut, though not fo general a grower as afh, is a moft excellent wood, either for timber or underwood, and wants only to be more known to be higher in eftimation. It partakes much of the properties of oak, but excels it in two points, namely, that it grows fafter, and that the fap part of the timber is firmer and lefs corruptible. To fill up woods that are become thin by age or neglect, the proper time is one year, or at the utmoft two years, after the underwood is cut. The young plants fhould be eight or ten feet high, and an inch and an half diameter at the ground, and fhould be planted without cutting off. If the foil be dry, no other preparation is neceffary than barely digging the holes for the plants; if wet, deep drains fhould be made, to take off the fuperabundant water. The earth dug from thefe drains fhould be thrown out on the lower fide of them, and upon this new earth the plants fhould be planted. If land of this latter defcription be black and peaty, afh is peculiarly proper for it; and will, if planted on the earth thrown from the drains, make a moft furprifing progrefs. If it be a ftiff yellow clay, it is generally more favourable to the growth of oak than of afh. In fuch foils, oak for timber, with a mixture of willow, birch, alder, and Spanifh chefnut, for underwood, will perhaps be the moft proper. All thefe kinds fhould ftand one round of the underwood; and if ftill weak, fhould ftand two, before thofe are cut off which are intended for underwood. Birch plants are indeed an exception to this rule: they fhould always be cut off the firft round of the underwood; for, if they are large when cut off, the ftocks frequently decay and die. In all mixtures of kinds of wood for coppices, thofe forts fhould be ufed which are not unfriendly to each other, and which will come round fit to be cut together at the fame periods; and fuch kinds fhould be allowed to ftand for timber, and that at fuch diftances as to injure the underwood as little as poffible. The plants for filling up old decayed woods of the coppice kind, fhould be the ftrongeft and beft of their kinds. Thofe which are weak at firft will be drawn up by the furrounding underwood, and become, from their increafed height, ftill weaker. At the next cutting of the underwood, they will be blown down; or, if cut off, the fhoots will be too weak to grow up with the other underwood. Oak, afh, and Spanifh chefnut, fhould be kept in a nurfery for this purpofe. Alder and birch plants grow plentifully fpontaneoufly in fome countries, and may be taken up for ufe; if none fuch are to be obtained, they may be raifed from feed foon on a moderate hot-bed, in the open air. Alder is fometimes propagated by taking up old roots, and dividing them into feveral parts; and hazel may be propagated the fame way. Willow is generally planted in cuttings; but a much better way, where there are any old willow ftocks, is to plafh down the fhoots, and fill up the vacant places round fuch old ftocks. The wild cherry, which will grow on almoft any foil, and is eafily propagated, makes an exceedingly good underwood, though as yet it is but feldom ufed for that purpofe.

It is remarked by the author of Modern Agriculture, that the coppice-woods, when the fhoots are young, whether of oak, afh, elm, or birch, or a mixture of thefe with other forts, are very little attended to in any part of the ifland: fencing being the only particular which marks the difference between a good and a bad manager. But, he fays, when the wood can be fold for different ufeful purpofes, at various

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ftages of its growth, as is the cafe in many parts, an effential improvement in the management of coppices might be introduced with great propriety. In all fuch fituations, it would be profitable to the owners, were the fhoots thinned two or three times between each general cutting. The weedings or thinnings would do much more than defray the expence, while, by admitting a more free circulation of air, and by cutting off the fupernumeraries, the principal fhoots would advance more rapidly, and become by that means fit for fale, perhaps, two or three years fooner than they do by being allowed to remain in a neglected ftate. This is a circumftance that particularly merits the attention of thofe who are favourably fituated, in regard to market, for the various productions of coppices; as faving two or three years in the regular cuttings would materially enhance the value of the land fo occupied.

He further ftates, that feveral other improvements in the management of coppices might certainly be effected, were the owners to beftow due attention. It frequently happens, that, from mifmanagement in cutting, many of the ftools become ufelefs, while fcraggy thorns, brambles, &c, are allowed to fpring up, and occupy the place of more valuable plants. Were the owners of coppices in general to permit their labourers, or other induftrious poor people in the neighbourhood, to dig up the decayed ftools and ufelefs brufh-wood for fuel, under condition that they plant healthy vigorous ftools in their places, the coppices by this management would neceffarily become more valuable. Much damage alfo frequently happens from allowing the underwood to remain fcattered over the furface of the wood, for a confiderable time after it is cut. Every perfon muft be fenfible, that if the cuttings are allowed to remain in this fituation till after the young fhoots begin to fpring, it is fcarcely poffible to remove them without breaking or otherwife injuring thefe tender fprigs. In all auctions of coppices, it ought, therefore, to be an article of fale, that the whole fhould be carried off the premifes in a limited time; and the forefter, or wood officer, fhould receive injunctions to fee this condition of the fale ftrictly fulfilled.

Much greater care is requifite, the fame writer fays, in cutting coppices properly than the owners, in many cafes, are difpofed to beftow. It cannot be fuppofed, when fifty or a hundred purchafers, with their affiftants, are allowed to ufe their axes with no other view than to cut the wood which they have purchafed, without regard to the fuccefs of what may be called the next or following crops, that any regard will be beftowed as to the proper manner of cutting. It is certainly of much importance, not only for the future vigour, but alfo for the durability of the ftools, that the ftems or fhoots fhould be cut in that manner which experience has proved moft effectual for anfwering both purpofes. The fhoots ought to be cut as low as poffible, without injuring the ftools. When that practice is adopted, the ftools remain nearly even with the ground, and confequently in a much better ftate of prefervation than by cutting the ftems at the height of fix, eight, or ten inches; as, by this method of cutting being frequently repeated, the ftools get in procefs of time, as he has frequently feen, to the height of feveral feet above the furface foil. Another common error, and which wood-cutters of the above defcription may be fuppofed very guilty of, is to leave the butt-ends of the ftems jagged and uneven, and part of the bark torn off, or loofened all the way down to the ftool, than which nothing can be more injurious. The butt-ends of the ftems ought rather to be brought to a point in the middle, and the bark remain quite clofe and firm, otherwife dews and rain drop into the hollows, and either rot or otherwife prove ruinous to the future health and vigour of the ftools. In fhort, to render a coppice both valuable and lafting, a larger fyftem of management ought to be adopted. For the reafons mentioned above, they ought to be thinned two or three times between every general cutting. The ufelefs brufh-wood ought to be rooted out, and other more ufeful plants fubftituted. Where too much water abounds, drains ought to be opened; the fences at all times kept in a fubftantial ftate of repair; and on no confideration whatever fhould the purchafers of coppices be allowed to cut down the woods. Men employed by the owners, and who are properly bred to the bufinefs, ought only to be employed; who, by beftowing proper pains in dreffing and pruning the butts and ftools as they go along, would thereby enfure the fpringing of numerous and vigorous fhoots the following feafon.

The periods of cutting coppice underwood muft be regulated, it is obferved in the work firft mentioned, by the luxuriance of its growth, and by the demand of the country, and the ufes to which the wood is to be applied when cut: but, in general, the common rule of trade will hold good here, *viz.* "that fmall gains and quick returns make the dealer rich, but long credit ruins." In the article of underwood, not only the intereft of money, but the lofs of the fucceeding growth, tells againft the value of ftanding wood after it is fit to cut, and makes it doubly the advantage of the owner to cut his underwood as early as it is faleable. As foon, therefore, as any kind of wood is fit for the ufes of the country, it fhould then be cut; unlefs it can be made appear, that it will pay compound intereft for ftanding longer, or, in other words, will pay not only the fimple intereft of the firft value, but alfo the lofs of fo many years growth of the wood, as fo far advanced towards another crop. Wood merely for fuel can fcarcely be cut too young. Hazel is ufually fit for hurdles and dead hedges, from nine to twelve years old; afh for fheep-cribs, at the fame age; and afh and other woods for hop poles, from eleven to fourteen years old: while afh for carpenters, and other large ufes; alder, birch, and willow, for rafters, turner's ufes, pattens, clogs, coal-pit ufes, &c. muft ftand from fixteen to twenty years, before the poles are large enough for their refpective purpofes. It therefore behoves every owner of woods of the latter defcription, unlefs he is public-fpirited enough to give up his own profit to the good of the public, to confider well before he fuffers his wood to ftand to the age of fixteen, eighteen, or twenty years, whether the value of fuch wood, when cut younger, and fold for other purpofes, added to the intereft thereof up to the ufual period of cutting, and the gain by the growth between thefe two periods, will not more than equal the value the wood will be of, if fuffered to ftand fo long; and if fo, whether he ought not to cut his wood at fhorter periods. He will have this additional fatisfaction, that, by more frequent cuttings, his wood will be the lefs liable to decay, by the ftrong fhoots fmothering the weak ones, as is before explained; and will have an opportunity of letting up more faplings for timber than he could otherwife do. There are many opinions refpecting the moft proper time of the year for cutting underwood; but there is one rule which, on the feller's part, is without exception, *viz.* that the older the wood is, the later in the fpring it fhould be cut. When old wood is cut early in the winter, and a hard winter follows, the damage done to the ftocks is very great: young flourifhing wood will bear cutting at any time. But on the part of the buyer, it is allowed that all woods are more durable, when cut in the moft ftagnant ftate of the fap; and in all cafes where bending is required, fuch as hurdles, hoops, and even dead hedges, the wood cannot be cut too early in the winter, be-

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ing, if cut when the ſap is riſing, brittle, and unfit for thoſe purpoſes. Oak underwood will, at the preſent price of bark, pay well for ſtanding till the ſap is up for barking it; and it ſeldom happens that the ſtocks are injured by cutting it ſo late in the year.

The beſt way of diſpoſing of coppice-underwood, to anſwer the purpoſe of the ſeller, is, in the opinion of this writer, to cut it at the ſeller's expence, before it is ſold; to lay it out in ranges or driſts, according to the cuſtom of the country; to value it in that ſtate, and ſell it in ſuch ſized lots as the number of buyers may warrant: always keeping up a ſufficient number to make a competition, and particularly to oblige the buyers to clear the whole out of the wood by the 24th day of June; and never to ſuffer them to bring their horſes into the woods, after any new ſhoots are ſhot out, without muzzling them, or at leaſt tying up their heads.

But in the View of Modern Huſbandry, Mr. Donaldſon thinks, that the more approved method of diſpoſing of coppice, or other under-ſized wood, is that which is practiſed in Northamptonſhire. When the ſeaſon for cutting arrives, which is during the winter months, or before the ſap begins to aſcend, that operation is performed by people employed by, and who work under the direction of, the owner of the woods or his agent. The part of the wood intended to be ſold, is parcelled out into regular ſized lots, to ſuit the convenience of the intended purchaſers. The whole of the underwood, growing upon each lot, is indiſcriminately cut, and laid in one direction. As ſoon as the operation of cutting is completed, and the wood parcelled out in a proper manner, a valuation is put on each lot or parcel according to its quality, and the whole is then ſold by public auction to ſuch perſons as incline to become purchaſers, who, over and above the price of the underwood, repay the expence of cutting. This is, however, by no means the general mode in which woods of this deſcription are cut. It is a very common, but a very bad, practice, to ſell the coppice under the condition that the purchaſers are to be at the expence of cutting it down. This is often performed in ſuch a careleſs manner, that the ſtools are ſo greatly injured, that they either rot or die, or a few weak ſtinted ſhoots only ſpring up.

The price of coppice or underwood varies ſo exceedingly, that it is almoſt impoſſible to form any idea of the value of the acre. Perhaps 8 or 9*l.* may not be far from the average price of coppices, not remarkably ſituated in regard to market, and when they are cut every twelve or fourteen years. But the value of coppices depends on many circumſtances; as the roots of wood, the uſes to which they are applied; the price of bark, &c. In ſome parts of Kent, where hop-poles are in great requeſt, an acre of coppice will yield ſometimes 30 or 40*l.* at a cutting. Whereas in Scotland, where the coppices are for the moſt part oak, and where the wood is chiefly uſed for fuel, or converted into charcoal, the value of the coppices conſiſts almoſt entirely in the quantity and quality of the bark, the wood being little more than ſufficient to defray the expence of cutting and peeling.

Mr. Marſhall, in his "Management of Landed Eſtates," has remarked, in reſpect to ſtub or coppice wood, that "the proper harveſting it as of timber, depends on ſituation and other circumſtances. And that the age or ſize of cutting muſt ever be guided by the demand in a given diſtrict; whether it be for the uſe of coal-mines, or for cord-wood, hop-poles, hoops, ſticks, faggot-wood, or other ware.

"The mode of diſpoſal is," ſays he, "to be determined upon by the ſucceeding crop. If the land be intended to be appropriated wholly to coppice wood, it is generally the moſt eligible to diſpoſe of the crop, as it ſtands, by auction or propoſal. But if ſeedling plants are to be ſet out for timber ſtands, or the young ſhoots from the ſtubs to be trained up, in the grove manner, it is requiſite that a proprietor ſhould employ his own people in reaping the crop, and making it up into ſuch wares as are the moſt ſaleable and profitable.

"In cutting down coppice-woods, the main obſervances are," he thinks, "to cut them in ſeaſon, to take off the ſtems, clean and ſmooth, with upward ſtrokes of the axe, that the ſtubs may ſhoot with the greater certainty; and to cut them off as low as conveniency will allow, in order that the ſhoots may be few and vigorous."

COPPICE-*Wood*, is that ſort of ſmall woody growth, which is raiſed in incloſed woods of the coppice kind, and which is converted to various purpoſes of the farmer and manufacturer, ſuch as cord-wood, hop-poles, hoop-ſtuff, hedge-ſtuff, faggot-wood, and various other ware.

COPPLE-STONES, in *Natural Hiſtory*, globuli lapidei, rotulæ lapideæ, boulder-ſtones, rolled-ſtones, or pebbles, as ſome call them, are rounded and worn fragments of ſtones and rocks, that are not inveſted with an exterior ſtony cruſt or ſkin, occaſioned by concentric laminæ of the ſtone, but ſhew the internal plane laminæ broken off and rounded at their edges by attrition. It is of the utmoſt conſequence, in all reſearches relating to the ſtrata of the earth, to diſtinguiſh carefully between copple or boulder-ſtones, and original nodules of the ſtrata.

COPPY, in *Rural Economy*, is a term ſometimes provincially employed to ſignify a wood of the coppice kind. Thus to coppy, in ſome diſtricts, ſignifies to cut over for underwood.

COPRATAS, in *Ancient Geography*, a river of Aſia, in the Perſian territory, mentioned by Strabo and Diodorus Siculus; the latter of whom ſays, that it diſcharged itſelf into the Tigris.

COPRIA, a name given by Strabo to a ſhore of Sicily before Tauromenium, becauſe the wrecks of veſſels that were loſt in the gulf of Charybdis were collected in this place.

COPROCRITICA, from κοπρος, *excrement*, and κρινω, *ſeparate*; medicines which purge away the excrements in the guts.

COPROPHAGOS, from κοπρος, and φαγω, *I eat*; the *dung-fly*, in *Natural Hiſtory*, the name given by many authors to the common yellowiſh fly found on human excrements. There are ſeveral other ſpecies found on the excrements of various animals, and thence called *merdivoræ*.

COPROSMA, in *Botany*, (from κοπρος, *dung*, and οσμη, *ſmell*, alluding to the offenſive ſmell of the firſt ſpecies.) Forſt. Gen. 69. Linn. jun. Supp. 24. Schreb. 1593. Juſſ. 205. Lam. Ill. pl. 854. Claſs and order, *polygamia monoecia* (*pentandria digynia*; Linn. jun.) Nat. Ord. *Rubiaceæ*, Juſſ.

Gen. Ch. *Hermaphrodite flowers*. *Cal.* Perianth inferior, one-leafed, ſhort, five-toothed, permanent. *Cor.* monopetalous, bell-ſhaped, much larger than the calyx, five, ſix, or ſeven-cleft; ſegments acute, erect. *Stam.* Filaments five, ſix, or ſeven, capillary; anthers oblong, bifid at the baſe, erect, a little incurved, acuminate. *Piſt.* Germ ſuperior, oblong; ſtyles two, filiform, ſlightly cohering at the baſe, longer than the corolla, divaricated; ſtigma ſimple. *Peric.* Berry ovate-globular. *Seeds* two, flat on the inner,

nner, and convex on the outer fide, feparated from each other by the pulp of the berry. *Male flowers, Cal., Cor.,* and *Stam.*, as in the hermaphrodite. *Pist.* abortive.

Eff. Ch. Calyx one-leafed, five-toothed. Corolla five, fix, or feven-cleft. Stamens five, fix, or feven. Styles two, long. Berry with two feeds.

Sp. 1. C. *fœtidiffima*. Forft. Fl. Auft. 138. Linn. jun. Supp. 178. Mart. 1. Lam. 2. "Flowers folitary." A very fœtid fhrub. 2. C. *lucida*. Forft. Fl. Auft. 137. Linn. jun. Supp. 178. Mart. 2. Lam. 1. "Peduncles compound." A perfectly fmooth fhrub, refembling phyllis in its habit. *Leaves* oppofite, petioled, egg-fhaped, acuminate upwards and downwards, quite entire. *Stipule* interfoliaceous, folitary, combining the leaves, acute. *Peduncles* axillary, folitary, oppofite, two-leaved, terminated by heads of pedicelled flowers. Calyx and corolla greenifh. Both the fpecies are natives of New Zealand.

COPSE, in *Agriculture*, a term applied to the regulating iron apparatus, which is fixed to the end of the beam of a plough, and to which the team is attached. Thefe irons are of very different forms and conftructions according to circumftances.

COPTIS, in *Botany*, (from κοπτω, *fcindo*; a name taken from the cut leaves of the plant.) Linn. Tranf. vol. viii. p. 305. A genus formed by Mr. Salifbury for Helleborus trifolius of Linnæus, which differs from the other hellebores, in having a caducous corolla. See HELLEBORUS *trifolius*.

COPTIS, in *Ancient Geography*. See COPTOS.

COPTITES *Nomos*, a nome of Egypt, extending along the bank of the Nile, which derived its name from Coptos or Coptis, its capital.

COPTOPSKILL, in *Geography*, a town of America, in the ftate of New York; 42 miles N. of New York.

COPTOS, *Coptus*, or *Coptis*, in *Ancient Geography*, now *Kepht*, a city of Upper Egypt, three miles diftant from the Nile, and connected with it by a navigable canal. It was the centre of communication between Egypt and the Red Sea, by a N.E. route to Myos Hormus, fituated on the weftern coaft of the Red Sea, and by a S.E. courfe to Berenice, which was the ftaple of the trade with India. If Plutarch is to be credited, Ifis, upon receiving the news of the death of Ofiris, cut off one of her locks in token of grief; and hence the place was named Coptos, which, in the Egyptian language, is faid to denote want or privation. This city was inhabited both by the Egyptians and Arabians, and Pliny calls it the emporium of commodities brought from India and Arabia, which were conveyed by the Nile to Alexandria. Pliny mentions Juliopolis, as being two miles diftant from Alexandria, and fays that from Juliopolis to Coptos, the voyage of 303 miles was performed in 12 days, when the northerly winds blew; the diftance between Berenice and Coptos was, according to the fame author, 258 Roman miles, and the journey was performed in 12 days. The road, however, lay through the defart of Thebais, almoft entirely deftitute of water; but Ptolemy Philadelphus not only repaired the road, but made provifion for fupplying the want of water by fearching for fprings; and wherever thefe were found he built inns, or more probably in the eaftern ftyle caravanferas, for the accommodation of merchants. (Strabo, lib xvii. p. 1157.) In this channel the intercourfe between the eaft and weft continued to be carried on during 250 years, as long as Egypt remained an independent kingdom. The Chriftians were formerly very numerous in the city of Coptos. The rubbifh of this ancient city may fill a circumference of two miles, and fufficiently evinces its former extent. Amidft the ruins are feen feveral fmall columns of grey granite lying on the ground, and fome large ftones, engraved with hieroglyphics. Near it is alfo a fmall part of a bridge over the canal by which water was conveyed from the river into a large bafon. This place has occafionally afforded medals, fmall ftatues of earthen-ware, pieces of rock cryftal, and precious ftones.

COPULA, in *Logic*, a verb that connects any two terms in a propofition, either negative or affirmative: as, *A rofe is fweet;* where *is* is the copula.

COPULATION. See COITION, CONGRESS, and CONSUMMATION.

COPULATIVE *Propofitions*, are thofe which include feveral fubjects, or feveral attributes joined together by an affirmative or negative conjunction.

Thus, v. gr. *Power and riches do not make a man happy.* Where *and* is the conjunction that couples *power* and *riches*.

COPULATIVE *Conjunction*. See CONJUNCTION.

COPY, in *Law*, a tranfcript of a writing or inftrument, made for the ufe and fatisfaction of fome of the parties concerned; or in order to preferve the memory thereof. See COPIA.

The copy of an inrolled deed is admitted in evidence; but not the copy of a will of lands nor the probates, nor of a common deed where the original may be procured. Few ancient documents do now fubfift otherwife than in copies.

COPY is alfo ufed for an imitation of any original work; particularly a painting, draught, figure, &c.

The following procefs for taking a copy of a recent MS., was communicated to the Philomathic Society at Paris, by M. Charles Coquebert. It confifts in putting a little fugar in common writing ink, and with this the writing is made on common paper, fized as ufual, when a copy is required; this unfized paper is taken and lightly moiftened with a fponge. The wet paper is then applied to the writing, and a flat iron, fuch as is ufed by laundreffes, of a moderate heat, being lightly paffed over the unfized paper, the counter-proof or copy is immediately produced. This procefs is the more interefting, as it requires neither machine nor preparation, and may be ufed in any fituation. That fugar prevents ink from fpeedily drying, has been long known (fee INK); and this method of impreffion has been ufed in fome of our public offices, and elfewhere in England, for fome years.

COPY, among *Printers*, denotes the manufcript or original of a book given to print from.

To caft off a copy, is to make a computation of the number of fheets a manufcript will make in print.

In the bookfellers' ftyle, a *good copy* is that which produces a faleable book.

Tenant by COPY *of court roll.* See TENANT.

COPY-HOLD, is a tenure for which the tenant has nothing to fhew but the *copy* of the roll made by the fteward of the lord's court.

The fteward of the court is, among other things, to inroll and keep a regifter of all fuch tenants as are admitted to any parcel of land, or tenement, belonging to the manor; and the tranfcript is called the *copy of the court-roll*, which the tenant keeps as his own evidence.

This tenure is called a *bafe tenure*, becaufe the tenant holds, in fome fort, at the will of the lord. Fitzherbert fays, it was formerly called *tenure in villenage;* and that *copy-hold* is but a modern name.

This

This is the land which the Saxons called *folk-land*, as being held *sine scripto*, in contradistinction to *bock-land*, or *charter-land*, *terra ex scripto*, and now *free land*, or *free hold*.

However, it is not simply at the lord's will, but according to the custom of the manor; so that if the copy-holder doth not break that custom, and forfeit his tenure, he seems not to stand at the lord's courtesy. These customs are infinite; varying in one point or other, almost in every manor.

Copy-holders are, in reality, no other but villeins (see VILLEIN), who, by a long series of immemorial encroachments on the lord, have at last established a customary right to those estates, which before were held absolutely at the lord's will.

This affords a very substantial reason for the great variety of customs that prevail in different manors, with regard both to the descent of the estates, and the privileges belonging to the tenants. By various means the generality of villeins in the kingdom have long ago sprouted up into copy-holders; their persons being infranchised by manumission, or long acquiescence; and their estates, in strictness, remaining subject to the same servile conditions and forfeitures as before; though, in general, the villein-services are usually commuted for a small pecuniary quit-rent. In some manors the copy-holders were bound to perform the most servile offices; as to hedge and ditch the lord's grounds, to lop his trees, and reap his corn, and the like; the lord usually finding them meat and drink, and sometimes, (as is still the case in the highlands of Scotland) a minstrel or piper for their diversion. Thus also, in the kingdom of Whidah, on the coast of Africa, the people are bound to cut and carry in the king's corn from off his demesne lands, and are attended by music during the whole time of their labour. See WHIDAH.

The custom of the manor is the life of copy-hold estates; for, without a custom, or if copy-holders break their custom, they are subject to the will of the lord; and as a copy-hold is created by custom, it is also guided by custom. (4 Rep. 21.) A copy-holder, whilst he performs his services, and doth not break the custom of the manor, cannot be ejected by the lord; if he be, he shall have trespass against him:—but if a copy-holder refuse to perform his services, it is a breach of the custom, and forfeiture of his estate. Some copyholders hold by the *verge* in *ancient demesne*; so that though they hold by copy, they are a kind of free-holders; some others hold by common tenure, called "mere copy-hold," whose land, upon the commission of felony, escheats to the lord of the manor.

It should be recollected, however, that copy-hold land cannot be made at this day; for the foundation of a copy-hold is, that it hath been demised time out of mind, by copy of court-roll; and that the tenements are parcel of, or within the manor. 1 Inst. 58. 4 Rep. 24.

Estates held by copy of court-roll, and not at the will of the lord, have been deemed free-hold by lord Coke (1 Inst. 59 *b*.) and also by others; and by way of distinction from the ordinary kind, they have been denominated "customary free-holds." Tenants of this description have claimed the right of voting at the election of the knights of the shire. But the stat. 31 Geo. II. c. 14, enacts, that no person holding by copy of court-roll, should have this privilege.

In some manors, where it has been the custom to permit the heir to succeed the ancestor in his tenure, the estates are styled "copy-holds of inheritance;" in others, where the lords have been more vigilant to maintain their rights, they remain "copy-holds for life," only; for the custom of the manor has, in both cases, so far superseded the will of the lord, that provided the services be performed or stipulated for by fealty, he cannot, in the first instance, refuse to admit the heir of his tenant upon his death; nor, in the second, can he remove his present tenant, so long as he lives, though he holds nominally by the precarious tenure of his lord's will. If the lord refuses to admit, he shall be compelled in chancery. (2 Cro. 368.) And if the lord refuse to admit a surrendree, on account of a disagreement about the fine to be paid, the court of B. R. will grant a mandamus to compel the lord to admit without examining the right to the fine. (2 Term Rep. 484.) But that court will not grant a mandamus to admit a copy-holder by descent; because, without admittance, he has a complete title against all but the lord. (2 Term Rep. 198.) Copy-holds descend, according to the rules and maxims of the common law (unless in particular manors there are contrary customs of great antiquity); but such customary inheritances shall not be assets, to charge the heir in action of debt, &c. (4 Rep. 22.) though a lease for one year, of copy-hold lands, which is warranted by the common law, shall be assets in the hands of an executor. (1 Vent. 163.) Copy-holders hold their estates free of dower, being created by custom, which is paramount to title of dower. (4 Rep. 24.) By particular custom, there may be dower and tenancy by the curtesy. (Cro. Eliz. 361.) There may be an estate-tail in copy-hold lands by custom, with the co-operation of the stat. W. II. And as a copy-hold may be entailed by custom, so by custom the tail may be cut off by surrender. (1 Inst. 61.) A copy-hold may be barred by a recovery, by special custom; and a surrender may bar the issue by custom. A fine and recovery at common law will not destroy a copy-hold estate; because common law assurances do not work upon the assurance of the copy-hold; though copy-hold lands are within the stat. 4 Hen. VII. c. 24, of fines and proclamations, and five years non-claim, and shall be barred. (1 Rol. Abr. 506.) Copy-holds are not within the statute 27 Hen. VIII. c. 10, of jointures; nor stat. 32 Hen. VIII. c. 28, of leases; copy-holds being in their nature demisable only by copy; they are not within the statute of uses; nor are copy-holds extendible in execution; but they are within the statute of limitation of actions, and the statutes against bankrupts. The lord shall have the custody of lands of ideots, &c. And a copy-holder is not within the act 12 Car. II. c. 24, to dispose of the custody and guardianship of the heir; for, if there be a custom for it, it belongs to the lord of the manor. (3 Lev. 395. 1 Nels. Abr. 492, 522.) A copy-holder cannot convey or transfer his copy-hold to another, otherwise than by *surrender*; which see.

A manor may be held by copy of court-roll, and the lord of such manor may grant copies; and such customary manor may pass by surrender and admittance, &c.

The fruits and appendages of a copy-hold tenure, which it hath in common with free tenures, are fealty, services, (as well in rents as otherwise,) reliefs, and escheats. The two latter belong only to copy-holds of inheritance, the former to those for life only. Besides these, copyholds have also heriots, wardships, and fine. See each of these articles. See also FORFEITURE, FREEHOLD, SURRENDER, and TENURE.

COPY-HOLDER, is defined by West, a person admitted tenant of any lands, or tenements, within a manor, which, time out of mind, by the use and custom thereof, have been devisable to such as will take the same by copy of court-roll, according to the custom of the said manor.

COPYING *of* LETTERS, *and other writings.* The celebrated Dr. Franklin made feveral effays, many years ago, for fpeedily multiplying the copies of his own hand-writing, which he exhibited to M. Alexis Rochon, of the French National Inftitute, and director of the Marine Obfervatory at the port of Breft; an account of which he has given in his memoir on the Typographic Art. This method confifted in writing upon fmooth paper, with ink containing much gum, which was afterwards fanded with emery, or powder of caft-iron, and by means of a rolling-prefs, fuch as is ufed by the copper-plate printers, the ftrokes of the writing were transferred to a plate of rofe copper or pewter. This plate fupplies as many copies as the depth of the engraving can allow; but the copies are far from being beautiful, and the ground is fpotted and fpoiled. Before Dr. Franklin's procefs was communicated to M. Rochon, he fhewed him that by writing with a fteel point on a copper-plate previoufly varnifhed, a more fatisfactory refult might be obtained, by etching the ftrokes with nitric acid to a fufficient depth, for the fubfequent ufe of a liquid ink fimilar to that of the printers. In this cafe, the plate may be wiped without precaution, and twelve or more copies may be pulled off upon coarfe paper. Thefe proofs are foul and reverfed; and, therefore, in order to have them neat and in the proper direction of the writing, it becomes neceffary to place the fame number of leaves of white paper, wetted and prepared, upon the twelve proofs; and while the ink is ftill frefh, the whole being paffed together through the rolling-prefs, the fame number of leaves of counter-proofs are obtained as there were proofs; fo that inftead of twelve turns of the prefs, thirteen will be required to fupply twelve counter-proofs, very black, neat, and legible, even when the plate has not been perfectly wiped. This method is certainly not to be compared with fine engraving; but it may be ufeful in military operations, and all other cafes in which a fpeedy multiplication of copies is required. No precaution is here neceffary; whether the nitrous acid be more or lefs ftrong, or remain a longer or fhorter time upon the plate, or whether the plate be fomewhat heated to increafe the ftrength of the folvent, the procefs of the operation will never fail; provided the fteel point made ufe of to trace the characters through the varnifh, fhall lay the copper perfectly bare. It is of advantage that the nitric acid fhould bite deep, becaufe the counter-proofs are, by thefe means, much darker. The plate need not be well wiped, becaufe it is of no confequence whether the proof which is ufed to afford a counter-proof fhould be very clean, provided that it does not fpot the copy intended to be procured. The moft liquid kind of printers ink may be ufed. See ENGRAVING and STEREOTYPE.

In 1780, Mr. James Watt, of Birmingham, obtained a patent for a new method which he had invented to this purpofe; of which the following defcription is given in his fpecification: Let the letter or other writing, that is intended to be copied, be written with the ink hereinafter defcribed, or with any other writing-ink fit for the purpofe. Take a piece, or pieces, of thin paper which contains no fize, or glue, or gummy or mucilaginous matter, or which at leaft does not contain fo much fize, or other matter, as would make it fit for being written upon. Cut this paper, or papers, to the fize and fhape of the writing of which a copy is wanting; moiften or wet the fame thin paper with water, or other liquid, by means of a fpunge or brufh, or by dipping, or otherwife. Having moiftened or wet the thin paper, lay it between two thick unfized fpungy papers, or between two cloths, or other fubftances capable of abforbing the fuperfluous moifture from the thin paper; when it has been flightly preffed between fuch thick fpungy papers, or other fubftances, by the hand or otherwife, lay the faid thin paper, fo moiftened and preffed, upon or under the fide of the writing which is to be copied, and in fuch manner that the one fide of the faid moiftened paper fhall be in contact all over the fide of the faid writing, fo intended to be copied; and that to the other fide of the faid moiftened thin paper, there fhall be applied a piece of clean writing-paper, or cloth, or other fmooth uniform fubftance. Lay the faid writing intended to be copied, with the thin moiftened paper intended to receive the copy, (placed refpectively as above directed,) upon the board of a common rolling-prefs, or of that of which a defcription and drawing are hereunder written and drawn, and prefs them once, or oftener, through the rolls of the faid prefs, in the fame manner as is ufed in printing by copper-plates; or, inftead of ufing the faid or any rolling-prefs, fqueeze the faid papers, placed refpectively in the manner above defcribed, in a fcrew-prefs; or fubject them to any other preffure fufficient for the purpofe; by means of which preffure, in whatever manner applied, part of the ink of the writing intended to be copied fhall prefs from the faid writing into, upon, and through, the faid thin moiftened paper, fo that a copy of the writing, more or lefs faint, according to the quality of the ink and paper employed, fhall appear impreffed on both fides of the faid moiftened paper, *viz.* upon one of the fides in the natural or proper order and direction of the lines, as they are in the original writing, and on the other fide in the reverfe order and direction. But, in order to make the impreffion or copy of the writing more ftrong, legible, and durable, it is proper and ufeful to moiften the faid thin paper, which is to receive the copy or impreffion, with the following liquor, inftead of water or other liquid, and to proceed in all other refpects as is above directed; or to moiften the faid thin paper with the following liquor, and to dry the faid paper, and, when a copy of a writing is required to be taken, the faid paper, thus previoufly prepared and dried, ought to be moiftened with water or other liquid, and to be proceeded with in all other refpects as has been directed. The faid liquor to be ufed for moiftening the faid thin paper, or for preparing the faid paper previoufly to its being ufed, is made in the following manner: Take of diftilled vinegar two pounds weight, diffolve in it one ounce of the fedative falt of borax; then take four ounces of oyfter-fhells, calcined to whitenefs and carefully freed from their brown cruft, put them into the vinegar, fhake the mixture frequently for four-and-twenty hours, then let it ftand until it depofits its fediment; filter the clear part through unfized paper into a glafs veffel, then add to the faid mixture or folution two ounces of the beft blue Aleppo galls bruifed, and place the liquor in a warm place, fhaking it frequently for twenty-four hours; then filter the liquor again through unfized paper, and add to it, after filtration, one quart, ale meafure, of diftilled or other pure water. It muft then ftand twenty-four hours, and be filtered again if it fhews a difpofition to depofit any fediment, which it generally does. The liquor, thus compounded and prepared, is to be ufed as hath been directed.

N. B. In place of the vinegar, any other liquor impregnated with a vegetable acid may be ufed; and, in place of the galls, oak bark, or any other vegetable aftringent, or fubftance which is capable of becoming black, or deep coloured, with folutions of iron; and, in place of the oyfter-fhells, any other pure calcareous earth may be ufed. But if the impreffions are not wanted to be very black, and the writing ink is good, water itfelf may be ufed to moiften the thin paper, as herein firft directed. It may be found necef-

ſary to add more or leſs water, in the preparation of the above liquor to be uſed for moiſtening the thin paper, or to vary the proportions of the other ingredients, according as they are more or leſs perfect or ſtrong, or as the impreſſion is required to be more or leſs deep coloured. The writing-ink, which the patentee uſes for letters or writings intended to be copied, is prepared as follows: Take four quarts, ale meaſure, of ſpring water; one pound and a half, avoirdupoiſe weight, of Aleppo galls; half a pound of green copperas or green vitriol; half a pound of gum-arabic; four ounces of roach-alum; pound the ſolid ingredients, and infuſe them in the water ſix weeks or two months, during which time the liquor ſhould be frequently ſhaken; ſtrain the liquor through a linen cloth, and keep it in bottles, cloſely corked, for uſe.

Plate III. *Miſcellany*, *fig.* 1. repreſents a front or end view of the rolling-preſs invented by Mr. Watt, and referred to in the above ſpecification. A B C is one of the ends of an iron or wooden frame, which ſerves to connect the two rollers. D, D, are two wooden or metalline rollers, turned extremely exact, or truly cylindrical, and which are mounted on iron axles, firmly fixed in them. E E is a double-ended lever, by means of which the roller, on whoſe axle it is applied, may be forcibly turned round. F F repreſents the board of the rolling-preſs, on which the writings to be copied are to be laid. N N is a piece of cloth, or other elaſtic pliable ſubſtance, placed next the roller, and above the writings to be copied; and the board, G, is a ſtrong plank of wood, or plate of metal, ſerving to connect the two end-pieces of the frame at bottom. H H repreſents the edge of a common table, to which the preſs may be faſtened by the iron ſcrew-cramps I, I. K is a ſlit, of which there is one in each end-piece of the frame; theſe ſlits are filled with elaſtic ſteel, or other metalline ſprings, or with ſome other elaſtic ſubſtances which ſerve to preſs the two rollers forcibly together. L is a braſs bolſter, ſupported upon the ſprings, and ſerving to ſupport the end of the axis of the under roller.

Fig. 2. repreſents a ſide-view of the rolling-preſs, in which A B, A B, are the two end-pieces of the frame. D, D, are the two rollers. E is the double-ended lever. G is a ſtrong plank, or plate of metal, which forms the bottom of the frame. H H is the table on which the preſs ſtands. I is one of the iron cramps which faſten the preſs to the table; and M is a bar of iron which connects the upper part of the frame.

Fig. 3. repreſents a ſcrew-preſs, which may be uſed, inſtead of the rolling-preſs, in taking off impreſſions from writings. A A is a double-ended lever. B B the ſcrew. C a block of wood, or metal, which the ſcrew acts upon, and which is attached to it. D D the frame of the preſs, made of iron or wood. E E is a moveable board, on which the writing to be copied is to be laid, with a cloth over it. F F the bottom or ſole of the preſs, made of wood or metal. Be it remembered, that theſe preſſes are made of different ſizes, according to the ſizes or largeneſſes of the writings intended to be copied. Thoſe now referred to are drawn from one ſufficiently large to take an impreſſion from a folio page of writing or poſt paper, and are drawn to a ſcale of one inch and a half for each foot, or one-eighth of their natural ſize.

Fig. 4. repreſents one of Hawkins's patent polygraphs, for making two or more copies of any writing at once. A A B, is an upright frame, from the upper piece of which is ſuſpended a double parallel ruler, D D, E E; *d d*, *e e*, is another ſimilar parallel ruler, of which *fig.* 5. is a plan, faſtened to the board, F F, of the inſtrument. Theſe two rulers are connected to a ſtout bar, G; the vertical one, D D E E, by pivots at the end of the bar, H, *fig.* 4. going into holes in the projecting part of two pieces of braſs, *g g*, at each end of G; and the horizontal one, *d d e e*, by pivots at the ends of its correſponding bar, *h*, working in holes in another arm of the ſame braſſes. The pens are connected with the bar, G, by a curved braſs limb, *a*, turning on a ſcrew put through the bar, G, as a centre. On the other ſide of the bar is a ſhort arm, *b*, in the ſame piece with the limb: this is jointed at its upper end to the end of a ſmall rod, *i*, the other end of which is jointed to another exactly ſimilar limb, carrying the other pen. The pens are fitted into a ſmall tube, called the pen-tube, having a ſhoulder at its upper end. This fits tight into another tube, in the ſame piece with the curved limb, and is puſhed in as far as the ſhoulder of the pen-tube will allow.

The weight of the machinery is ſuſpended by eight ſmall ſpiral ſprings, I, faſtened to a ring fixed to the bar, G; their upper ends are connected with the end of a double jointed lever, K, which can follow the motion of the bar, G, without ſtretching the ſprings too much. The rod, L, by which the perpendicular motion is ſuſpended, turns upon pivots working in pieces of braſs beneath the piece, B: the right-hand one is called a regulator, and has two ſcrews, one moving the pivot vertically, and the other horizontally, for adjuſting the inſtrument. The two bars, *e e*, of the horizontal motion are connected with *d d* by pivots at the end of *h*, ſo that *d d* can be lifted up without moving the other, whoſe weight is ſupported upon two ſmall braſs wheels *i*, *i*. The frame, A A B, when the inſtrument is not in uſe, turns down on the board, F F, and is kept faſt by a ſpring lock, which is opened by puſhing in a round button, *k*. The frame now forms the ſides, and the front board becomes the lid, and, when ſhut down, is locked by a lock, M. In explaining the uſe of the inſtrument, we cannot do better than copy the printed directions ſold with the inſtrument. Chooſe two gooſe quills, taking care they are of the ſize wanted; make them into pens, and put them into the pen-tubes. Having introduced them with the nibs firſt, apply the ſhoulder end of the pen-tube againſt the ſemi-circular hollow, in the upright part of the gauge, Q, *fig.* 4. and puſh the pen through the tube, till the nib reaches a line drawn acroſs the end of the gauge; ſlide the pen-tube into the fixed ſocket, until the ſhoulder of the pen-tube ſtop it, holding by the fixed ſocket, and not by the work, ſo as not to ſtrain the machinery. If the polygraph is in order, the pens will now write, draw, or copy whatever may be required, with the greateſt exactneſs. To prove the machine's being in order, bring the pens to the upper part of the paper, and try if they both touch; if not, with a ſmall ſcrew-driver turn the perpendicular ſcrew of the regulator, till they touch equally. Bring the pens to the bottom of the paper, and move the horizontal ſcrew till they both touch. When a pen wants mending, nothing more is neceſſary than to take the pen-tube out of the ſocket, mend the pen, gauge it, and return it into the ſocket again. When the machine is out of uſe, wipe the pens clean, and place the left one, with the curved limb, on the hook beneath the horizontal rulers. Let down the frame, A A B, which faſtens by a ſpring-lock, and at the ſame time raiſes the writing-board, which then becomes the lid of the portable caſe for the polygraph.

The patent now belongs to Mr. Farthing, Cornhill, who manufactures the inſtruments.

Theſe inſtruments are made with three, four, and five pens, and anſwer the purpoſe very well.

COPYIST, in Diplomatic *Science*, ſignifies a tranſcriber or copier of deeds, books, &c.

Copyist, a tranſcriber of *Muſic*. Whatever improvements have been made in literary typography, no muſic printed

printed with types has equalled that of writing, engraving, or ftamping. Rouffeau has extended this article to a greater length than feems neceffary. It is indeed neceffary for a *copyift* to know practical mufic well, and to be fufficiently acquainted with compofition to avoid grofs miftakes himfelf and detect them in others; to write a neat and legible hand; to know the Italian and French technicu, to form all the characters in a bold and clean manner; and, by underftanding the language of mufic, leaving no bar incomplete, by omiffion or redundance. Thefe feem to be all the neceffary requifites of a good *copyift*, if to them be added care and accuracy, particularly in forming a fcore, where quantity muft be attended to in the exact arrangement of the notes over each other. Mufic has long been very neatly engraved in France, on copper; and in Holland, though lefs neat, with more force and diftinctnefs: 60 or 70 years ago, the Dutch editions of the works of Corelli were much fought all over Europe; and 30 or 40 years ago, there was no mufic printed in Italy or Germany; all was MS. By which employment fo many *copyifts* obtained a livelihood, that it was thought a cruelty to fhorten labour by the prefs; as in the firft attempts at erecting filk and cotton-mills. Works in literature, till the invention of the prefs, muft have been diffeminated very flowly by tranfcription; perhaps by the medium of the prefs works of little merit, and of corrupt and noxious principles, have been too eafily multipled, and put in circulation. And indeed cheapnefs has not been eventually the confequence of mufical typography, ftamping, or engraving; as printed mufic is now dearer than written was, early in the laft century.

COPY-RIGHT. See *Literary* PROPERTY.

COQ. *ad med. confumpt.* an abbreviature among *Phyficians*, fignifying that the thing is to be boiled till half of it be confumed.—*Coq. in S. Q. Aq.* implies it to be boiled in a fufficient quantity of common water.

COQUALLIN, in *Zoology*, the SCIURUS *variegatus* of Gmelin, and *varied fquirrel* of Pennant.

COQUANTOTOTL, in *Ornithology*, a bird of the warmer climates of America, defcribed by Seba under this name: it is a fmall crefted-bird, fhaped like a fparrow; the PIPRA *Grifea* of Gmelin, the *manacus criftatus grifeus* of Briffon, and the *gray manakin* of Latham.

COQUAR, the variety *hybrida*, ε. of Gmelin's PHASIANUS *Colchicus* and the pied-pheafant of Hayes's Britifh birds.

COQUATOTOTL of Hernandez and Ray, the variety β. of Gmelin's AMPELIS *garrulus*, the *chatterer* of Carolina of Edwards and Catefby.

COQUES, GONZALO, in *Biography*, a painter who was born at Antwerp in 1618, and became the difciple of David Ryckaert the elder. He foon gave proofs of extraordinary talents in fmall pictures; and the early friendfhip which he formed with the fon of Ryckaert, whofe name was likewife David, did not a little contribute to roufe his emulation, and quicken his diligence. His firft effays, after the example of his mafter, were domeftic fubjects and converfations, in the manner of Teniers and Oftade; but his admiration of the works of Vandyke, foon caufed him to adopt a ftyle, in which the beautiful and picturefque grouping of his former models acquired additional intereft, by being united to greater elegance and dignity of character. In this manner he painted a picture for Jacques Le Mercier, a rich merchant of Antwerp, which gained him great applaufe. It reprefented his employer with his wife and children at table: the painter himfelf was introduced in profile. From this period he devoted himfelf principally to the painting of fmall portraits, which he executed with fuch delicacy and happy effect, that excepting Vandyke, no artift of his time enjoyed a greater reputation. He was employed by the court of Bruffels, Charles I. king of England, and feveral other potentates. He died in 1684, leaving confiderable riches to his family. Defcamps.

COQUET, in *Geography*, a river of England, in Northumberland, which runs into the fea feven miles S.E. of Alnwick, at Hawkfley, and is navigable for about 12 miles up to Warkworth bridge.—Alfo, a fmall ifland of England, in the German ocean, about a mile in circumference, near the coaft of Northumberland. It was taken by the Scots in the reign of Charles I. N. lat. 55° 13′. W. long. 1° 36′.

COQUETTE, a female character, no lefs contemptible than odious; againft the iniquity of which Mr. Gifborne, in his excellent treatife, "On the Duties of the Female Sex," cautions his readers in the following defcriptive and impreffive terms. "To delude a young man by encouraging his attentions for the pleafure of exhibiting him as a conqueft, for the purpofe of exciting the affiduities of another perfon, or from any motive except the impulfe of mutual regard, is a proceeding too plainly repugnant to juftice, and to delicacy of fentiment, to require much obfervation. On fuch fubjects, even inadvertence is highly culpable, what then is the guilt of her, who deliberately raifes hopes which fhe is refolved not to fulfil!"

COQUILLADE, in *Ornithology*, the ALAUDA *undata* of Gmelin and *undated lark* of Latham.

COQUILLES A BOULETS, fhells or moulds for bullets. They are made either of brafs or iron. Two of them are required for the cafting of a cannon-ball. And they never join or clofe fo effectually, as to prevent the liquid metal when poured in from running fomewhat out at the feam, where they join. This fmall part of the metal, or excrefcence of the bullet, is called the beard, which is broken or knocked off to make the ball perfectly round.

COQUIMBO, or LA SERENA, in *Geography*, one of the 13 provinces of Chili in South America. This is a rich, verdant fruitful valley, not far from the coaft of the South Sea, producing corn fufficient for confiderable exportation to Lima, and abounding with various mines. One mine of copper, fituated about 5 leagues N. from the town of Coquimbo on mount Carro Verde, or Green Hill, rifes to a confiderable elevation in form of a fugar-loaf, and ferves as a land-mark to the port. The climate is fingularly agreeable, being almoft uniformly mild and ferene.

COQUIMBO, or *La Serena*, the capital of the fore-mentioned province, was the fecond town built by Valdivia, in the kingdom of Chili, in 1544, for the purpofe of maintaining an intercourfe between Peru and Chili, in order to procure a regular fupply, and to fecure the fidelity of the Indians who lived in that valley. The town ftands about ¼ of a league from the fea in a moft delightful fituation, commanding an extenfive profpect of the fea, a river of the fame name, and the country, and prefenting to view a charming variety of fields, with different kinds of grain and woods of a lively verdure. The town is large but not proportionably populous; the number of families not amounting to above four or five hundred, confifting of Spaniards, Meftizos, and a few Indians. The ftreets are conveniently wide, interfecting one another from north to eaft, and from eaft to weft, fo as to form fquares of buildings, with intervals for gardens. The houfes are conftructed with mud walls and covered with leaves, and each of them is provided with a large garden, planted with fruit trees and efculent vegetables,

vegetables. It has feveral parifh churches, and three convents, and alfo a town-houfe, where the Alcaldes and Regidores meet, who, with the corregidor, form the corporation. On the north fide of the town runs the river; after flowing in various meanders through the whole valley of the fame name; and, by canals cut from it, furnifhes the town with water, which is principally applied to preferve the fertility and beauty of their gardens. The river at its mouth forms a very fine bay, where fhips lie fafely and commodioufly, though the coaft is rocky; fome iflands lying fo as to keep off the winds. S. lat. 29° 52′. W. long. 71° 19′.

COR, in *Geography*, a town of Chinefe Tartary, in the defert of Cobi. N. lat. 44° 16′. E. long. 93° 29′.

Cor, in *Anatomy*. See Heart.

Cor, *Fr.* Corno, *Ital.* in *Mufic*. A horn.

Cor *de Chaffe* is a very long and inftructive article in the Encycl. Meth.; but the plates, to which the reader is frequently referred, not being yet publifhed, the precepts for performing on the inftrument, if tranflated, would not be intelligible.

Cor, in *Natural Hiftory*. See Chama.

Cor *Caroli*, in *Aftronomy*, an extra-conftellated ftar of the feoond magnitude in the northern hemifphere, fituated between the Coma Berenices and Urfa Major; fo called by fir Charles Scarborough, in honour of king Charles I.

Cor *Hydræ*, a ftar of the fecond magnitude, in the heart of the conftellation Hydra.

Cor *Leonis*, or *Regulus*, a fixed ftar of the firft magnitude, in the conftellation Leo.

Cor *Scorpii*. See Antares.

Cor *Anguinum*, in *Natural Hiftory*, a fpecies of Echinus found only in a foffile ftate.

Cor *Bovis*. See Cardium Aculeatum.

Cor *Marinum*, the name of one of the claffes of the *echini marini*, the characters of which are, that the anus is placed in the fide of that point of the fhell which appears as if cut off; and the mouth has two lips, and is placed in the third region of the axis of the bafe. Klein's Echin. p. 34.

Cor *Veneris*, *Venus's heart*. See Cardium Cardissa.

CORA, in *Ancient Geography*, a town and Latin colony of Italy, in the country of the Volfci, according to Virgil, Silius Italicus, and Livy; now *Cori*. This is a town of Latium on the left of the Appian way. S. E. of Velitræ. By its ruins we may conclude, that it was a place of importance: among thefe we difcover a temple of Caftor and Pollux, and an aqueduct for conducting water, &c. The ancient walls are ftill remaining.—Alfo, a town of Italy, fituated in a promontory of Etruria. Juftus Lipfius fays, that in the paffage of Tacitus which mentions it, we ought to read *Cofa*, which is not improbable.

CORAAGE, Coraagium, in our *Old Cuftoms*, a kind of impofition extraordinary, growing upon fome unufual occafion; and it feems to be of certain meafures of corn; for *corus tritici* is a meafure of wheat. Bracton, lib. ii. cap. 116. num. 6. who, in the fame chapter, num. 8. has thefe words: "Sunt etiam quædam communes præftationes, quæ fervitia non dicuntur, nec de confuetudine veniunt, nifi cum neceffitas intervenerit, vel cum rex venerit; ficut funt hidagia, coraagia, & carvagia, et alia plura de neceffitate et ex confenfu communi totius regni introducta, &c."

CORACA, or Corace, in *Ancient Geography*, a town of Arabia Petræa. Ptolemy.

CORACE, in *Geography*, a river of Naples, which runs into the gulf of Squillace; four miles fouth of Balicaftro.

CORACESIUM, a fortified place of Afia in Cilicia, according to Pliny and Strabo; the latter of whom fays, that it was fituated on a rugged rock at the extremity of Cilicia.

CORACIAS, in *Ornithology*, a genus of the order, *Picæ*, or Pies. The birds of this genus have the bill fharp at the edges, the tip incurvated, and the bafe bare of feathers; tongue cartilaginous and bifid; feet formed for walking.

The coracias genus comprehends only thofe birds which are known by Englifh writers under the title of *Roller*, amounting altogether to between twenty and thirty fpecies. In Dr. Latham's fynopfis it is obferved, that the bill of the roller is ftraight, bending towards the tip, with the edges cultrated; the noftrils narrow and naked; and the legs for the moft part fhort, with the toes placed three before and one behind, the whole of which are divided to their origin. It differs from the corvus, or crow tribe, chiefly in the noftrils being deftitute of reflected briftles, and having the legs fhorter. Briffon makes a particular genus of pies under the name of coracias, including thofe birds of the Linnæan genus corvus which have the beak a little bent or arched. The coracias of the lateft French writers, it may be likewife remarked, belongs to the corvus genus both of Gmelin and Latham, as for example, the corvus graculus (*Cornifh chough*) and corvus eremita (*Hermit crow*), &c. of the two laft mentioned writers are referred to the coracias genus by the French.

The roller tribe is not confined to any particular part of the world like fome other genera of birds, but the far greater number of its fpecies are found in warm climates.

Only one fpecies of the roller has been yet difcovered, in England, the *garrulous roller, coracias garrula.*

Garrula. Blue, back red; quill-feathers black. Linn. Fn. Sv. Common roller. Penn.—Donov. Brit. birds. *Pica marina et garrulus argentoratenfis*, Ray. *Galgulus*, Briffon. *Rollier*, Buffon. *Gazza marina*, Zinan.

A beautiful bird, in fize fomewhat inferior to the common jay; the head, neck, breaft, and belly are of a fine blueifh-green, the back and fcapulars reddifh-brown; coverts on the ridge of the wing rich blue; the tips of the quill-feathers dufky above, beneath blue; the tail forked with the two middle feathers obfcure green, the reft blue with the tip on the outer edge black; legs fhort and dirty yellow.

This fpecies inhabits various parts of Africa, and Europe, but in greateft numbers in the warmer regions; in the north of Europe they are uncommon, in England very rare. It has obtained the name of garrulous roller in allufion to its chattering noife. The fpecies is of the migratory kind, gregarious and timid, and builds in trees, particularly the beech. In the fouth of Germany it is feen in flocks in autumn, in company with the rooks and other birds fearching for worms, fmall feeds and roots, in tilled, or cultivated grounds.

Bengalensis. Somewhat fulvous, beneath blueifh; neck beneath violet with paler ftreaks; tail entire. Lath. *Coracias bengalenfis*, Linn. *Galgulus mindanoenfis*, Briff. *Rollier de Mindanao*, Buff. *Le cuit*, ibid. Jay from Bengal, or Bengal Pye, Albin. *Bengal roller*, Lath.

Inhabits Bengal and the ifle of Mindanao. Dr. Latham obferves that it does not effentially differ from the following fpecies, the chief difference being the rufous violet colour on the breaft, and the want of the long outer tail-feathers. The bengalenfis, he thinks, may be perhaps the female or a young bird, as the long tail-feathers of coracias caudata do not appear till the fecond year. Lath. Gen.

Syn.

Syn. In Ind. Orn. of the same writer, since published, these two birds are considered as distinct species.

Caudata. Somewhat fulvous, beneath blueish; neck beneath violet, streaked with paler; the outer tail-feathers very long. Linn. *Galgulus angolensis*, Briss. *Rollier d'angola*, Buff. *Long-tailed roller,* Lath.

A native of Angola, and measures fifteeen inches and a half in length.

Senegala. Reddish fuscous; beneath, head, tail, and upper part of the wings blueish sea-green; face white, shoulders and quill-feathers blue; exterior tail-feathers very long. Lath. *Coracias senegalensis*, Gmel. *Rollier de Senegal*, Buff. *Swallow-tailed Indian roller*, Edwards. *Senegal roller*, Lath.

This is rather less than the common jay. The bill black; the whole space round the base of the bill white; head and under parts of the body, the upper parts of the wings, and tail, blueish-sea-green; shoulders and quills deep blue; the outer tail-feathers of great length as in the last species; hind part of the neck, and the back of a reddish-brown; the legs of a reddish-flesh-colour. It inhabits Ceylon and Senegal.

Abyssinica. Rufous-brown; head, neck, body beneath, and wing-coverts green; shoulders, greater quill-feathers, and rump blue; outer tail-feathers very long. Lath. *Coracias Abyssinica*, Gmel. *Rollier d'Abyssinie*, Buff. *Abyssinian roller*, Lath.

The bill of this bird is black; tip of the upper mandible much bent; sides of the head from the nostrils to a little beyond the eyes are white; the rest of the head, neck, and under parts of the body fine green; the two middle feathers of the tail are dusky, with a gloss of blue especially down the middle, the outer ones blue-green: the two exterior tail-feathers are five inches longer than the rest, and the end, beyond the extremity of the others, of a fine deep blue; the legs are red-brown. A native of Abyssinia.

Orientalis. Green; throat striated with blueish; tail-feathers black at the tip. Lath. Linn. *Galgulus indicus*, Briss. *Rollier des Indes*, Buff. *Oriental roller*, Lath.

A native of the East Indies. Its size is that of a jay, the length ten inches and a half; the bill yellowish, broader at the base, and more hooked than in any of the genus; the head and hind part of the neck brown; back, rump, and scapulars, with the wing and tail-coverts, green-brown; throat fine blue; down the shaft of each feather a pale line, the other parts beneath blue-green; quills blue and black, with a large pale blue spot. The wings are longer than in the other species of roller; the tail even at the end, the two middle feathers green at the base, with the other part black; legs yellowish with black claws.

Indica. Blue, fore-part testaceous; cap green. Linn. *Blue jay* from the East Indies. Edwards. *Indian roller*, Lath.

The length of this bird is eleven inches. The bill is dusky, an inch and a half in length; the crown of the head blue-green; throat, breast, neck, and back, reddish-brown, with the sides of the head and throat darkest, streaked with white; rump and tail, with the under-parts from the breast, fine cyaneous blue; the middle feathers of the tail green, the outer ones blue at the bottoms and tips, in the middle sea-green; the wings green and blue. A native of Ceylon.

Caffra. Blue, exterior edge of the quill-feathers pale-yellow. Linn. *Cape roller*, Lath. Inhabits Ethiopia; an obscure species described on the authority of Linnæus.

Vivida. Entirely of a most vivid blue. Lath. *Coracias cyanea*, Gmel. *Ultramarine roller*, Lath.

Length of this species eight inches; the bill dusky. Native place unknown.

Madagascariensis. Purple-brown; rump, vent, and tail blueish-green; tail towards the tip marked with a purplish band, tip and quill-feathers dark blue. Gmel. *Rollier de Madagascar*, Buff. *Madagascar roller*, Lath.

A beautiful species found in Madagascar. The length of this bird is ten inches; the bill is very stout at the base, rather short and of a yellow colour; the legs reddish-brown.

Mexicana. Reddish-grey; beneath and on the wings pale grey mixed with flame colour. Gmel. *Galgulus mexicanus*, Briss. *Merula mexicana*, Seba. *Rollier de Mexique*, Buff. *Mexican roller*, Lath.

Larger than a thrush, and inhabits Mexico.

Puella. Blue, collar in front, and at the side, with the breast, belly, quill-feathers, and greater wing-coverts black. *Fairy roller*, Lath.

Size of a blackbird, and inhabits India.

Striata. Blue-black, streaked with greenish-blue; bill, tail, and legs, black. Lath. *Coracias striata*, Gmel. *Blue-striped roller*, Lath.

The length of this bird is eight inches. The female cinereous-grey and not streaked like the male; quill-feathers black, edged with cinereous; irids pale red. A native of New Caledonia.

Sinensis. Green, beneath yellowish-green, tail cuneated, and white at the tip. Gmel. *Galgulus sinensis*, Briss. *Rolle de la Chine*, Buff. *Chinese roller*, Lath.

Inhabits China, and is called at Canton Sau-ta-hoang. The size is that of a jay, the length eleven inches and a half; the bill and irids are red; head, and hind part of the neck, back, rump, and upper tail-coverts green; through the eyes on each side is a black stripe; the underparts from the chin to the vent yellowish-white tinged with green; wing-coverts olive-brown; quills the same with a mixture of chesnut in some, and others tipped with white; the tail resembles that of a magpie in form, and is marked at the tip of every feather with a white spot; the legs and claws are pale red, and longer than in other rollers.

Vagabunda. Head and neck black; body above ferruginous-brown, beneath cinereous; middle of the wing white; tail very long, wedge-formed, greyish with the tip black. Lath. *Grey-tailed roller*, Lath.

This is a native of India; the length is seventeen inches; its bill black; legs cinereous; lesser wing-coverts rustybrown; greater and secondary quill-feathers white, the primary ones black.

Cayana. Tawny-green; beneath dirty white; eyelids white; chin with a black streak each side; tail cuneated. Gmel. *Grivert, ou rolle de Cayenne*, Buff. *Cayenne roller*, Lath.

Inhabits Cayenne, and measures about nine inches in length, the bill is reddish; legs long and grey.

Docilis. White interspersed with reddish; beneath chesnut; legs pale yellow; tail-feathers black with the tips white. Gmel. *Docile roller*.

Size of a blackbird, and inhabits the southern parts of Asia. The bill is yellow; the nine first quill-feathers white as far as the middle and from thence black, the rest entirely black; claws flesh colour.

Nigra. Body and limbs entirely black; tail long. Gmel. *Black roller*, Lath.

Length sixteen inches; bill thick, and with the legs black; tail seven inches. Native country unknown.

Afra. Testaceous red; beneath reddish-purple; vent blue-green; wing and tail-feathers blue, with the tips blackish. Gmel. *African roller*, Lath.

Length

Length eight inches and a half; the body ftout, bill yellow; legs brown. A native of Africa.

Melanocephala. Blue-purple; head and neck black; body beneath white; quill-feathers fufcous; tail cuneated and white at the tip. Gmel. *Black-headed roller*, Lath.

Size of a crow, bill and legs red; nape pale grey; two middle tail-feathers blue, the reft purplifh, and the whole white at the tip. Inhabits China.

Strepera. Black; fpot on the wings, vent, bafe, and tip of the tail black. Lath. *Noify roller*.

This is an inhabitant of Norfolk ifland in the Pacific ocean, where it occurs in vaft numbers; it has the reputation of being a filly bird, and is very noify in the night. The length is nineteen inches, of which the bill is two inches and a half long, fomewhat ftraight, black, denticulate, and horn-coloured near the tip; noftrils naked, long, and placed near the bafe of the bill. The firft fix quill-feathers are white at the bafe; the tail long and rounded, the larger feathers white at the bafe, the lateral ones white at the tips within. When the wings are folded they reach as far as the middle of the tail. The legs are black, the outer toe connected at the bafe to the middle one.

Varia. Black; beneath, lower part of the back, rump, and upper tail coverts white; tail black, equal, with the tips of the feathers white. Gmel. *Caffican de la Nouvelle Guinée*, Buff. *Pied roller*, Lath.

Length about thirteen inches; the bill two inches and a half long, and of a blueifh colour with the tip dark; legs lead colour. A native of New Guinea. This bird partakes of characters common to the oriolus, coracias, and ramphaftos genera, and might with fome propriety be referred to either. In the index ornithologicus it is placed with the coracias tribe.

CORACINSII, in *Ancient Geography*, a people who inhabited the northern part of the ifle of Sardinia.

CORACINUS, in *Ichthyology*, the name of a fea-fifh caught in the Mediterranean, and called by fome authors *fkiæna*, and by Aldrovand and Salvian *umbra*. It is of the colour of the common tench, but in figure more approaches to the perch: its fcales are fmall; its mouth not very large, but well furnifhed with teeth; and its tail is not forked, but when extended, feems of a roundifh figure; the ends of the rays or nerves of the tail-fin are black, and the other fins are all black, and feem as if dyed with ink.

Coracinus *Brafilienfis*, the Labrus *Cromis* of Gmelin, and *Guatucupa* of Marcgrave. Found in Carolina.

CORACIUS Mons, in *Ancient Geography*, a mountain of Afia Minor in Jonia, fituated near the town of Colophon. Strabo.

CORACLE, a fifhing boat of curious conftruction ufed in Wales for time almoft immemorial. Thefe boats afford a fpecimen of the earlieft Britifh navigation, and they are ufed at this time on many of the rivers in Wales, probably without any deviation from their original form. They are made with very ftrong bafket-work, and covered with hides, or coarfe canvas, with a thick coating of pitch. Their fhape is oval and refembles the fection of a walnut-fhell, their length is generally five feet, and their breadth feldom lefs than four. They contain only one perfon, who fits precifely in the middle, and by dextrous management maintains his juft balance. The inftrument with which he moves his boat is a paddle; one end of which refts upon his fhoulder, and the other is employed by his right hand, in making a ftroke alternately on each fide. The left hand is, in the mean while, employed in conducting the net, and he holds the line between his teeth. Thefe veffels were anciently ufed, as the means of intercourfe between the inhabitants on the oppofite banks of the rivers. They are now applied only to the purpofe of fifhing. So frail an invention would probably have been fucceeded by fomething of greater ftrength and capacity, had not there been found a remarkable convenience in their lightnefs. The fifherman, when his labour is finifhed, flings his boat acrofs his back, and marches homewards under the burden of his machine and booty. There is fcarcely a cottage in the neighbourhood of the Tivy in South Wales, or feveral other rivers in thofe parts, abounding with fifh, that has not its coracle hanging by the door. Such is the adroitnefs of thofe who ufe them, that they are very rarely overturned on lakes or rivers; and they fometimes even venture a little way out to fea, when the weather is perfectly calm. Similar to thefe in their nature are the Indian canoes; though they are conftructed of different materials and forms, and applied to different purpofes.

CORACOBRACHIALIS, in *Myology*, a mufcle of the fhoulder-joint, arifing by a tendinous and flefhy origin from the apex of the coracoid procefs of the fcapula, and connected for fome extent with the fhort head of the biceps. It paffes downwards and backwards, to be inferted into the inner fide of the os humeri about the middle of the bone. The mufculo-cutaneous nerve generally penetrates the fibres of the mufcle; whence it has been called the mufculus perforatus Cafferii. It will move the os humeri towards the fide; it will elevate the bone, and carry it obliquely forwards acrofs the front of the cheft. It may rotule the os humeri outwards, particularly if that bone has been previoufly turned inwards.

CORACODES, in *Ancient Geography*, a port of the W. coaft of the ifland of Sardinia. Ptolemy.

CORACOHYOIDEUS, in *Myology*, a term applied to the omohyoideus mufcle, for which fee Larynx.

CORACOIDES, in *Anatomy*, a fmall fharp procefs of the fcapula; fo called from its refembling a crow's bill.

The word comes from κοραξ, *corvus*, and ειδος, *imago*.

The coracoides is placed in the upper part of the neck, and projects over the head of the bone of the arm. It ferves to ftrengthen the articulation of the fhoulder; and gives origin to one of the mufcles of the arm.

CORACOMANTES, from κοραξ, *crow*, and μαντεια, *divination*, in *Antiquity*, a kind of diviners, who made their predictions by obferving the crows.

CORACONESUS, in *Ancient Geography*, an ifland of the Mediterranean fea, towards the coafts of Libya. Steph. Byz.—Alfo, a place of Peloponnefus, in Arcadia; fituated, according to Paufanias, where the river Ladon difcharged itfelf into the Alpheus.

CORACORADIALIS, a name given by Winflow to the biceps flexor cubiti. See Biceps.

CORADI, or Curadi, Ottavio, in *Biography*, a Bolognefe painter, the fcholar of Giacomo Cavedone. His principal excellence confifted in the boldnefs and truth with which he copied the works of his mafter. He flourifhed in 1630, and is faid by Pilkington to have died in 1643. Malvafia, Orlandi.

CORAH, or Corah-Jenehabad, in *Geography*, a fmall city of Hindooftan, or capital of a province in the Dooab, or country between the rivers Ganges and Jumnah; fubject to the nabob of Oude; 184 miles S.E. of Agra, and 67 S.S.W. of Lucknow. N. lat. 26° 10′. W. long. 80° 50′. When lord Clive affumed the government of Bengal, in 1765, he reftored to Sujah Dowlah all the conquefts that had been gained from him, except the provinces of Corah and Allahabad, which were referved as part of an eftablifhment for the emperor, or great Mogul. The Corah provinces were valued at 30 lacks. The emperor was to refide at Allahabad, under the protection of the Englifh, to whom, in

in reality, he owed all that he poſſeſſed ; and a treaty offenſive and defenſive was entered into with Sujah Dowlah, nabob of Oude. The ambition of the emperor was not ſatisfied ; but after about ſix years quiet reſidence at Allahabad, he put himſelf into the hands of the Mahrattas, who promiſed to ſeat him on the throne of Delhi. The immediate conſequence of this connexion was a ceſſion of the Corah provinces to the Mahrattas, who, unleſs the Engliſh had interpoſed, would have eſtabliſhed themſelves in that important angle of the Dooab, which commands the navigation of the upper part of the river Ganges, and the whole courſe of the Jumnah. On this occaſion, the Britiſh government conſidered the Corah, &c. provinces, which, by right of conqueſt, were originally theirs, as having reverted to them again, when they were alienated from the purpoſes for which they had been originally granted to the emperor; and applied to the aggrandiſement of a power inimical to them and their allies. They, therefore, reſumed the poſſeſſion of theſe provinces, and immediately ceded them to the nabob of Oude, for a valuable conſideration. See Oude.

CORAL, in *Botany*, *arbor non ſpinoſa* ; Pet. Rai. See Erythrina *criſta galli.*

Coral *arbori affinis* ; Sloan. See Sophora *occidentalis.*

Coral *arbor americana* ; Com. See Erythrina *corallodendrum.*

Coral *carolinenſis* ; Dill. See Erythrina *herbacea.*

Coral *arbor polyphylla* ; Sloan. See Piscidia *erythrina.*

Coral, in *Zoology*, a general Engliſh name for zoophytes of the Iſis tribe, or thoſe whoſe animal reſembles a plant, and have the ſtem ſtony and articulated ; with the joints longitudinally ſtriated, united by ſpongy or corneous junctures, and covered by ſoft porous cellular fleſh. About ſix ſpecies of this curious genus are at preſent known. See Isis.

Coral, *red*, or true red coral, was conſidered by Linnæus as an iſis, and arranged as ſuch in the Syſtema; though Linnæus himſelf acknowledged to Mr. Ellis, the author of the Natural Hiſtory of Zoophytes, that the latter had more properly claſſed it with the gorgonia, or ſea-fan, the genus iſis being fufficiently diſtinguiſhed by its jointed ſtem. In the laſt edition of the Syſtema, the coral is placed with the ſea-fans, or gorgonia.

The red coral grows in an expanded and ſomewhat flattened form, with dichotomous branches, that leſſen towards their extremities. The fleſh is of the colour of red lead, or inclining to vermilion, ſoft, ſlippery, and full of minute veſſels. The mouths are placed on the ſurface, and riſe up in a conical form, conſiſting of eight valves, juſt opening, from whence proceed polypes of a white colour, with eight claws, each of which has a double fibre at both edges. The bone itſelf, diveſted of the fleſh, is the true coral of the ſhops, and which, in its natural ſtate, is of a ſtony texture, and of a bright red colour, with the outſide marked with minute furrows, or irregular ſtriations, interſperſed with a few ſlight depreſſions, correſponding with the ſituation of the ſhells, before the fleſh be removed. For a further account of this curious article, ſee Gorgonia *nobilis.*

Coral, *black.* In the Linnæan ſyſtem, the true black coral is deſcribed as appertaining to the ſame genus of zoophytes as the red kind, under the ſpecific name of antipathes. This ſort is found on the ſhores of the Indian and Mediterranean ſeas, and grows in a ſhrubby form to the height of about two feet, with the branches erect, and alternately panicled. The bone is of a black colour, marked on the outſide with flexuous ſtriæ, and in its native ſtate is covered with fleſh of a grey colour. See Gorgonia *antipathes.*

The gorgonia antipathes, or true black coral, muſt not be confounded, from the ſimilarity of names, with the antipathes genus, the latter being very diſtinct, although its ſpecies are not unfrequently denominated black corals, as well as the gorgonia before-mentioned. There is a great affinity between the antipathes and gorgonia genera ; notwithſtanding which they may be readily diſtinguiſhed, the bony part of the antipathes being beſet with ſmall ſpines, and covered with gelatinous fleſh, and numerous polype-bearing tubercles, while the bone of the gorgonia is ſmooth, or deſtitute of ſpines, and the fleſh cellular.

From the old botanical writers it appears, that many of the zoophytes were conſidered as genuine plants ; and that in particular ſeveral ſorts of black corals were formerly called antipathes. But as the characters of theſe marine bodies are better underſtood in the preſent age, only part of theſe have been retained in the genus antipathes, and ſome of the reſt referred to the gorgonia. The antipathes of certain kinds were formerly uſed as ſceptres for princes, and likewiſe for divining rods, and other ſimilar purpoſes, as is evident from the remarks of Salmaſius, addreſſed to Solinus, wherein he ſays, that antipathes denotes ſomething proper to reſiſt incantations, and that they were in uſe for that purpoſe by ſeveral Indian nations.

There are a number of different ſpecies of this kind of black coral, which, not being ſufficiently noticed under the article antipathes, it may be proper to deſcribe in this place.

Spiralis. With a very ſimple, ſpiral, rough ſtem. *Antipathes ſimpliciſſima attenuata flexuoſo-ſpiralis ſpinulis ſeriatis ſcabra* of Pallas. *Gorgonia ſpiralis*, Linn. *Palmjuncus anguinus*, Rumpf.

This kind inhabits the Indian, Mediterranean, and North ſeas. It is of a hard and horny black ſubſtance, extremely brittle, and varying in length and thickneſs ; one deſcribed by Mr. Ellis meaſured two feet long, and was about the thickneſs of a writing-pen ; another, not thicker at the baſe than the quill of a hen's feather, was ſeven feet in length. In its natural ſtate this kind is variouſly twiſted, or generally in a ſpiral manner, and the fleſh which covers the ſpiny ſurface of the bone is full of little gelatinous warts.

Ulex. Very much branched, with ſcattered ſpreading rough and pointed branches. *Furze-like antipathes*, Soland. and Ellis.

A native of the Indian ocean. This kind is full of ſmall ſhort ſpines, the branches are looſe and irregular, and the whole remarkably black. The ſpecimen brought from Batavia, and deſcribed by Mr. Ellis, had the ſurface marked with ovate cavities, diſperſed about the branches, which were of a browniſh-yellow colour, and ſuppoſed to be the ovaries.

Subpinnata. Branched and pinnated, rough with ſetaceous alternate ſub-diviſions, and a few others proceeding tranſverſely from them. Soland. and Ellis.

Deſcribed by Gmelin as a native of the Mediterranean ſea on the authority of Ellis, who, however, merely informs us his ſpecimen was brought from Gibraltar, and is ſuppoſed to be taken in the ſea thereabouts. The ſpines of this kind are long and ſmall, and of an amber colour when magnified. The ſurface of the antipathes appears to be cinereous.

Myriophylla. With numerous, incurved, pinnate branches, the ſubdiviſions with leſſer ſpinous pinnules on the upper ſide. Soland. and Ellis. *Myriophyllum indicum ramoſiſſimum*, Petiv. *Erica marina tenuis*, Rumpf.

This is called by Ellis the yarrow-leafed antipathes ; it is of a beautiful ſhrub-like appearance, with many pinnated branches, bending downwards all round ; the colour yel-

lowiſh.

lowifh-brown, and the furface rough, but confiderably lefs fo than the fpecies fubpinnata. Found near the Spice iflands.

Alopecuroides. With fpinous, fetaceous, clofely panicled branches. Soland. and Ellis. *Fox-tail antipathes.*

The trunk of this fpecies rifes from a broad fpreading bafe, and divides immediately into feveral large branches, of about one-third of an inch in diameter. As they rife up, one fide of them appears flat, with a groove or channel along the middle of it, where there are the remains of many little branches that have grown in rows on each fide. It then divides into branches, and often into other branches, all which are in form of clofe panicles, not unlike the fox-tail grafs. Thefe panicles are compofed of very rough thorny minute branches, which are twice as long on one fide of the ftem as the other. This rifes to the height of two feet, and is of a greyifh colour on the outfide, the infide black and very brittle. A rare fpecies, difcovered on the coaft of South Carolina.

Cupressus. Growing in the form of a fimple rough panicle, with recurved branches. Soland. and Ellis. *Antipathes cupreffina*, Pallas. *Gorgonia abies*, Linn. *Cupreffus marina*, Rumpf.

The cyprefs antipathes was erroneoufly claffed by Linnæus with the gorgonia; Gmelin places it with the antipathes. The fpecies inhabits the Indian ocean; it is about two feet in length, and is covered with a brownifh-down, beneath which the colour is deep black.

Dichotoma. Very long, dichotomous, and upright. Pallas.

Inhabits the Mediterranean, is about two feet in height, round, and dufky.

Orichalcea. Braffy, fmooth, with a fimple, rigid, flexuous ftem, and alternate, fcattered, dichotomous branches. Pallas. *Gorgonia ænea*, Linn.

Twelve inches in length, and very rigid. A native of the Indian ocean.

Clathrata. Very much branched, intricate, with confufed fub-divifions in every part coalefcing, the younger ones fetaceous. Pallas.

Size of the laft, and of a black colour within: this inhabits the Indian ocean.

Flabellum. Dilated, very ramofe, and fub-divided, the fub-divifions branching both ways, and cohering together in a reticulated manner. Pallas. *Erica marinæ affinis*, Rumpf.

This kind inhabits the Indian fea, and is about fix inches wide, black, rough, and undulately curved.

Pennacea. Branched, fomewhat incurvated, the branches with fetaceous and very crowded rough fub-divifions. Pallas. *Accabaar rutturuttu*, or *Erica marina craffa*, Rumpf. *Peucites prifma*, Aldr.

Inhabits the Indian ocean, the outfide grey and rough, within black.

Ericoides. Very much branched, rough and black, with fcattered branches, covered throughout with fubulate fub-divifions. Pallas. *Cupreffus marina prior*, Rumpf.

A fpecies about a foot high, and of a deep black colour; an inhabitant of the Indian ocean.

Foeniculacea. Very much branched, with fetaceous decompofite fub-divifions. Pallas. *Fœnum marinum*, Rumpf.

Twelve inches high, the colour black. A native of the Mediterranean.

Coral, *white*. See Madrepora, Millepora, and Cellepora.

Coral gives title to an officinal compofition, called *fyrup of coral*, fometimes prefcribed by phyficians; as is likewife the powder of coral finely ground, and afterwards levigated on a marble, and made up into a proper form. But there are few, except thofe who are fond of medicines with gems in them, that make ufe of it. By means of its exceeding hardnefs, it is fufpected to take away with it a great deal of the levigating ftone.

Difpenfary writers have given us receipts for a great many preparations of coral, as magifteries, tinctures, falts, &c. none of which enter the prefent practice.

Coral and coralline being the fhells of marine animals of the polype kind, poffefs the fame chemical properties as the frefh fhells of oyfters and other fhell-fifh, *i. e.* they are calcareous earths impregnated with fome animal principles.

Coral, *artificial*, is made of cinnabar well beaten; a layer whereof is applied on a piece of wood well dried, and polifhed, firft moiftened with fize: the whole is then again polifhed; and for varnifh, rubbed over with the white of an egg. See Grotto.

Coral-*fifhery*. The time for fifhing coral is from April to July; the places are the Perfian gulf, the Red fea, coafts of Africa towards the baftion of France, the ifles of Majorca and Corfica, and the coafts of Provence and Catalonia.

The method of fifhing is nearly the fame in all places: that ufed at the baftion of France, where there is an eftablifhed fifhery, under the direction of a company at Marfeilles, is as follows.

Seven or eight men go in a boat, commanded by the patron or proprietor; the cafter throws his net, if we may fo call the machine wherewith he ufes to tear up the coral from the bottom of the fea: and the other fix manage the boat. The net is compofed of two beams tied acrofs, with a leaden weight to prefs them down; to the beams is faftened a great quantity of hemp loofely twifted round, among which they mix fome ftrong nets. In this condition the machine is let down into the fea; and when the coral is pretty ftrongly embarraffed in the hemp and the nets, they draw it out by a rope, which they unwind according to the depth, and which fometimes requires half a dozen boats to draw. If the rope happen to break, the fifhermen are in great danger of drowning. They have two machines, one for fifhing up the coral where the bottom is fmooth; and the other, called in the Provençal language the *falabre*, fo conftructed as to be employed where the bottom of the fea is rocky and unequal.

Before the fifhermen go out, they agree on the price of the coral, which is ordinarily at the rate of 4*s.* 6*d. per* pound.

When the fifhery is over, which in a feafon ufually amounts to twenty-five quintals of coral each boat, it is divided into thirteen parts; the patron whereof, or mafter coraller, has four, the cafter two, and each of the fix companions one: the thirteenth being referved for the company, &c.

Spallanzani has particularly defcribed the coral-fifhery in the ftrait of Meffina. (Travels in the two Sicilies, &c. vol. iv. p. 308.) This, he fays, is both a laborious and dangerous occupation. The inftrument, with which they force the branches of coral from the rocks, is formed with two poles of wood, croffing each other at right angles, and having a piece of a net faftened on the under fide to their extremities. A large ftone is fixed where the poles crofs each other, that the inftrument may more readily fink to the bottom. A cord is ftrongly tied round the middle of it, one end of which the fifherman holds in his hand, guiding by it the net to thofe places where the coral is fuppofed to grow; and which is inclofed, in the pieces of the net, broken off, and drawn up. This fifhery

is carried on from the entrance of the Faro to the part of the ftrait oppofite to the church of the grotto, or through a tract fix miles in length, and to the diftance of three miles from Meffina. The rocks which produce the coral are fituated almoft in the middle of the ftrait, at different depths, from 350 to 650 feet. The bottom and caverns of the rocks are the places from which they endeavour to bring up the coral with their nets; and it is a conftant obfervation, that every branch is perpendicular to the plain on which it grows, without ever turning on one fide. Coral, it is faid, grows more plentifully in places fituated to the eaft than in thofe to the fouth; it is rarely found to the weft, and never to the north. In the firft fituation it is larger, and of a finer colour, than in the fecond and third; which two valuable qualities are likewife found in that which is brought from a lefs depth, compared with that which is grown at a greater. The greateft height to which it grows is never a foot, and its ufual thicknefs is that of the little finger, and fomewhat lefs than that of the coafts of Trapani and Barbary; but the latter are exceeded by the Meffinefe in vividnefs of colour. Thefe differences, according to the account of the fifhermen, arife from their coral being produced in a fea which is kept in continual agitation, from the furface to the bottom, by the current and the winds. With refpect to colour, there are three kinds; the red, the vermilion, and the white coral. The firft is fubdivided into the deep crimfon-red, and the lighter red. The vermilion is extremely rare, but the white common. In the white they include the clear white and the dull white.

The coral fifhermen have divided the whole tract in which they fifh into ten parts. Every year they fifh only in one of thefe parts, and do not fifh in it again till ten years are elapfed. This interval of ten years they think neceffary for the coral to acquire its full growth in height and confiftence. When they tranfgrefs this law, they find, in fact, the coral fmaller, and of lefs confiftence, and the intenfity of the colour is always in proportion to the number of years they have defifted from fifhing. When the ten years have elapfed, they believe that the coral no more increafes in height, but only in thicknefs, which, however, has its limits. In fact, they have obferved that the coral fifhed up near San Stefano, a place where none had been fought for in the memory of man, though it was of a very bright colour, was not higher than the ordinary coral, though it exceeded it by one-third in thicknefs.

The number of fhips which ufually go together in this fifhery is eighteen or twenty, each of which is ufually managed by eight men. The quantity of coral procured may amount every year to twelve Sicilian quintals. The quintal, as is well known, contains two hundred and fifty pounds, and the pound twelve ounces. The gain acquired is therefore adequate to the labour; yet may the fifhery be confidered as a fecondary occupation, fince the fifhermen only follow it when they have no other employment by which they can make a greater profit. Spallanzani examined the branches of coral, as they were taken out of the nets, by putting them into glafs veffels filled with fea-water. It is well known that, in this cafe, the white polypi will come out of their cells in the coral as foon as the water is perfectly at reft. He examined and re-examined thefe polypi, as it was the firft time he had feen them; but he difcovered nothing which can make any addition to the accurate obfervations of Peyffonel, Juffieu, Guettard, Donati, and the very recent remarks of the celebrated Cavolini, which feem to leave nothing to be defired to complete our knowledge of thefe animalcula, and their natural habitudes. Having made fome additions and corrections to the obfervations of count Marfigli, relative to this fubject, he proceeds to defcribe the principal of thofe branches, which now make a valuable addition to the clafs of Zoophyta in the imperial mufeum at Paris. He obferves, 1. That the bark of this branch has the colour of fealing wax; but the folid coral is purple, with fome tranfparency at the extremity of the branches.

2. The bark in colour refembles that of the foregoing; but the included folid coral is of a lefs vivid red.

3. The bark is of a blueifh grey; the folid coral grey, with a flightly reddifh tinge.

4. In this fpecimen four branches fhoot from the fame ftem; two of a pale red in the bark, and a whitifh red in the folid coral. In the fourth the bark is of a whitifh colour, and the folid coral ftill whiter.

5. Three branches joining in one, the colour of which, both in the bark and the folid coral, is a milky white.

With refpect to the ftructure of the cortical and folid parts of the white corals, he obferves that they are the orifices of the cells in the bark of the white coral, which being octoradiated like thofe in the red, appears to be a proof that the polypi in both are of the fame ftructure, and confequently of the fame fpecies; the polypi inhabiting the red coral having likewife eight tentacula. That coral is foft in the fea, but hardens when it comes in contact with the air, was the opinion of the ancients; but has been proved falfe by the obfervations of the moderns. The coral-fifhermen of Meffina, who derive all their knowledge from experience only, are convinced this opinion is erroneous; but they affert that coral which has not attained maturity has not that degree of confiftence it acquires when it has arrived at its full growth. The truth of this pofition Spallanzani was not able to afcertain, as, for that purpofe, it would have been neceffary to caft the net in one of thofe ten parts of the ftrait in which it is prohibited by the law to fifh till the expiration of the ten years prefcribed. Yet the rules of analogy derived from what is obferved in all animals and vegetables, incline him to favour this opinion. It is agreed however by the fifhermen on the coafts of Barbary, and alfo by thofe of Meffina, Sardinia, and Corfica, that the deeper they defcend into the fea, the fmaller is the coral. Donati obferves, that the broken and detached branches of coral will continue to live and multiply in the fea; and this Spallanzani allows to be the cafe, provided they meet with a firm point of fupport to which they can attach themfelves with their vifcous humour. Otherwife, if they fall on the moveable fand, they become the fport of the waves, and he has no doubt but they muft perifh. The fifhermen, with whom Spallanzani converfed, appeared to be well acquainted with the true generation of coral; as they told him that they had frequently obferved, on hard matters drawn from the bottom of the fea, the firft principles of coral beginning to germinate; which they defcribe as having the appearance of a red fpot, with a button or bud implanted in thofe matters, fometimes tender and fragile, and fometimes hardened, and of the colour and nature of ordinary coral.

They were likewife acquainted with thofe branches of coral which, when fifhed up, are fometimes found perforated by lithophagous worms, and which are mentioned by Vitaliani and Marfigli. Their nets had frequently brought them up, either from the bottom of the fea, from caverns, or the fides of rocks; and thefe perforated corals were found fometimes broken in the trunk, where the perforations

forations are moſt frequent; and at other times attached to ſome body which ſerved them as a baſe. They were of opinion that theſe corals were thus perforated, becauſe they were dry; and this dryneſs, they imagine, proceeds either from age, or their having been broken from their root by ſome fiſh, or by a part of a rock falling on them; or poſſibly by the coral nets, which do not always bring up all the branches of coral they tear away from their roots.

CORAL *iſlands*, in *Geography*, called by the Spaniards in their old charts *los corales*, or *iſles del coral*, three iſlands lying in the form of a triangle and ſituated S.W. of the Ladrones, in the Eaſt Indian ocean.

CORAL *river*, a river of New Mexico which runs a W. by S. courſe and diſcharges itſelf into the head of the gulf of California, near the mouth of the Collerado river.

CORAL-*tree*, in *Botany*. See ERYTHRIMA CORALLODENDRUM.

CORAL-*wort*. See DENTARIA BULBIFERA.

CORALARIA, *parvifolia*; Rumph. See ADENANTHERA PAVONINA.

CORALIS, in *Ancient Geography*, a marſh of Aſia, in Lycaonia, placed by Strabo in the vicinity of Galatia.

CORALIUS, a river of Greece, in Bœotia.

CORALLA, a place of Aſia, in Cappadocia, on the Euxine ſea, according to Arrian's Periplus.

CORALLI, a people of European Sarmatia, who inhabited the banks of the Euxine ſea, towards the Danube.

CORALLINA, in *Zoology*, a genus of zoophytes, the animal of which is of a plant-like form, with the ſtem fixed, and the branches ſubdivided, calcareous, and moſtly jointed.

The ancient naturaliſts miſtook corallines for a particular tribe of plants, and accordingly introduced them into their works under the title of marine moſſes. Tournefort enumerates thirty-ſix ſpecies among his plants; and indeed certain kinds appear to be ſo nearly allied to the lichen family, that ſome continental botaniſts, even in the preſent day, are in doubt where to draw the exact limit between the cryptogamia and the corallina.

All the corallines adhere to rocks or other ſolid bodies, and are concretions formed by the polype animals which inhabit them, the coralline itſelf being only the habitation of theſe creatures. The branches are commonly elevated, of a ſhrub-like form, and exhibit an elegant appearance from the ſymmetry and general proportions of their reſpective articulations; the branches being compoſed of little joints, like beads ſtrung in a necklace. The joints conſiſt of a calcareous and gelatinous matter, and have the ſurface perforated, or full of minute pores, which in many ſpecies are ſo very ſmall as to be viſible only with the aid of glaſſes. It is in theſe minute cells that the polypes reſide, and through which they either protrude their limbs when they lie in wait for food; or draw their nouriſhment through the aperture. When a branch of coralline is inmerſed in vinegar the calcareous cruſt diſſolves, and leaves the cartilaginous parts uninjured, and by that means enables us to examine its internal tubular ſtructure. In point of colour the corallines differ very conſiderably, not only in different, but alſo in the ſame ſpecies, and without exception the whole become white on expoſure to air.

The coralline tribe, poſſeſſing much elegance and beauty, are highly ornamental in a collection of natural hiſtory; one ſpecies only appears to be appropriated to an uſeful purpoſe, which is the corallina officinalis, vaſt quantities of which are gathered and employed in medicine as an abſorbent.

Among the older writers the word coralline had a very general acceptation, and ſeems to have comprehended every deſcription of polype-bearing ſubſtances, in addition to the coralline genus of modern naturaliſts, ſuch as the *tubipora*, *ſertularia*, *cellepora*, *fluſtra*, *alcyonium*, *ſpongia*, &c. Mr. Ellis, in his publications on corallines, adheres rather too cloſely to this idea, but ſtill defines the ſeveral genera with ſo much accuracy as to render his works of the greateſt value to future naturaliſts. His veſiculated, tubular, celliferous, and articulated corallines are referable to the different genera above-mentioned (which ſee reſpectively). He includes alſo among his corallines the iſis, gorgonia, antipathes, &c. in which he is certainly wrong. The ſpecies of the true corallina at preſent known are as follow.

Species.

TRIDENS. Trichotomous, with compreſſed three-lobed flat joints. Ellis.

Found on the coaſt of the North American iſlands, where it was firſt diſcovered by Mr. John Greg.

OPUNTIA. Trichotomous, with kidney-ſhaped joints waved at the edges. Gmel. Indian fig coralline, Ellis. *Corallina latifolia*, Plunk. *Muſcus*, &c. Bocc. *Fucus*, &c. C. Bauh. *Scutellaria, opuntia marina*, J. Bauh. *Sertolaria*, Imper.

This kind grows on the coaſt of Jamaica, and other Weſt India iſlands, and is found alſo in the Mediterranean ſea. The colour is white, and the joints ſomewhat kidney-ſhaped.

MONILE. Trichotomous, with the lower joints compreſſed, convex, cuneated, oblong, and with the upper ones ſub-cylindrical. Soland. and Ellis. Necklace coralline.

Inhabits the ſhores of Jamaica.

INCRASSATA. Trichotomous, with compreſſed plano-convex wedge-ſhaped joints. Soland. and Ellis. Fleſhy coralline.

This kind is very frequently caſt up on the ſhores of the American iſlands, particularly Jamaica.

TUNA. Trichotomous, with compreſſed flat roundiſh joints. Soland. and Ellis. *Tuna coralline*. *Opuntia marina*. Park. Theat.

Found in the Mediterranean ſea.

NODULARIA. Trichotomous, and very much branched, with thick wedge-ſhaped joints, thoſe at the diviſions broadeſt, the terminal ones tricuſpidate or ovate. Pallas. *Nodularia alba*, Imp. *Muſcus coralloides*, C. Bauh.

Inhabits the ſame ſea as the preceding. Grows to the height of eighteen inches, and is very thick, ſtrong and white.

SQUAMATA. Trichotomous, the joints of the ſtem roundly compreſſed and wedge-ſhaped, thoſe of the branches flatly compreſſed; terminal ones flattiſh and ſharply two-edged. Ellis.

Inhabits European coaſts, and is of a ſea-green colour.

LORICATA. Trichotomous, with compreſſed, ſub-convex, wedge-ſhaped joints, angulated at the ſides; the terminal ones with ſmall obtuſe lobes. Ellis.

A native of the Mediterranean ſea.

PALMATA. Trichotomous, with compreſſed, ſub-convex, wedge-ſhaped joints, ſlightly denticulated at the tip; the extreme joints broad, and often furniſhed with ſhort finger-like lobes. Ellis.

This was found in the American ſeas, and is of a gloſſy white colour.

Elongata. Trichotomous, with the joints of the ftem roundifh and cuneated; thofe of the branches cylindrical; the extreme joints a little obtufe, and fome of them capitated. Ellis.

Varies in colour from red to purple. It inhabits the European coafts.

Subulata. Trichotomous, with the joints of the ftem cuneated and two-edged, and projecting fmall pointed branches from the top of each of their fides, with round joints. Ellis.

The appearance of this coralline is very flat, white, flender, and fmall, and feems as if it were very clofely pennated or befet with fine white fibres, projecting out on each fide like the plume of a feather. This is the moft delicate of the coralline tribe. Found in the Weft Indies.

Granifera. Trichotomous, with the joints of the ftem compreffed and wedge-fhaped; thofe of the branches roundifh, and furnifhed with oppofite ovate ovaries, feated on fmall pedicles. Ellis.

This differs from all the other kinds of trichotomous corallines, in having proliferous ovaries, or branches growing out of them, being other ovaries. It is of a fine flender texture, and of a fea-green colour. It was found on the coaft of Africa, in the Mediterranean fea.

Officinalis. Sub-bipinnate, and ufually trichotomous, with the joints of the ftem fomewhat cuneated or turbinated; thofe of the branches round, and fome of the terminal ones capitated. Ellis. *Corallina officinalis, fub-bipinnata, articulis fubturbinatis*, Linn. Fn. Suec. *Corallina altera*, Tobernaem herb. *Mufcus corallinus filicinus*, Barrel.

Common on almoft every fhore, where it grows on the rocks in tufts of two, three, or four inches in length, and varying confiderably in colour, being red, yellow, green, and white. This is the coralline of the fhops, and is the kind ufed in powder as an abforbent.

Pinnata. With pinnated branches without joints, and covered with a mealy fubftance. Ellis.

Found on the coaft of the Bahama iflands.

Rubens. Dichotomous, filiform, with the joints of the ftem round; thofe fupporting the divifions clavated, and fome of the lower ones bicornuted. Ellis. *Corallina rubens*, Linn. *Corallina filiformis dichotoma faftigiata, articulis omnibus cylindricis*, Pallas.

Inhabits European feas; length two inches; colour red.

Cristata. Dichotomous, filiform, in crefted clufters, with roundifh joints; thofe fupporting the laft fub-divifions clavated. Pallas.

This kind inhabits the European and American feas. The colour, as in officinalis, varies from red to purple, green, yellow, and white.

Fragilissima. Dichotomous, with fmooth, even, cylindrical joints; thofe at the extremity broadeft at the tip. Linn. *Corallina minimum capillaceum*, Sloane.

This is found in the Weft Indian and Mediterranean feas, and is fo extremely fragile, that perfect fpecimens are very rarely obtained; the colour is milk-white; length about two inches.

Spermophoros. Dichotomous, filiform, with roundifh branches; thofe fupportingthe two laft fub-divifions clavate. Linn., &c.

Inhabits European feas, is of a milk-white colour, and about an inch in length.

Corniculata. Dichotomous, with the joints of the ftem and branches bicornuted; thofe of the fubdivifions roundifh. Linn.

Inhabits the fame feas as the preceding.

Fruticulosa. Dichotomous, with round branches tapering towards the extremities, without joints, and mealy. Ellis and Soland.

There are many varieties of this fhrub-like coralline; the fpecies occurs on the coaft of the Bahama ifles.

Indurata. Dichotomous, with fmooth round fpreading branches, fcarcely jointed. Ellis and Soland.

Found on the fame fhores as the preceding fpecies.

Lichenoides. Dichotomous, with the branches a little rugged and not jointed, the tips dilated and flattened. Ellis. Liver-wort coralline.

This coralline is of a fea-green colour; it inhabits the Bahama iflands.

Rugosa. Dichotomous, with cylindrical branches, hardly jointed, rough, with tranfverfe wrinkles, and compreffed at the tips. Ellis and Soland. *Fucus Marinus*, &c. Sloane.

Found on the coaft of Jamaica.

Marginata. Dichotomous, with fcarcely jointed fmooth flat branches, and raifed margin. Ellis.

This kind occurred on the fhore of one of the Bahama iflands. Mr. Ellis obferves, that though this coralline is found, when dry, on the fhore, more flat than the reft of this kind, it is very probable, when it is frefh taken out of the fea, it is much rounder, the fibres in the infide being extremely delicate, which occafions its fhrinking very much, when the gelatinous fluid is evaporated.

Cylindrica. Dichotomous, with cylindrical and nearly equal fmooth joints. Ellis.

Mr. Ellis received this fpecies of coralline preferved in fpirits, from the Weft Indies, and obferved by that means the internal parts appeared full of a clear gelatinous fubftance. Upon opening fome of the joints, a number of minutely branched tubes were alfo difclofed, and hence this writer concludes, that the tubular-hollow appearance defcribed by authors, proceeds from their having diffected only dried fpecimens.

Obtusata. Dichotomous, with oval-oblong joints, a little compreffed and rounded at the ends. Ellis.

Inhabits the fhores of the Bahama iflands.

Oblongata. Dichotomous, with oblong cylindrical joints, a little compreffed. Ellis

A fpecies allied to the two foregoing corallines, and found on the fhores of the fame iflands.

Lapidescens. Dichotomous, with cylindrical downy branches. Ellis.

This kind is fometimes found trichotomous, or three-branched, inftead of two. In fpecimens juft received from the fea, the furface appears covered with fhort hair-like verticillate down, of a reddifh colour, difpofed in regular circles, one above another.

Barbata. Dichotomous, with fhort cylindrical joints; thofe at the extremity bearded at the tips. Linn.

Inhabits the fhores of Jamaica, and meafures about three inches in length. This is the bearded, or bead-coralline, of Ellis

Rosarium. Dichotomous, with round bead-like joints, thofe of the ftem longeft and cylindrical. Ellis. Rofary coralline.

Nearly allied to the laft, but fpecifically different. A native of the Weft Indies.

Cuspidata. Branches often dividing into four parts, and ending in fharp points; joints cylindrical, and united by a glutinous tendinous fubftance. Ellis.

Found in the Weft Indies; it is very brittle, white, and grows in tufts about three inches high.

Tribulus. Branches often dividing into five; joints two-edged, and united by a glutinous tendinous fubftance. Ellis.

A Weft Indian fpecies, of a whitifh colour, and rather larger than the laft.

Flabellum. Stem fimple, incrufted, with the branches fticking together, in a foliaceous fan-fhaped manner, and fomewhat waved. Ellis.

This coralline is alfo found in the Weft Indies, and varies much in figure, being fometimes of a flat kidney-fhaped form, of about an inch in height, and fometimes expanding to a large fubdivided, lobed, and undulated mafs, from one to five inches broad, and as many in height. At the bottom of the ftalk is a tuft of fine hair-like tubes. There are many kinds of this curious coralline found in the Weft Indies, which vary in colour from a greenifh-brown to a milk white.

Conglutinata. Stem fingle, flightly incrufted, with the branches dichotomous, and agglutinated together, and forming a naked fan-fhaped leaf. Ellis.

Found on the coaft of the Bahama iflands; the colour fea-green, and the height an inch and a half.

Phoenix. Stem fingle, incrufted, terminating in an oblong frond, compofed of diftinct fafciculated branches, produced on all fides, the fub-divifions of which are united together, and appear quite flat. Ellis.

This is the palm coralline of Ellis, a fingular fpecies found on the coaft of the Bahama iflands; it is of a milk white colour, and about three inches and a half high.

Pencillus. Stem fingle, incrufted, terminated by an orbicular tuft of dichotomous, filiform, jointed ramifications. Linn. Pencil coralline. Ellis.

This coralline varies in the thicknefs of its branches, as well as in fize, being found from one to four inches long. In fome the ftem is very fhort, in others four times the length of the head. The joints are eafily diftinguifhed where the branches divide; the ftem is compofed of tubular filaments covered with calcareous cruft; its general colour is white. This fort of coralline adheres to fhells by the bafe of its filaments, and is often found attached to fuch bodies, in large clufters, in the Weft Indian ocean.

Peniculum. Stem fingle, incrufted, and terminated by an orbicular tuft of dichotomous, filiform, jointed ramifications. Ellis, &c. Mop coralline.

This is one of the moft fingular of the coralline genus, and differs from the reft, among other particulars, in having the ftem regularly wrinkled. The ftem is fmall at the bafe, and grows wider as it rifes, till it fends forth its branches at the top; it adheres at the bafe like the fertulariæ, by means of ramofe tubes, which tubes do not leffen as they extend or branch out, but have an equal diameter throughout their whole length. The fpecies is found in clufters in the American feas, particularly near the Bahama iflands.

We muft laftly mention the corallina tereftris of Linnæus, a fpecies, according to that writer, diftinguifhed by having the branches placed oppofite, and the joints cylindrical, with lateral peduncled, and tranfverfely wrinkled fructifications; it is further added, that the fpecies is a few lines high, and inhabits heaths in Friefland. Gmelin admits it as a fpecies of coralline, with fome doubt, and feems uncertain whether to confider it of the animal or vegetable kingdom, and undoubtedly not without reafon, for it has been defcribed by different writers, both as a plant and a coralline. Meefe defines it to be a vegetable of the cryptogamia clafs "Lichen fruticulofus ramofus articulatus, articulis longis cylindricis peltis pedunculatus." But Pallas, on the contrary, inferts it in his work on Zoophytes, as a genuine coralline. "Corallina oppofita ramofa articulis cylindricis, fructificationibus lateribus pedunculatis tranfverfim oblongis." Between two fuch oppofite authorities, it muft be acknowledged it might be improper to form any very conclufive opinion as to the real nature of the article in queftion. Confidering the fituation in which it was faid to be difcovered, we fhould fcarcely hefitate for a moment in concluding that it muft belong to the vegetable kingdom, but then again the decided affertion of Pallas would militate againft fuch an opinion, and the teftimony of fuch an intelligent naturalift is not unworthy of regard. It is fortunate, however, that the accurate Ellis has afforded us much fatisfactory information on this very fubject: the matter is not fo completely elucidated, perhaps, as we might wifh; but his obfervations on the article are remarkable, and deferve to be tranfcribed. "I fhould have taken notice, (fays this writer) of the corallina terreftris mentioned by Linnæus, Syft. Nat. 1306, from other authors; but as I found it a defective fpecimen, of fome one of the trichotomous corallines already defcribed, I muft refer the reader to a full account which I have given of it, in the Philofophical Tranfactions, vol. lvii. p. 415, wherein the abfurdity of a *marine* animal fubftance, growing on a heath many miles from the fea, is, I hope, fully demonftrated." We are hence inclined to fuppofe, that in the courfe of correfpondence between Mr Ellis and Linnæus, the former had obtained an opportunity of examining fome fpecimen of the article in queftion, or at leaft of afcertaining from Linnæus himfelf, what was really meant by his corallina terreftris, and we fhall therefore conclude, that it could not be of the fhrubby lichen kind, as fome imagine, but as Mr. Ellis ftates it, a defective or mutilated fpecimen of the coralline tribe, and in which cafe Linnæus and others muft have been greatly deceived as to its *habitat;* the fpecimen might, indeed, be found on a heath at any diftance from the fea; but, if truly a marine production, no one can be ridiculous enough to conceive it could grow there.

The ancients have faid great things of the virtues of the common *coralline*. Diofcorides prefcribes it for mitigating the pain of the gout, and for preventing ftagnations of the humours in any part; he fays nothing of its virtues againft worms, which are what we alone efteem it for. They have been given in powder from ten grains to a fcruple or half a dram twice a day in thefe cafes, and it has been faid with confiderable good effect. Geoffroy, Mat. Med. vol. ii p. 238.

Although the corallium and coralline are reckoned alkaline and abforbent, they are neglected in the prefent practice as unneceffary.

CORALLINUM Arcanum. See Arcanum.

CORALLO-ACHATES, in the *Natural Hiftory of the Ancients*, the name of a very beautiful fpecies of agate, found at this time in the Eaft Indies, but not in any plenty. It is very hard, and capable of a fine polifh; and, when wrought, is an extremely elegant ftone.

Corallo-dendron, in *Botany*. See Coral-*tree*.

Corallo-fungus, Vaill. See Clavaria.

CORALLOIDE Marble. See Marble.

CORALLOIDES, in *Botany*, Tournef. See Clavaria.

Coralloides, Cord. See Dentaria *enneaphylla* and *bulbifera*.

Coralloides, Dill. See Lichenes *Scyphiferi* and *Fruticulosi*.

CORALLORHIZA, Gmel. Hall. Scop. See Ophrys *corallorhiza*.

CORALLUM, in *Mineralogy*, a name given by some of the writers on these subjects to the common Pyrites.

CORAM, Thomas, in *Biography*, a name worthy of some memorial, as the founder of a new species of charity, was born about the year 1688, and introduced at an early period to the business of the seas. Having spent some years in the service, he settled in the eastern part of the metropolis, and was frequently witness to distressing scenes of children exposed, through the indigence or cruelty of their parents, which excited him to project the foundling hospital; for which he obtained a charter in 1739. This charity has been of much real benefit to society; but its regulations respecting the children seem to require revision, as it should seem, by some late publications on the subject, that for a child to become an inmate there, the parent must be prevented for a long term of years from having the smallest intercourse with her infant, for which she must be supposed to have a tender affection, although unable to support it. Mr. Coram was highly instrumental in procuring a bounty upon naval stores imported from the colonies, and in establishing the colonies of Georgia and Nova Scotia. He died March 29, 1751, in his 84th year, and was buried in a vault under the chapel of the Foundling Hospital, where an inscription perpetuates his memory; but his good deeds will live longer than inscriptions on brass or marble. Biog. Brit.

Coram, in *Geography*, a post-town of America, in Suffolk county, Long island, New York. It has about 60 houses, and lies 62 miles eastward of New York city, and 10 from Smithtown.

Coram *non Judice*, in *Law*, is when a cause is brought into a court whereof the judges have no jurisdiction.

CORAMBIS, in *Ancient Geography*, a town of Ethiopia, near Egypt.

CORANCALI, a people of India, on this side of the Ganges. Ptolemy.

CORANI, a people of Italy, in the country of the Volsci. Pliny gave this name to the inhabitants of Cora; and says, that they derived their origin from Dardanus the Trojan.

CORANITÆ, a people of Arabia Felix. Pliny.

CORANTO, a *Dance*, *Courante*, *Fr*. *Corrente*, *Ital*. &c. It is strange that the *courant* is said by some writers to be the *most solemn* of all dance-tunes; forgetting the *saraband*, and that the word is derived from *currere*, to run. See Courant.

CORAS, John de, in *Biography*, a learned French lawyer, born at Realmont in 1513. He studied law at Toulouse with so much success, that he gave public lectures upon it before he attained to manhood. He was afterwards elected professor of the university of Toulouse, where he taught with so much celebrity that he is said to have had 4000 auditors at one and the same time. He was appointed to the chancellorship under the queen of Navarre; and counsellor in parliament in the reign of Hen. II. He embraced the reformed religion, and lay under the suspicion of being one of the authors of the conspiracy in 1562, to deliver Toulouse into the power of the Calvinists. On this account it was with difficulty that his life was spared. For taking part with the prince of Conde, and other alleged offences, he was apprehended in 1572, imprisoned, and at length assassinated. The works of Coras, consisting of interpretations of the civil law, were printed at Lyons in 1556 and 1558, in two folio volumes. Moreri.

CORASAN, in *Geography*. See Korasan.

CORASIÆ insulæ, in *Ancient Geography*, a name given by Pliny to islands of the Ægean sea.

CORASIUS Mons, a mountain of Asia in Syria, near Antioch.

CORASPHI, or Coraxi, a people of Scythia, on this side of Imaus. Ptolemy.

CORAX, a mountain of Greece, in Etolia, between Naupacte and Callipolis, according to Livy, Ptolemy, and Strabo. It is now a mountain near Lepanto.—Also, a river of Asiatic Sarmatia.—Also, mountains of Asia, between Sarmatia and the Colchide territory, forming the boundary between the countries.—Also, a promontory of Tauric Chersonesus; E. N. E. of Criu Metopon.—Also, a river of Asia *(Carvasiday)* which took its rise in the mountains, ran from N. to S., traversed the country of the Abari, and discharged itself into the Euxine sea, E. of Pytium.

Corax, in *Ichthyology*, the Trigla *hirundo* of Gmelin.

Corax, in *Ornithology*, the *raven*, a species of Corvus.

CORAYA, the name given by Buffon to the Turdus *Coraya* of Gmelin, or *barred tail thrush* of Latham.

CORBACH, in Latin *Corbacum*, in *Geography*, a small town of Germany, in the circle of the Upper Rhine, capital of the principality of Waldeck, which is now enclosed on all sides by the kingdom of Westphalia, and likely to be considered only as a fief of the same.

The town is divided into the Old and New, each of which has its church. There is an excellent gymnasium or grammar school. One of the churches is adorned with a fine marble monument, erected by the republic of Holland to the memory of prince George Frederic of Waldeck, who was a field marshal in the Dutch service. Corbach is situated in N. lat. 51° 17′, forty miles south of Paderborn.

CORBAN, a Scripture term, signifying an oblation, or offering, to God on the altar.

Corban also denotes a ceremony in use among the Mahometans, yearly performed at the foot of mount Ararat in Arabia, near Mecca. It consists in flaying a great number of sheep, and distributing them among the poor.

This festival occurs seventy days after that of Beiram, and like the latter, continues three days; and these two are the only festivals which the Mahometans of the East observe with great ceremony; so that the people do not labour during these three days. The Moors keep each of these festivals eight days; and the emperor of Morocco holds this festival out of the city, that more people may assemble, and he thus preserves the custom which subsists among the Moors, of praying in the open fields, before they were converted to Mahometanism. He leads a slain sheep to his palace by a horseman, and, if the heart palpitates when it arrives there, this is interpreted to be a good omen.

CORBASA, in *Ancient Geography*, a town of Asia, in Carbalia, a country of Pamphylia.

CORBEIAN *MS*. in *Biblical History*, *Codex Corbiensis*, a MS. of the New Testament; of which there are two; one published by Blanchini, and the other by Sabatier. These two MSS. were noted 1. 2. by Griesbach, in his preface, p. 23, 24.

CORBEAU, *Raven* or *crow*, a moveable bridge, that received at the distance of six feet, from one end of it, a round pillar of wood about 12 feet high, and three palms in diameter, fixed or erected on the prow of a vessel with a pully at the top of it. This moveable bridge or stage was about 18 feet long, and 4 feet broad, and was made somewhat in the form of a ladder of strong timbers, laid close

close acrofs, and cramped together with iron. On each fide-lengthways of this bridge or ftage, there was a parapet, which reached juft above a foldier's knee. At the fartheft end of this ftage or ladder, there was a bar of iron in fhape fomewhat like a peftle, but fharpened at the bottom, or brought to a point at the lower end. And connected with the top or upper end of it, there was a ring. To the ring there was fixed a rope, by means of which, with the help of the pulley at the top of the pillar, the machine was hoifted up, and as an enemy's veffel approached let fall on it, fometimes on the prow, and fometimes on either fide, as an opportunity prefented itfelf. The fartheft end of the machine falling with great force, ftruck into the deck of the enemy's veffel, and held it faft. In this fituation, if the two veffels happened to be fide by fide, the Romans, who firft made ufe of fuch means in the fea-fight between them, commanded by Duilius, and the Carthaginians, leaped on board the enemy's veffel from every part of the fide of their own at once. But if the veffels were joined only by the prows, they then went two and two abreaft along the machine, the two foremoft extending their fhields or bucklers right before them to ward off the ftrokes or blows that were aimed at them in front, whilft thofe that followed, refted each of them, the bofs of his buckler upon the top of the parapet on either fide, and thus covered both their flanks. Such were the machines employed on that occafion by the Romans, to which they gave the name of *Corvi*, or *Corbeaux*.

Some French writers give the name of Corbeaux to the machines with long beaks extending beyond the battlements and iron-hands fufpended to them by chains, with which Archimedes, at the fiege of Syracufe, under Marcellus, raifed the Roman veffels erect out of the water, and then, by loofening the chains from the beaks, let them fall into the water fometimes on one fide, and fometimes bottom uppermoft. But it is evident from Polybius's account of thofe machines, that they were quite different from the *corvi* of the Romans, which we have juft given a defcription of. The *corvus* was alfo very different from what thefe writers call the *corbeau a lacs-courans*, the *corbeau a griffes*, the *corbeau demoliffeur*, the *corbeau à tenailles*, and the *corbeau à faux*.

CORBEIL, in *Natural Hiftory*, the name of a curious fpecies of *Chama*. It is of the larger kind, and is deeply ftriated, both longitudinally and tranfverfely; fo that it has a fort of reticulated furface, like bafket-work.

Corbeil, in Latin *Corbolium*, in *Geography*, a town of France, in the department of Seine and Oife, fituated at the confluence of the rivers Seine and Juine or Effonne, which divides it into the Old and New Town, in N. lat. 48° 38′, twenty-four miles fouth of Paris. It is the chief place of a diftrict, and has a fub-prefect and a court of juftice. The inhabitants excel in calico-printing and the manufacturing of glue; they have alfo very good tan-yards. Between Effonne and Corbeil is a larger powder-mill. The diftrict has befides feveral manufactures of cotton and linen, a fugar-houfe, a paper-mill; and in the village of Moulin Galons there is a confiderable manufactory of large copper coppers, kettles, and all forts of tinned copper kitchen utenfils. The population of Corbeil itfelf is 3200; that of the canton, which contains 26 communes upon a territorial extent of 225 kiliometres, is 14,807. The diftrict comprifes four cantons, containing together 56,567 inhabitants upon 697 kiliometres and a half. Corbeil was formerly a county.

CORBEILLES, *Fr.* Bafkets about eighteen inches high, eighteen inches wide at top, and only about nine or ten inches wide at bottom, in order to furnifh loop-holes or openings for men ftanding behind the parapet or work, they are placed on, to fire through without being feen by the enemy. They may be ufed either by the befieged, or the befiegers, on the parapet of the body of a place, or of any of its out-works, and on all kinds of retrenchments, whether they be lines of circumvallation or countervallation, of approach or counter-approach, &c.

Corbeilles, in *Geography*, a town of France, in the department of the Loiret, and diftrict of Montargis; eight miles N. W. of Montargis.

CORBEL, in *Architecture*, the reprefentation of a bafket, fometimes feen on the heads of caryatides.

The word is alfo ufed for the vafe, or tambour, of the Corinthian column; fo called from its refemblance to a bafket, or becaufe it was firft formed on the model of a bafket.

Corbel, or *Corbil*, is alfo ufed, in *Building*, for a fhort piece of timber placed in a wall, with its end fticking out fix or eight inches, as occafion ferves, in manner of a fhouldering-piece. The under-part of the end, thus fticking out, is fometimes cut into the form of a boultin; fometimes of an ogee, and fometimes of a face, &c. according to the workman's fancy; the upper-fide being plain and flat.

Thefe corbels are ufually placed for ftrength immediately under the femi-girders of a platform, and fometimes under the ends of chamber-beams: in which latter cafe they are commonly placed a foot or two below the beam, and have a piece of timber ftanding upright clofe to the wall from the corbel to the beam.

Corbel is alfo ufed by fome architects for a niche, or hollow, left in walls for images, figures, or ftatues to ftand in.

CORBELIN, in *Geography*, a town of France, in the department of the Ifere, and diftrict of La Tour-du-Pin; 30 miles E.S.E. of Lyons.

CORBENY, or St. Marcoul, a fmall town of France, in the department of the Aifne, with a priory of Benedictines, where the kings of France ufed to pray for nine days, after having been anointed at Rheims.

CORBERA, a town of Spain, in the province of Valencia; 20 miles S. of Valencia.

CORBETT, in *Architecture*, is ufed by fome, as Harris, in his Lexicon, for corbel.

CORBEUNTOS, in *Ancient Geography*, a town of Afia, in Galatia, affigned by Ptolemy to the Tectofages.

CORBIA, a town of the ifland of Sardinia, fituated 25 miles from Bos, according to the Itinerary of Antonine.

CORBIANA, or Corbiena, a province of Afia, between Hyrcania and Bactriana, according to Strabo, who fays that it was in the country of the Elymæani.

CORBIE, in Latin *Corbeia*, a fmall town of France, in the department of the Somme, on the Somme, in N. lat. 49° 54′ 32″, one hundred miles north of Paris; it is the chief place and canton in the diftrict of Amiens, and has 1913 inhabitants. The whole canton contains 14,626 inhabitants difperfed in 24 communes upon an extent of 172 kiliometres and a half.

CORBIENA, in *Ancient Geography*, (*Khorrem abad*) a place of Afia, on the banks of the Gyndes, S.S.W. of Ecbatana and N.N.W. of Sufa.

CORBIERES, in *Geography*, a town of Swifferland, and chief place of a bailiwick, in the canton of Friburg; 10 miles fouth of Friburg.

Corbieres, a valley of France near the Pyrenées, celebrated on account of a victory which Charles Martel obtained over the Saracens.

CORBIGNY, or St. Leonard, in Latin *Corbiniacum*, a ſmall town of France, in the department of the Nievre, chief place of a canton in the diſtrict of Clamecy, has 2315, and the whole canton 11,221 inhabitants. The territorial extent of the latter is 307 kiliometres and a half. It is compoſed of 15 communes.

CORBILO, in *Ancient Geography*, (*Coetton*) a port of Gaul, upon the Loire. M. D'Anville places it at a little diſtance from Condivicnum or Nantes to the weſt.

CORBIO, a town of Spain belonging to the Sueſſitani. —Alſo, a town of Latium, whoſe ſituation is unknown.

CORBIVEAU, from *Corbeau*, a raven, in *Ornithology*, an African bird, deſcribed by M. F. le Vaillant, in his "Hiſtoire Naturelle des Oiſeaux d'Afrique, &c." This bird is ſimilar to the raven in the ſhape of his body, his feet, and his claws; his middle claw is united as far as the firſt articulation, by a membrane, to the inner one; and the feathers on the lower part of his beak are turned upwards, and cover his noſtrils; but he is unlike the raven in his back, in the length of his wings, and in his graduated (*etagé*) tail. He appears, ſays the writer, to occupy in part the interval between the genus of the ravens and that of the vultures; though he reſembles the former in a greater degree than the latter. He is ſimilar to the African vulture in the ſize of his wings, which when ſpread are three inches longer than his tail; in his *graduated* tail, in the form of his beak, which is compreſſed ſide-ways, convex above, crooked and rounded. Theſe particulars diſtinguiſh the corbiveau from all the ſpecies of ravens hitherto deſcribed; and this bird may be always aſcertained by the white patch on the nape of his neck, which ſtrongly contraſts with the gloſſy black that conſtitutes the reſt of his plumage; except a white mark which ſeparates the ſides of this white patch on the back of his neck, and encircles the neck. This bird has ſome reſemblance, in point of form, to birds of prey; and his manners and mode of life confirm the reſemblance. Carrion conſtitutes the chief part of his food; and theſe birds frequently aſſemble in large and noiſy crowds. The appetite for fleſh and blood leads him to kill lambs and young antelopes, and to purſue even the largeſt quadrupeds. He flies with great ſtrength, and raiſes himſelf to a great height by his long wings. He conſtructs his neſt, in October, amidſt the trees; and lays four eggs greeniſh, ſpotted with brown. The corbiveau is not a bird of paſſage, but continues the whole year in the country where he was born. The female is leſs than the male, and the black leſs gloſſy.

CORBRENÆ, in *Ancient Geography*, a people of Aſia, placed by Polybius in the vallies of Media, with the Coſſæans and other barbarous nations.

CORBRIDGE, in *Geography*, a place of England in Northumberland formerly a borough, which ſent members to parliament. In 1296 it was burned by the Scots, and in 1311 ſuffered ſeverely from the ſame invaders; 4 miles eaſt of Hexham.

CORBULO, Cn. Domitius, in *Biography*, a diſtinguiſhed commander under ſome of the Roman emperors. By Tiberius he was made ſuperintendant of the highways in Italy. His conduct in this ſituation was queſtioned by ſucceeding ſovereigns. In the year 47, he engaged in military ſervice, and had the command of an army in Lower Germany, among whom he maintained, though at the expence of his humanity, the moſt exact diſcipline. In this commiſſion he was eminently ſucceſsful over the enemies of the empire. By Nero, in 54, he was ſent into Armenia, which was invaded by the Parthians. He employed all his efforts in reſtoring the diſcipline of the legions which had been enervated by the luxury of Syria. A maxim by which his conduct was governed, was, "that an enemy might be conquered with a pick-axe," referring to the labours of entrenchment and fortification, for which the Roman armies were ſo much diſtinguiſhed. No ſeverity, either of ſeaſon or climate, prevented him from keeping his troops in the field; and in ſuffering, as well as in exertion, he was an example to his men, going conſtantly in their clothing, and with his head bare. He never pardoned a deſerter who was apprehended. His various ſucceſſes were important to the government under which he was employed, and will be related under the article Rome. After he had forced the Parthians to an accommodation, he became, on account of the glory attached to his military reputation, an object of ſuſpicion and jealouſy with Nero, who reſolved upon his death. He accordingly ſummoned him to his preſence by a letter filled with the moſt flattering expreſſions of regard. The brave ſoldier ſcorned to ſuſpect the integrity and honour of his infamous ſovereign. He prepared to attend the court, but no ſooner had he reached the port of Corinth, than he met an order to die. Reflecting for a moment upon his own want of prudence and foreſight, he exclaimed, "I have merited my fate by truſting to the profeſſions of the monſter," and inſtantly plunged his ſword through his body. This was in the year 67. He left behind him memoirs of the ſeveral wars in which he had been engaged.

CORBUT, Charles and Philip, two draftſmen and mezzotinto ſcrapers of London, by whom we have ſeveral portraits from different maſters, as well as other prints from Vandyke, Ramſey, Titian, Oſtade, Renolds, Wilſon, &c. Charles Corbut, who was the elder, flouriſhed about the year 1760. Heinecken. Strutt.

CORCANG, or Aljorjaniyah, in *Geography*, a town of Aſia, on the river Gihon.

CORCAS, or Grand Corcas, an iſland almoſt in the form of a creſcent, N. of St. Domingo, in the windward paſſage, about ſeven leagues W. of Turk's iſland, and about twenty E. of Little Inagua, or Heneagua. N. lat. 21° 55′. W. long. 70° 55′.

CORCELET, in *Natural Hiſtory*, that part of the fly claſs which is analogous in its ſituation to the breaſt in other animals. Many have called it the breaſt in theſe alſo, but improperly; becauſe the breaſt of other animals is the place of the lungs and trachea; but theſe organs are in the fly claſs diſtributed through the whole body. The wings are affixed to this part of the fly claſs; and there are ſome diſtinctions of great conſequence, in regard to the arrangement and diſtribution of thoſe animals into genera. Reaumur's Hiſt. Inſect. tom. iv. p. 126.

CORCELLE, in *Geography*, a river of France, which runs into the Arroux near Autun.

CORCHORUS, in *Botany*, a name given by the ancients to one or more of their moſt common pot-herbs. Linn. gen. 675. Schreb. 917. Willd. 1052. Tourn. Cl. 6. gen. 9. Gært. 391. Juſſ. 290. Vent. 3. 207. (Corete. Encyc.) Claſs and order, *polyandria monogynia*. Nat. Ord. *Columniferæ*, Linn. *Tiliaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth five-leaved; leaves linear-lanceolate, acute, erect, deciduous. *Cor.* Petals five, oblong, obtuſe, narrowed towards the baſe, erect, the length of the calyx. *Stam.* Filaments numerous, capillary, ſhorter than the corolla; anthers ſmall. *Piſt.* Germ ſuperior, furrowed; ſtyle thick, very ſhort; ſtyles ſimple or bifid. *Peric.* Capſule from two to ſix-celled, from two to ſix-valved. *Seeds* numerous, angular.

Eſſ. Ch. Corolla five-petalled. Calyx five-leaved, deciduous. Capſule from two to ſix-celled, from two to ſix-valved.

Sp. 1. C. *olitorius.* Briſtly-leaved corchorus, or common

mon Jews' mallow. Linn. Sp. Pl. 2. Mart. 1. Lam. 1. Willd. 1. Comm. Hort. tab. 12. Lam. Ill. Pl. 478. fig. 1. Gært. tab. 64. fig. 2. (C. Plinii; Bauh. Pin. 317. Lob. ic. 505. Melochia; Alp. Egypt. 45. tab. 30.) "Capsules oblong, ventricose; lowest serratures of the leaves bristle-shaped." *Root* annual. *Stem* about two feet high, cylindrical, smooth, even-surfaced, a little branched. *Leaves* alternate, some spear-shaped, some oval, some almost heart-shaped, serrated, with a bristle-shaped reflexed appendage on each side at the base, on long slender petioles; stipules simple, red at the base. *Flowers* small, reddish-yellow; peduncles a line and half long; bractes three, awl-shaped. *Capsules* oblong, somewhat cylindrical or spindle-shaped, two inches long, obsoletely pentagonal, attenuated into a beak at the tip, five-celled, five-valved; cells divided by incompleat transverse partitions. *Seeds* numerous, nearly pyramidal, dark brown, fixed in a double longitudinal row to the central margin of the partitions. A native of Asia, Africa, and America; cultivated as a pot-herb in Egypt, Syria, and other parts of the East, particularly by the Jews. It is said to possess some medicinal qualities, and to be useful as an emollient, a sweetener, and a pectoral. 2. C. *trilocularis*. Linn. Mant. 77. Mart. 2. Lam. 2. Willd. 2, Jacq. Hort. 173. (C. æstuans; Forsk. Desc. 101.) "Capsules triquetrous, three-celled, three-valved; angles bifid, scabrous; leaves oblong; lowest serratures bristle-shaped." *Root* annual. *Stems* a foot high, erect, cylindrical, even-surfaced, green. *Leaves* alternate, petioled, undulate-serrated; stipules bristle-shaped, small. *Flowers* yellow; peduncles nearly opposite to the leaves, short, two-flowered; calyxes angular; petals narrow. *Capsules* linear, triangularly prism-shaped, channelled at each angle, scabrous, obtuse and simple at the tip. A native of Arabia. 3. C. *tridens*. Linn. Mant. 565. Mart. 3. Lam. 3. (C. Americanus angusto barbato folio; Pluk. Phyt. tab. 127. fig. 4.) β. trilocularis; Burm. ind. 123. tab. 37. fig. 2. "Capsules linear, nearly cylindrical, scabrous; lowest serratures of the leaves bristle-shaped." *Stem* even-surfaced, green. *Leaves* lanceolate, marked with lines, undulate-serrated. *Capsules* terminated by the three, much diverging, bifid styles. La Marck received from Sonnerat an East Indian specimen, which seems to be C. trilocularis of Burman, and to be somewhat different from Plukenet's plant. Its leaves are linear-lanceolate, toothed, on short petioles; its capsules grow two or three together, on very short peduncles, and are terminated by three diverging points, which do not appear bifid. 4. C. *æstuans*. Linn. Sp. Pl. 3. Mart. 4. Lam. 4. Willd. 4. Gært. tab. 64. Lam. Ill. Pl. 478. fig. 2. Jacq. Hort. 1. tab. 85. (C. americana carpini folio, fructu longiore; Tourn. 259. Triumfetta subvillosa; Brown. Jam. 232. tab. 25. fig. 1.) "Capsules oblong, three-celled, three-valved, six-furrowed, six-cuspidate; leaves heart-shaped; lowest serratures bristle-shaped." *Root* perennial. *Stem* about a foot high, cylindrical, purplish, with divaricating branches. *Leaves* petioled, oval-heart-shaped or oblong, edged with sharp teeth, the two lowest sometimes, but not always, extended into a long awl-shaped appendage. *Flowers* yellow, small, lateral, two together, on short petioles. *Capsules* terminated by three widely divaricated bifid beaks; valves marked on the inside with obsolete transverse wrinkles, instead of partitions; furnished with a double, crenulate, and somewhat undulated dorsal wing. A native of the West Indies. 5. C. *acutangulus*. Lam. 5. Willd. 5. (Lysimachia; Pluk. Phyt. tab. 44. fig. 1.) "Capsules prismatic-wedge-shaped, acutely angular, three-toothed; leaves egg-shaped, sometimes with a single bristle at the base; petioles hispid." *Root* perennial. *Stem* about a foot high, cylindrical, rather slender, hispid, branched. *Leaves* alternate, on long petioles; stipules five or six lines long, narrow, bristle-shaped. *Flowers* yellow, small, lateral, in pairs, on short peduncles; petals oblong, rather narrow; bractes three, bristle-shaped, often longer than the flower. *Capsules* scarcely an inch long, narrowed towards the base, pentangular, two of the angles more acute and more prominent than the others, terminated by three bifid beaks. A native of the East Indies. 6. C. *capsularis*. Linn. Sp. Pl. 4. Mart. 5. Lam. 6. Willd. 7. Gært. tab. 179. fig. 6. Lam. Ill. Pl. 478. fig. 3. (Alcea sine corchorus; Pluk. alm. 18. tab. 255. fig. 4. Gænia sativa; Rumph. amb. 5. 212. tab. 78. fig. 1.) "Capsules roundish, depressed, wrinkled; lowest serratures of the leaves bristle-shaped." *Root* annual. *Stem* five or six feet high, erect, cylindrical, smooth, branched. *Leaves* five or six inches long, petioled, oval-lanceolate, toothed, thin, pale green above, glaucous underneath. *Flowers* small, lateral, single; calyx-leaves concave, incurved, shorter than the corolla; petals emarginate. *Capsules* short, striated, wrinkled, five-celled, five-valved, (imperfectly ten-celled, ten-valved; five larger cells fertile; five smaller barren, placed between the others near the circumference of the capsule; Gært.) A native of China and the East Indies. A kind of hemp is obtained from the macerated stems, which is much used in China. 7. C. *fascicularis*. Mart. 13. Lam. 7. Willd. 6. Vahl. symb. 3. p. 69. (Euphrasiæ affinis; Pluk. amalth. 85. tab. 439. fig. 6.) "Capsules conoid, woolly, fascicled, nearly sessile; leaves oblong-elliptical, petioled, without bristle-shaped appendages at the base." Lam. *Root* perennial. *Stem* one or two feet high, slender, cylindrical, almost entirely smooth, a little branched. *Leaves* less than an inch long, alternate, toothed; petioles somewhat villous; stipules simple, narrow-lanceolate. *Flowers* yellowish, small, almost sessile, lateral, in fascicles opposite to the leaves. *Capsules* five or six lines long, erect, three-valved, six-celled, furrowed. A native of the East Indies. 8. C. *hirsutus*. Linn. Sp. Pl. 6. Mart. 6. Lam. 8. Willd. 10. Jacq. Amer. 165. Hort. 3. 57. Pict. 81. tab. 157. (Guazuma; Plum. gen. 36. Burm. amer. tab. 104.) "Capsules roundish, woolly; leaves egg-shaped, obtuse, tomentous, equally serrated." Linn. "Leaves elliptical, tomentous, crenate; capsules ovate-oblong, downy, umbelled." Lam. A shrub three feet high, or more; branches alternate, cylindrical, cloathed with a whitish cottony down. *Leaves* alternate, petioled, near two inches long, and one broad. *Flowers* yellow; common peduncles opposite to the leaves, the length of the petioles, solitary, cottony, supporting five or six pedicelled flowers; calyx cottony on the outside; petals scarcely the length of the calyx. *Capsules* a little incurved, very woolly, obtuse, two-celled. A native of South America. 9. C. *tomentosus*. Thunb. Fl. Jap. 228. "Capsules oblong, woolly; leaves tomentous." Thunb. *Stem* shrubby, cylindrical, erect, two feet high, and more; smooth, purple, branched; branches alternate; at the bottom purple and smooth; at the top tomentous, erect, wand-like; branchlets filiform, spreading, tomentous. *Leaves* alternate, petioled, nerved, spreading; petiole very short, tomentous. *Flowers* orange-coloured, axillary and terminal, generally solitary. *Capsules* cylindrical, woolly. A native of Japan. La Marck asserts that it is distinct from the preceding. 10. C. *hirtus*. Linn. Sp. Pl. 5. Mart. 8. Lam. 9. Willd. 13. Jacq. Hort. 3. tab. 58. (C. folio ulmi major; Plum. Sp. 7. Burm. Amer. tab. 103. fig. 2.) "Capsules oblong, hairy; stem hairy; leaves oblong, equally serrated." *Root* annual. *Stem* about two feet high, cylindrical, rather slender, branched. *Leaves* alternate, unequal at the base, on short hispid petioles; stipules narrow,

very hifpid. *Flowers* yellow; peduncles and calyxes hifpid; petals oblong, fhorter than the calyx, obtufe, narrowed a little towards the bafe; ftamens yellow, the length of the petals; germ oblong, columnar, hifpid, with whitifh hairs directed upwards; ftyle filiform, the length of the ftamens; ftigmas two, not fpreading. *Capfule* near an inch long, two-furrowed, two-valved. *Seeds* fmall, black. A native of the Weft Indies, and South America. 11. C. *filiquofus.* Linn. Sp. Pl. 1. Mart. 9. Lam. 10. Willd. 14. Jacq. Hort. 3. tab. 59. (C. folio ulmi minor; Plum. Sp. 7. Burm. Amer. tab. 103. fig. 1. Corchoro affinis; Sloan. Jam. 50. hift. 1. 145. tab. 94. fig. 1. Coreta foliis minoribus; Brown. Jam. 147.) "Capfules linear, compreffed, two-valved; leaves lanceolate, equally ferrated." *Root* perennial. *Stem* about two feet high, almoft woody, erect, flender, cylindrical, panicled, fomewhat pubefcent. *Leaves* fmaller than thofe of the preceding fpecies, without awl-fhaped appendages at the bafe, on rather long petioles, which are pubefcent on one fide. *Flowers* yellow, lateral, peduncled, folitary or in pairs; germs cloathed with fhort hairs. *Capfules* nearly fmooth, two-valved. According to Linnæus, the fpring flowers are without petals, tetrandrous, with a four-leaved calyx; but thofe produced in autumn, correfpond with the generic character. A native of the Weft Indies. 12. C. *japonicus.* Mart. 7. Lam. 11. Willd. 11. Thunb. Fl. Jap. 227. (Teito, vulgo jamma buki; Kæmpf. amæn. 844.) "Capfules round, fmooth; leaves doubly ferrated." *Stem* fhrubby, two feet high or more, fmooth; branches alternate, filiform, angular. *Leaves* feveral together from alternate buds, petioled, almoft heart-fhaped, ovate-acuminate; ferratures acute, almoft briftle-fhaped, nerved, villous, and particularly fo on the nerves underneath. *Flowers* yellow or orange-coloured, terminal, folitary, on fhort peduncles. A native of Japan, where it is cultivated on account of its beauty. There is a variety with double flowers. 13. C. *tetragonus.* Mil. Mart. 10. (C. flore flavo fructu caryophylloide; Pluk.) "Capfules quadrangular, reflexed at the points; leaves ovate-heart-fhaped, crenate." *Stem* about two feet high, with fmall branches. *Flowers* pale yellow, very fmall. *Capfules* fwelling, rough, about an inch long, flattened at the top. A native of both Indies. 14. C. *linearis.* Mil. Mart. 11. "Capfules linear, compreffed, two-valved; leaves lanceolate, ferrate toothed." *Stem* three feet high, with weak branches. *Leaves* about three inches long, and one broad, fitting clofe to the branches. *Flowers* pale yellow, very fmall, oppofite to the leaves, folitary. *Capfules* two inches long, flat, two-celled. A native of New Spain, about Carthagena. 15. C. *bifurcatus.* Mil. Mart. 12. "Capfules linear, compreffed, with two horns at the points; leaves heart-fhaped, ferrated." *Stem* between three and four feet high, herbaceous, ftrong, with upright branches. *Leaves* on long flender petioles, and between them many fmaller leaves, nearly of the fame form, fitting clofe to the branches. *Flowers* pale yellow, very fmall, lateral, on fhort peduncles. *Capfules* near three inches long, flat, ending in two horns, two-celled. A native of Jamaica; raifed from feeds fent to Miller by Dr. Houfton. 16. C. *flexuofus.* Mart. 14. Willd. 12. Thunb. in Linn. Tranf. 2. 335. "Leaves doubly ferrated, cufpidate; ftem zig-zag." *Stem* cylindrical, rendered fomewhat angular by the decurrent leaves, two feet high, erect, fmooth. *Leaves* two inches long, alternate, petioled, obliquely heart-fhaped, villous, fpreading. *Flowers* yellow, terminal. 17. C. *ferratus.* Mart. 15. Willd. 9. Thunb. ibid. "Leaves oblong, ferrated, cufpidate; branches fmooth." *Stem* erect, fmooth, branched; branches cylindrical, purple, erect. *Leaves* two inches long, alternate, petioled, fpreading; ferratures large, briftle-fhaped at the tip, flightly rough with hairs above, fmooth underneath. 18. C. *fcandens.* Mart. 16. Willd. 8. Thunb. ibid. "Leaves egg-fhaped, briftly-ferrated, oppofite; ftem and branches zig-zag, climbing." *Stem* cylindrical, branched; branches oppofite, divaricated. *Leaves* oppofite, on fhort petioles, rounded at the bafe, acuminate, an inch long. *Flowers* yellow, terminal, folitary. The laft three fpecies are natives of Japan.

Propagation and Culture.—All the fpecies may be raifed from feeds fown in the fpring in a hot-bed, protected by a glafs frame. Soon after they come up, they fhould be tranfplanted into a frefh hot-bed; when they are grown ftrong, they fhould be removed into feparate pots; and if gradually enured to the open air, they may be fhaken out of the pots in June, and fet in an open border, where they will generally flower and ripen their feeds. C. hirfutus muft be kept in a bark-bed in the ftove during winter. Miller.

CORCIA, in *Geography*, a town of the ifland of Corfica; 14 miles N.N.W. of Corte.

CORCIEUX, a fmall town of France, in the department of the Vofges, chief place of a canton, in the diftrict of Saint Dié, with a population of 1143 individuals; that of the canton amounts to 8351, upon $177\frac{1}{2}$ kiliometres; and the number of its communes is 13.

CORCOBA, in *Ancient Geography*, a town fituated on the fouth coaft of the ifland of Taprobana, according to Ptolemy.

CORCOMA, a town of Africa, in Mauritania Cæfarienfis, between Carepula and Lagrutum. Ptolemy.

CORCONIANA MANSIE, a place of Sicily, on the route from Catana to Agrigentum, according to the Itinerary of Antonine.

CORCORAS, a river of Pannonia, which, according to Strabo, paffed before Naupontus, and difcharged itfelf into the Savus.

CORCULUM, in *Vegetable Phyfiology*, is a term ufed by Linnæus, after Cæfalpinus, for the heart, or more properly embryo, of a feed; alluding to its fhape, which, in the walnut, and many other feeds, refembles the animal heart in miniature. It is the moft important and even effential part of a perfect feed, to which all the reft are fubfervient, being the point whence the future plant originates. In unimpregnated feeds it is deficient, or rather abortive; in fertile ones it is clofely connected with the cotyledons, on which it depends for the firft fupplies of nutriment, and other exciting caufes of its evolution. The corculum confifts of two parts: the *roftellum*, or radicle, which, by an unerring law of nature, defcends in order to become the root; and the *plumula*, or feather, which as regularly afcends, and becomes the ftem and leaves. Dr. Darwin ingenioufly accounts for this diverfity of direction in thefe two parts, from the former being ftimulated by moifture, the latter by air; and prefumes that each extends itfelf accordingly where its vitality is moft excited. Other philofophers have explained the fame phenomenon, far lefs happily, on mechanical principles. See COTYLEDON and EMBRYO. S.

CORCULUS, the *little heart*, in *Natural Hiftory*, a name given by authors to a fmall fpecies of *cordiformis*, or *heart-fhell*, of a rofe colour.

CORCURA, in *Ancient Geography*, a town of Afia, in Affyria. Ptolemy.

CORCYRA, (*Corfu*,) one of the Greek iflands, fituated in the Ionian fea, and called, in more ancient times, Drapane, Scheria, and Phæacia. It is faid to have taken its name from that of a nymph, whom Neptune ravifhed in this

this iſland. It is about 45 miles in length, 22 in breadth, and 210 in compaſs. It was famous for the delightful gardens of king Alcinous, who courteouſly entertained Ulyſſes after his ſhipwreck. The ſouthern parts of the iſland are barren, mountainous, and ill provided with water; but the northern coaſt is very fertile in all kinds of delicious fruit, excellent wines, olives, grain, &c.; whence Homer has denominated it the fruitful Scheria. It had anciently two cities of no ſmall note, *viz.* Corcyra and Caſſiope: the former was the metropolis of the iſland, and once very powerful, as appears from Thucydides, and others; the latter is commended by Pliny and Ptolemy as a wealthy and well-built city, but Cicero calls it only a haven.

This iſland is ſaid to have been firſt inhabited by the Phæaces, whence it was called Phæacia; but afterwards the Corinthians ſent hither a numerous colony, B.C. 756. The Corcyrians were, for ſome time, maſters of the ſea. Their government was firſt monarchical; but afterwards they formed themſelves into a republic, and made a very conſiderable figure in the flouriſhing times of Greece. Herodotus informs us (lib. vii. cap. 168.) that they were very powerful by land; but he much blames them for their deceitful conduct, with reſpect to the aſſiſtance they promiſed the Greeks againſt Xerxes: for, being invited by the Athenian and Lacedæmonian ambaſſadors to join them in the common cauſe, they readily engaged to ſend powerful ſuccours, aſſuring them that they would not neglect the ſafety of Greece in ſo imminent a danger; being well apprized, that if the enemy prevailed, they would ſoon be reduced to the condition of ſlaves. The ambaſſadors departed; and the Corcyrians, fitting out a ſquadron of 60 ſhips, failed to the coaſt of Peloponneſus, and having anchored about Pylos and Tenarus, waited in that ſtation to ſee the event of the war, being reſolved to join the victorious party. When they heard that the Perſians were defeated at Salamis, they left their ſtation, and joined the reſt of the Greeks, pretending that they had been prevented by the Eteſian winds from doubling the cape of Malæa, and being preſent at the battle. The Corcyrians ſubmitted to Alexander, and remained ſubject to the kings of Macedon, till they were delivered by the Romans, in the reign of Perſes; from which time they enjoyed their liberty, till the reign of Veſpaſian, when they underwent the common fate of the other Greek iſlands and ſtates both in Europe and Aſia. The Corcyrian ſeditions were proverbial even among the Greeks. See Corfu.

Corcyra *Melæna*, or *Nigra*, ſo called to diſtinguiſh it from the former, an iſland in the Adriatic ſea, on the coaſt of Illyricum. The Cnidians built a town on this iſland. In the war of Illyricum, B. C. 229, the Romans, under the conſulſhip of L. Poſtumius Alberius II. and Cn. Fulvius Centimalus, landed in the iſland, and the Corcyrians delivered up the garriſon of the Illyrians, who had taken poſſeſſion of it under the command of Demetrius of Pharos; and the whole iſland ſubmitted, conceiving that this was the only method of ſecuring themſelves for ever from the inſults of the Illyrians. Upon the concluſion of peace, it was agreed, that Corcyra, as well as ſome other places, ſhould continue in the poſſeſſion of the Romans. This iſland is now called *Curſoli.*

CORCYRIS, a town of Egypt. Steph. Byz.

CORCZYCZ, in *Geography*, a town of Poland, in the palatinate of Volhynia; 46 miles N. of Conſtantinow.

CORCZYN, or Kortschin, a town of Poland, in the palatinate of Sandomirz, on the Viſtula; 48 miles W.S.W. of Sando mirz.

CORD, or Chord, an aſſemblage of ſeveral threads of hemp, cabled or twiſted together by means of a wheel.

The word comes from χορδη, which properly ſignifies an inteſtine, or gut, whereof cords may be made.

Cord *of St. Francis*, a kind of rope adorned with knots, worn by the brothers of the fraternity inſtituted in honour of that ſaint.

Some, as the Cordeliers, Capuchins, Minorites, and Recolets, wear it white; others, as the Pique-puces, black. Its deſign is to commemorate the bonds wherewith Jeſus Chriſt was bound.

Cord, *the ſociety of the*, includes a great number of people beſides religious. To obtain indulgences, they are only obliged to ſay five Paters, five Ave Maries and Gloria Patris, and to wear this rope, which muſt have been firſt bleſſed by the ſuperiors of the order.

Cord *of wood*, a certain quantity of wood for burning; ſo called, becauſe formerly meaſured with a cord.

It is now meaſured, particularly in Worceſterſhire, where the ſame has been regulated by ſtatute, between two ſtakes of wood, four feet high, and eight feet apart; and is to be four feet broad and high, and eight feet long = 128 cubic feet = 4.74 cubic yards = 3.622 ſteres or cubic inches of France = 445.223 cubic links.

Cord *wood* is properly new wood; and ſuch as, when brought by water, comes aboard a veſſel; in oppoſition to that which is floated. All burning wood, not exceeding eighteen inches circumference, is deemed cord-wood.

Cord, in *Geometry*, *Muſic*, *&c.* See Chord, and String.

Cord, *Magical*, an inſtrument in great uſe among the Laplanders, and ſuppoſed to be of great virtues among them. It is a cord or rope, with three knots tied in it. They uſe many magical rites and ceremonies in the preparing and tying of this cord; and when thus prepared, it is ſuppoſed to have power over the winds; and they will ſell, by means of it, a good wind, or at leaſt a promiſe of one, to a ſhip If they untie only one of theſe knots, a moderate gale is to ſucceed; if two, it is to be much ſtronger; and if three, there is to be a ſtorm.

Cord, *Umbilical.* See Umbilicalis *funiculus.*

Cord-*Wood*, in *Rural Economy*, a term applied to the ſmall ſorts of broken-up or other wood, which was formerly ſold by the cord.

CORDA, in *Ancient Geography*, a town of Albion, in the country of the Selgovæ. As this place was ſituated farther to the N.W. than the other towns of the Selgovæ, it is thought to have ſtood on the banks of Loch-Cure, out of which the river Neith ſprings.

CORDAGE, is uſed, in *general*, for all ſorts of ropes and cords, great and ſmall; and more particularly for thoſe that are uſed in the rigging and fitting out of ſmall veſſels. The word is alſo uſed for the art of preparing and manufacturing the ropes, &c. See Cable. See alſo Rope, and Rigging.

The naval cordage of different ages and nations has been formed of very different materials. Thoſe of the earlier ages were probably thongs of hide or leather; the uſe of which was retained by the Caledonians in the third century, and by the nations north of the Baltic in the ninth and tenth centuries. They are even now uſed as ropes in the weſtern iſles of Scotland. Theſe were ſuperſeded in the ſouthern parts of Britain, and on the continent, at an early period, by iron chains. Accordingly we find, that in the maritime and commercial

commercial country of the Veneti, who were intimately connected with the Belgæ of Britain, iron chains were used for cables in the days of Cæsar. However, in the more improved countries of the south, thongs of leather and chains of iron had long given place to the use of vegetable threads; and the art of combining them into strong cords was understood and practised. In this manner the Greeks used the common rushes of their country, and the Carthaginians applied to the same purpose the spartium or broom of Spain. And as all the cordage of the Romans was formed of these materials, at their last descent on our island, the art of manufacturing them would necessarily be introduced with the Roman settlements among the Britons. Under the direction of the Roman artists, their *junci*, or rushes, would be wrought into cordage. Accordingly the remains of old cables and ropes are still distinguished among the British sailors, by the name of "old junk." Moreover, the Roman sails, which, in the days of Agricola, were composed of flax, were afterwards made of hemp; and our own are therefore denominated *cannabis*, or "canvas," by our present mariners. About the same period, the same materials were substituted for the junk of the British cordage; for the use of hempen ropes upon land, and of hempen nets for hunting, was very common among the Romans in the first century. The Indians still make their cordage of the bark of cocoas, and other trees, and of shreds of plants. The cordage of the British navy is made of the Riga or best Petersburg break hemp, and tarred with good Stockholm or Russia tar.

The cordage is said to be *baked*, when, having passed a stove, or other hot place, it is drained of all its moisture. *White* cordage is that not yet pitched. *Cordage pitched in the stove*, is that which is passed through hot pitch as it comes out of the stove. Each quintal of cordage may take up about twenty pounds of pitch. The cordage is sometimes pitched in the thread. For the method of making ropes and different sorts of cordage, see ROPE-*making*.

By 25 Geo. III. c. 56. no person shall use, in the manufacture of any ropes for shipping, (or sell the same,) hemp called sheet chucking, half clean, whale line, or other topping, cordilla, damaged hemp, or any hemp from which the staple part thereof shall have been taken away by the manufacturer, on pain of forfeiting, for the manufacturer, such rope, and treble the value of it; and for the vender, not being the manufacturer, a sum equal to treble its value. For the better distinguishing the quality of such ropes, that which is inferior to clean Petersburg hemp shall be deemed *inferior* cordage, and marked accordingly, by running from one end of it to the other three-tarred mark yarns, spun with turn contrary to that of rope yarn, and also one like tarred yarn in every other rope for the use of shipping; and the maker shall mark or write, on a tally to be affixed on it, the word "staple," or "inferior," (as the case shall be,) and also his name, signed by himself or his attorney, together with the name of the place where manufactured; and in default thereof, shall forfeit 10*s*. for every hundred-weight. And if any such rope-maker shall wilfully or knowingly permit his name to be put to any such ropes, not being of his own manufacture; or if the vender or proprietor, or any other person, mark upon the tally the name of any person, not being the manufacturer, he shall forfeit 20*l*. And if any person shall make any cables of any old or worn stuff, which shall contain above 7 inches in compass, he shall forfeit four times its value. Foreign-made cordage, for which no duties have been paid, belonging to a ship owned by any of his majesty's subjects, resident in Great Britain, or the British colonies, and entering any port in this kingdom, shall be duly entered on oath at the custom-house (standing and running rigging excepted); and before the ship be cleared inwards, the master shall pay the duties, on pain of forfeiting the cordage, and 20*s*. for every *cwt*. of it. Upon the importation of cordage, tarred or untarred, there is a duty payable of 8*s*. 6*d*. *per cwt*., and no drawback allowed upon exportation; and in the port of London there is a farther scavage-rate of 1*d*. *per cwt*. of 112 *lbs*. upon the importation of cable-ropes for cordage.

As to the strength of ropes, or cordage, M. Reaumur takes occasion, in the Memoirs of the Royal Academy, to consider the question, whether a rope composed of several twists, or strands, interwoven, *v. gr.* ten, have more strength to sustain a weight, than the ten twists would have separately, placed parallel over one another; or, which is the same thing, whether, if each twist be capable of sustaining the weight of a pound, the whole cord be able to sustain more than ten?

On the one hand, 1. By virtue of the twisting, the diameter of the rope is made larger than are those of the ten twists together; but it is apparently by its thickness that a rope sustains a weight, or resists a fracture. 2. Twisted strands have not all, as when parallel, a vertical direction with regard to the weight: several of them, and even the greatest part, have oblique directions, and of consequence do not bear all the share of the burden they would otherwise bear. In effect, they are inclined planes that are only pressed with a part of the load.

Hence it would follow, that the surplus of the strength of the twists might be employed in raising a larger weight.

On the other hand, it is true, that, in twisting the strands, some are stretched, and others left more loose; and the new tension given the former, serves to weaken them, and has of itself the effect of a weight: thus they become less able to sustain one so large. Those more lax, on the contrary, evade, in some measure, the action of weight: for the action is distributed equally on the ten supposed equal twists; and if some, by reason of their particular disposition, receive less than their quota, the weight will act more forcibly on the rest, and will break them first, as being more tense; after which, it will easily dispatch the rest, as not being in sufficient number to oppose it.

This is the sum of what can be urged for and against the twisting: to decide between them, M. Reaumur had recourse to experiment. The result was, that, contrary to all expectation, he still found the twisting diminished the strength of the rope: whence it is easily inferred, that it diminishes it the more, as the rope is the thicker. For inasmuch as the twisting diminishes; the more twisting, the more diminution.

The resistance or friction of cordage is very considerable; and by all means to be considered in calculating the power of machines. M. Amontons observes, in the Memoirs of the Royal Academy, that a rope is so much the more difficult to bend, 1. As it is stiffer, and more stretched by the weight it draws. 2. As it is thicker; and, 3. As it is to be more bent; *i. e.* as it is to be coiled, for instance, into a smaller ring.

The same author has thought of ways to prove, in what proportion these different resistances increase: that arising from the stiffness or rigidity occasioned by the weight which draws the rope, increases in proportion to the weight; and that arising from its thickness, in proportion to the diameter. Lastly, That arising from the smallness of the gyres, or pulleys,

pulleys, about which it is to be wound, is indeed greater for fmaller circumferences than large ones, but does not increafe fo much as in the proportion of thofe circumferences.

On this footing, the lofs a machine fuftains by the cordage, being eftimated in pounds, becomes, as it were, a new weight, to be added to that which the machine is to raife. This augmentation of weight will render the cords ftill the more ftiff; which excefs is to be computed as before.

Thus we fhall have feveral fums ftill decreafing; which are to be added together, as in the article of friction; and it will be furprifing to fee what a fum they will amount to. See FRICTION.

Where ropes are ufed in a machine, all the refiftance refulting from their ftiffnefs is to be put together; and all that occafioned by the friction; which will make fo confiderable an augmentation to the difficulty of the motion, that a power which to raife a weight of 3000 pounds, by means of a fixed and moveable pulley, needed only 1500 pounds, muft, according to M. Amontons, have 3942 pounds, on account of the frictions, and the refiftance of the cordage.

CORDAGE, *twice-laid*, is that which is made of caft rigging, as fhrouds, ftays, mooring and other cables, which, if not much worn, will make good ropes for wetting the fides of fhips, worming and woolding for cables, fpun-yarn for feizing, worming for large ftays, feizing for ftrops of blocks, fmall cable-laid ropes for warping fhips, rat-lines, fcaffolding-ropes for dock-yards, &c. When the yarn of this old ftuff is overhauled, a little thin tar fhould be poured on it, which will make it pliable and lie better. The yarn unfit for knotting will pick into oakum for caulking.

CORDATED LEAF, in *Botany*. See LEAF.

CORDAX, in *Antiquity*, a gay fort of dance.

CORDE, MAURICE DE LA, in *Biography*, born at Rheims, where he attained confiderable eminence for his claffical and critical learning, was made doctor of the faculty of medicine, at Paris, in the year 1559. In the courfe of an harangue, before his brethren of the faculty, having cenfured with afperity the manners of the Romifh clergy, and fome of their ceremonies, and fpoken too favourably of the reformed religion, he was feized and thrown into prifon. This happened in the year 1569. An edict of pacification being obtained the following year, he was releafed, and, with the reft of the Huguenots, allowed openly to profefs his religion. He was alfo permitted to practife medicine; but the College, who were firm in the Catholic religion, took from him the place of reader or lecturer. De la Corde was one of the few Huguenots who efcaped the maffacre, which took place on the eve of St. Bartholomew, in the year 1572; and in 1574, he obtained an order from parliament, reinftating him in his rights in the faculty of medicine. He publifhed, in 1574, "Hippocratis Libellus de iis quæ Virginibus accidunt," with Commentaries, 8vo. Parifiis; and in 1584, "Hippocratis de morbis Mulierum, Interpretatio," folio. Haller Bib. Med. Eloy Dict. Hift.

CORDE *a feu*, *Fr.* cord-match, or match of cord, fit for retaining a fmall quantity of fire for a long time, and of furnifhing it, or being lighted up, when wanted.

CORDEAU, *Fr.* a cord made ufe of for meafuring ground. That which engineers commonly made ufe of was divided into toifes, feet, and inches, in order to have the exact openings or magnitudes of angles, and the lengths of lines, which they wifhed to trace or meafure. But as cords fhrink in moift or wet weather, and lengthen in dry, this inequality of extenfion rendered the meafures of the divifions untrue, and not to be depended on. To guard againft fuch errors or miftakes, a chain of iron-wire, not fo liable to undergo alterations with thofe of the weather, was introduced and made ufe of. The French fay, *manier le cordeau*, *prendre le cordeau*, *travailler au cordeau*.

CORDEAU *de campement*, *ou cordeau d'alignement pour le campement*, cord of the encampment, or cord of alignement for the encampment; a long line or cord, divided equally from diftance to diftance, and marked at the points of equal divifions by pieces of cloth of a fcarlet or other vivid colour, in order to be the better feen and perceived. It ferves, in the firft place, to mark and aligne, from the left wing to the right wing, the extent on the front line of the camp for each battalion, company by company; and on which line are the colours and ftandards of the troops that occupy the camp. It then ferves for laying or marking off, on one and the fame right line, the bundles or bells of arms advanced in front of the aforefaid line, about ten paces, or five toifes, or thirty feet, and parallel thereto. The fame operation is performed for the alignement or the tracing out of the rear of the camp. Then the tents are placed, which occupy each about three paces or nine feet, with an interval of three paces between every two of them. About ten paces, or 30 feet, from the rear of the camp is the line for the kitchens or cooking-places for the companies; and about ten paces behind them is the ground for the drums and futtlers. At about 20 paces from this ground are the tents of the fubaltern-officers; and from 10 paces to 20 paces behind them are thofe of the majors and captains, and thofe of the colonels and lieutenant-colonels.

CORDED CROSS, in *Heraldry*. See CROSS-*Corded*. This is a term ufed to exprefs the cordage of a bale; as for example, a bale argent, corded gules.

CORDELIER, a Francifcan, or religious of the order of St. Francis.

The Cordeliers are clothed in thick grey cloth, with a little cowl, a chaperon, and cloak, of the fame; having a girdle of rope, or cord, tied with three knots: whence the name.

The Cordeliers are otherwife called *Minor Friars*, their original name. The denomination Cordelier is faid to have been firft given them in the war of St. Louis againft the Infidels; wherein the *Friars Minor* having repulfed the Barabians, and that king having inquired their name, it was anfwered, they were people *cordeliez*, tied with ropes. The Cordeliers are, to a man, profeffed Scotifts.

CORDELIER, *Order of*, in *Heraldry*. Anne de Bretagne, after the death of her firft hufband, Charles VIII., inftituted this order in 1498, for widow ladies of noble families.

The badge was a Cordelier's girdle argent, and was placed round the efcucheon of their arms. It was alfo worn round the waift, with the ends hanging down. This order, however, foon after the deceafe of the founder, fell into difufe.

CORDEMOI, GERARD DE, in *Biography*, a native of Paris, deftined by his friends for the bar; the ftudies preparatory to which he neglected for the more alluring purfuits of philofophy. On this fubject he wrote fome treatifes, that recommended him to Boffuet, by whofe influence he was appointed reader to the dauphin. For the inftruction of that prince, he ftudied with much affiduity the hiftory of France, and the refult of his labours were publifhed in two volumes, folio, foon after his death, which happened in 1684. This work did not obtain from the French that praife which it juftly merited. By fome Englifh hif-

torians it has been more worthily appreciated; as well on account of the purity of its ftyle, as from the depth of its refearches. M. Cordemoi was elected a member of the French academy in 1675. Befides his Hiftory of France, we have a 4to. volume of his works, publifhed in 1702. In the latter part of his life, he was affifted in his literary labours by his fon Lewis, who was born in 1651, and who became fucceffively a licentiate of Sorbonne, and an abbot in the diocefe of Clermont. He was a voluminous writer, chiefly on theological fubjects; and was confidered among the Catholics as an able advocate of their caufe, againft the attacks of the defenders of Proteftantifm. He was, however, of confiderable fervice to his father, in the latter part of his General Hiftory of France; and, it is believed, wrote the whole of that part which extends from about the conclufion of the reign of Lewis V. to the end of the work. By order of Lewis XIV. he continued that hiftory from the time of Hugh Capet until the year 1660, which he did not live to finifh. He died at the age of 71, in the year 1722. Moreri.

CORDERIE, *Fr.* a rope-yard. A fort of work-houfe or place convenient for making, both for the artillery and veffels, cords, cables, hawfers, &c. In inland towns, the corderies are open and uncovered, and commonly on the rampart, along by the walls; and in maritime towns, or fea-ports, where confiderable armaments are made, they are ufually low buildings, covered, long, and narrow, conftructed near the arfenals and magazines. Thefe laft mentioned corderies have generally, in France, been called *Corderies Royales*, becaufe the moft of them were built and kept up at the expence of the king.

CORDES, in *Ancient Geography*, a river of Afia, in Mefopotamia, which, rifing in the mountains, purfued its courfe to the fouth, and encompaffing the town of Dara, was loft in a gulf near it.

CORDES, BALTHASAR, in *Biography*, born at Antwerp, in the year 1592, belonged to the fociety of Jefuits in the Low Countries, and was doctor of theology at Vienna, where he attained a confiderable fhare of celebrity, as profeffor of that faculty. He was a man of great learning, particularly in Greek literature. His principal works, as editor and author, were, "S. Dionyfii Areopagitæ Opera omnia, Gr. et Lat., cum Scholiis, &c." in 2 tom. fol.; "Expofitiones Patrum Græcorum in Pfalmos," in 3 tom. fol. He died at Rome, in the year 1650.

CORDES, JOHN DE, was born at Limoges, in the year 1570, and at an early age difcovered a confiderable turn for literary purfuits, in which he would probably have been encouraged, but the death of his father obliged him to apply to trade. When he was about 30 years of age, a change of circumftances enabled him to relinquifh bufinefs, and to indulge his original propenfity. He entered himfelf with the fociety of Jefuits at Avignon; but a feries of ill health obliged him to quit their feminary, and to purfue his ftudies privately. He afterwards became a canon of his native place, and a collector of rare and valuable books. He was himfelf an author and editor of confiderable reputation; and after his death, which happened in 1642, his library was purchafed by cardinal Mazarine. He was editor of the works of Hincmar, archbifhop of Rheims; and of the works of George Caffander. He tranflated father Paul's "Hiftory of the Differences between Pope Paul V. and the Republic of Venice;" and likewife Camillo Portio's "Hiftory of the Troubles in the Kingdom of Naples, under Ferdinand I." Moreri.

CORDES, in *Geography*, a fmall town of France, in the department of the Tarn, on the river Ceron; 12 miles N.W. of Alby. It is the chief place of a canton, in the diftrict of Gaillac, and counts 2303 inhabitants. The canton contains 24 communes, upon 185 kiliometres, with 8019 inhabitants.

CORDES *Toulouſianes*, a town of France, in the department of the Upper Garonne; 20 miles N.W. of Thouloufe.

CORDESHAGEN, a town of Germany, in the circle of Upper Saxony, and duchy of Pomerania; 10 miles W. of Coflin.

CORDESSE, a town of France, in the department of the Saone and Loire, and diftrict of Autun; 2 leagues N. of Autun.

CORDEVATO, a town of Italy, belonging to the ftate of Venice, in the country of Friuli; 5 miles N. of Concordia.

CORDEVOL, a river of Italy, which runs into the Piavo, between Bellnno and Feltri.

CORDIA, in *Botany*, (named by Plumier in honour of Euricius Cordus and his fon Valerius, two German botanifts of the fixteenth century, the former author of Botanologicon, feu Colloquium de variis Herbis; the latter of Annotations on Diofcorides, and of a Hiftory of Plants in four books with figures.) Linn. Gen. 256. Schreb. 350. Willd. 396. Lam. Ill. 270. Juff. 128. Vent. 2. 382. (Sebeftena; Gært. 474.) Clafs and order, *pentandria monogynia*. Nat. Ord. *Afperifoliæ*, Linn. *Borragineæ*, Juff. *Sebeftenæ*, Vent.

Gen. Ch. *Cal.* Perianth one-leafed, tubular, or bell-fhaped, toothed or deeply divided. *Cor.* monopetalous, generally funnel-fhaped, fometimes campanulate or wheel-fhaped; tube about the length of the calyx, often enlarging upwards; border erect-fpreading; generally cut into five, fometimes four, fix, feven, or eight obtufe divifions. *Stam.* generally five, fometimes four, fix, feven, or eight, awl-fhaped, inferted into the tube; anthers oblong. *Piſt.* Germ fuperior, roundifh, acuminate; ftyle twice bifid; ftigmas obtufe. *Peric.* Drupe globular or egg-fhaped, growing to the calyx; nut furrowed or pitted, two or four-celled; fome of the cells frequently abortive. *Seeds* folitary, egg-fhaped, acuminate at the fummit.

Eff. Ch. Style twice bifid. Drupe with two or four-celled nuts.

Sp. 1. C. *Myxa.* Affyrian plum. Linn. Sp. Pl. 1. Mart. 1. Poiret in Encyc. 1. Mart. 1. Myxa feu febeften. J. Bauh. Hift. 1. 197. Rai. Hift. 1555. Sebeftena filveftris et domeftica. C. Bauh. Pin. 446. Profp. Alp. Egypt. 30? Cornus fanguinea; Forfk. Egypt. arab. 33. "Leaves egg-fhaped, fmooth above; corymbs lateral; calyxes ten-ftriated." *β. officinalis*; Lam. Ill. 1895. tab. 96. fig. 3. Sebeftena officinalis; Gært. tab. 76. fig. 1. Sebeftena domeftica, feu Myxa; Comm. Hort. 1. 139. tab. 72. Blackw. tab. 398. Prunus febeftena, longiore folio; Pluk. Almag. 306. tab. 217. fig. 3. Vidi-maram; Rheed. Mal. 4. 97. tab. 37. Rai. Hift. 1563. Burm. Flor. ind. 58. "Leaves egg-fhaped, rather acute, unequally ferrated above; calyx fomewhat cylindrical, even-furfaced." *Leaves* like thofe of alder, ferrate-angular, fcabrous underneath. Linn. A middle-fized tree. *Trunk* thick; wood whitifh; bark fcaly, marked with purple lines; branches and branchlets very fmooth and even-furfaced, cinereous, dotted. *Leaves* alternate, petioled, large, narrowed at the bafe, enlarged, rounded, and a little acute at the fummit, entire towards the bafe, toothed or almoft flightly finuated on the upper part; teeth unequal, diftant, acute or obtufe; nerves lateral, oblique, projecting; veins reticulated; petioles fmooth, cylindrical, little more than one-third of the length of the leaves. *Flowers* white, fweet-fcented, in a large, clofe, terminal panicle,

conſiſting of lateral branches with a few ſhort ramifications; calyx green, cylindrical, five-cleft; diviſions of the corolla five or ſix, open, a little reflexed. *Drupe* black, oval, acuminate, ſmooth, pulpy; nut deeply furrowed, perforated; naturally four-celled, but two of the cells generally abortive or quite obliterated. α. a native of Egypt; β. of the Eaſt Indies. Poiret aſſerts that it is not eaſy to determine what was the myxa of Linnæus, and thinks it probable that two ſpecies have been confounded, but though the African and the Eaſt Indian plants differ a little in habit, and in the form of their leaves, he has, for the preſent, conſidered them only as varieties. A more accurate knowledge of their flowers and fruit will be neceſſary before they can be pronounced to be abſolutely diſtinct. The fruit has been eſteemed a valuable medicine in diſorders of the cheſt and urinary paſſages, but is now entirely out of uſe in England. The Eaſt Indians eat it macerated in ſalted vinegar, and reckon it ſerviceable in diarrhœas. An excellent glue is made of the pulp, which is more viſcid than that of the Jujube. 2. C. *lutea.* Lam. Ill. 1897. Poir. 15. "Leaves egg-ſhaped, obtuſe, crenate near the ſummit; corymbs lateral and terminal; calyxes ten-ſtriated." A ſhrub twelve or fifteen feet high; branches zig-zag, ſmooth, cinereous, pubeſcent on their upper part. *Leaves* alternate, petioled, ſcabrous on both ſides, marked on the upper ſurface with ſmall whitiſh joints, a little pubeſcent underneath when young; petioles pubeſcent, half the length of the leaves. *Flowers* yellowiſh; peduncles very ſhort; calyxes whitiſh, ſtrongly ſtriated, four-toothed, a little ſcarious at the edges; tube of the corolla the length of the calyx; border open, with ſix, ſeven, or eight diviſions; ſtamens eight; filaments erect, filiform, villous at the baſe; anthers oval, compreſſed; ſtyle the length of the ſtamens. *Drupe* whitiſh, egg-ſhaped; not terminated by a recurved point, four-celled, two of the cells frequently abortive. Found by Dombey at Huanxa and in the neighbourhood of Lima, where it is very common. La Marck enquires whether it may not be the myxa of Linnæus, excluding all the ſynonyms; but there can be no ground for the conjecture, as Linnæus certainly referred to a plant of the old continent. 3. C. *obliqua.* Willd. 2. Phyt. 1. 4. tab. 4. fig. 1. (C. myxa γ. Poir.) "Leaves roundiſh, heart-ſhaped, nerved, veined, oblique. Nearly allied to C. myxa, but the leaves are quite entire and the calyxes not ſtriated. A native of the Eaſt Indies. 4. C. *monoica.* Willd. 3. Roxb. Coromand. 1. 43. tab. 58. "Leaves roundiſh, egg-ſhaped, toothed, veined, ſcabrous; corymbs axillary, monœcious." *Leaves* three inches long or more, two inches broad, alternate, very ſcabrous, acute; petioles about one-third of the length of the leaves. *Flowers* white, ſmall, in axillary or terminal corymbs, which are ſhorter than the leaves; corolla funnel-ſhaped, with five egg-ſhaped obtuſe diviſions; ſtamens within the tube of the corolla; filaments awl-ſhaped, enlarged at the baſe, anthers lanceolate. *Drupe* yellowiſh, globular, pointed, filled with a glutinous pulp. A native of foreſts on the coaſt of Coromandel. 5. C. *ſerrata.* Juſſ. Poir. 3. "Leaves heart-ſhaped, acutely ſerrated; panicle terminal." *Branches* erect, cylindrical, ſmooth and even. *Leaves* about three inches long and two broad, alternate, petioled, egg-ſhaped, acute or ſomewhat acuminate, irregularly ſerrated, membranous, dark-green above, yellowiſh-green underneath; nerves ſimple, alternate. *Flowers* in a cloſe, ſomewhat conical, panicle, a little leafy at the baſe of its firſt branches, ſmall, white; calyx and border of the corolla five-lobed; ſtamens five. A native of the Eaſt Indies; deſcribed from a dried ſpecimen without fruit in the herbarium of Juſſieu. 6. C. *ſubcordata.* Lam. Ill. 1899. Poir. 4. (Novella nigra, ſeu ſalamari; Rumph. Amb. 2. 226. tab. 75?) "Leaves ſomewhat heart-ſhaped, entire, even on its upper ſurface; calyx cylindrical." A tree. *Branches* ſpreading, tufted, ſmooth. *Leaves* from four to ſix inches long or more, and nearly as many broad, alternate, ſlightly pubeſcent underneath along the principal nerves. *Flowers* in ſhort, looſe, terminal racemes, large, white with a reddiſh tinge; calyx tubular, ſmooth, three-toothed; corolla funnel-ſhaped, wrinkled or plaited; tube at leaſt twice the length of the calyx, much enlarged near the top; border with ſix or ſeven roundiſh lobes; ſtamens ſix or ſeven; anthers verſatile; ſtyle ſhorter than the ſtamens. *Drupe* the ſize of a hazel-nut, four-celled; ſome of them abortive. Diſcovered by Commerſon in the Praſlin Iſlands in the Eaſt Indies. 7. C. *collococca.* Linn. Sp. Pl. 5. Mart. 6. Poir. 5. Willd. 14. (C. ehretioides; Lam. Ill. 1902? C. foliis rugoſis; Brown Jam. 167. Ceraſo affinis; Sloan. Jam. 169. hiſt. 2. 95. tab. 203. fig. 2. Ceraſa americana; Pluk. Phyt. tab. 158. fig. 1.) "Leaves oblong-ovate (cordate-ovate; ſyſt. nat.) quite entire; flowers in corymbs; calyxes tomentous on the inner ſide." A middle-ſized tree. *Trunk* divided near the top into ſpreading branches. *Leaves* alternate, petioled, acute, wrinkled. *Flowers* yellowiſh-green, in looſe ſomewhat-panicled terminal corymbs; peduncles branched, very unequal; corolla funnel-ſhaped, with five deep diviſions. *Drupes* bright red, the ſize of a ſmall cherry, with a ſweetiſh clammy pulp. A native of the Weſt Indies, where the fruit is a favourite food of turkies and other poultry. In Jamaica it is called clammy cherry, or turkey-berry tree. 8. C. *hirſuta.* Willd. 15. (C. colloeocca; Aub. Guian. 1. 219. tab. 86. C. nodoſa; Lam. 1905. Poir. 8.) "Leaves oblong, attenuated both ways, pubeſcent; flowers in terminal and axillary corymbs; peduncles hirſute." *Leaves* narrower than thoſe of the preceding ſpecies. *Stem* and *peduncles* hirſute. *Corymbs* denſe, ſomewhat umbelled, not dichotomous-divaricated. *Fruit* white, oblique, acuminate. A native of Cayenne and Guiana. 9. C. *tetrandra.* Lam. Ill. 1909. Poir. 11. Willd. 16. Aubl. Guian. 1. 222. tab. 87. "Leaves egg-ſhaped, ſomewhat heart-ſhaped, acute, ſcabrous underneath; corymb or cyme terminal; flowers tetrandrous." A tree forty or fifty feet high, with ſpreading branches. *Leaves* eight or ten inches long, three or four broad, alternate, entire or ſlightly undulated, nerved; petioles an inch long. *Flowers* greeniſh; common peduncle forked, dichotomous at the ſummit, and branched; calyx top-ſhaped, with four roundiſh acute lobes; corolla funnel-ſhaped; tube ſhort, border expanding, four-lobed; ſtamens four. *Drupe* whitiſh, round; nuts three or four-celled; ſomewhat oval, wrinkled, enveloped in a white gelatinous ſubſtance. A native of Cayenne and Guiana. 10. C. *tetraphylla.* Lam. Ill. 1908. Poir. 6. Willd. 18. Aubl. 1. 422. tab. 88. "Leaves four in a whorl, inverſely egg-ſhaped, quite entire; peduncles lateral, many-flowered." A ſhrub ſix or ſeven feet high, with knotty branches. *Leaves* nearly ſeſſile, firm, nerved, a little reticulated, ſmooth on both ſides. *Flowers* white, ſeſſile, on long common peduncles; calyx with five acute teeth; corolla funnel-ſhaped; tube narrowed at the baſe; border five-lobed; ſtamens longer than the corolla. *Drupe* yellowiſh, the form and ſize of an olive; not very hard, generally one-celled. A native of Guiana, on ſandy ſoil near the ſea. 11. C. *geraſcanthus.* Linn. Sp. Pl. 2. Mart. 4. Lam. 1903. tab. 96. fig. 2. Poir. 7. Jacq. Stirp. Amer. 43. tab. 175. fig. 16. Brown Jam. 170. tab. 29. fig. 3. "Leaves lanceolate-egg-ſhaped, quite entire; panicle terminal; calyxes tomentous, ten-ſtriated." A conſiderable tree. *Branches* ſpreading, cylindrical, clothed on the upper part with a thickiſh cinereous down. *Leaves* alternate, ſmooth, coriaceous, on ſhort petioles. *Flowers* rather large, white,

white, permanent, ſhrivelling; principal branches of the panicle furniſhed at the baſe with narrow ſeſſile bractes; pedicels ſhort, unequal, three-flowered; calyx oblong, funnel-ſhaped, ſlightly toothed; corolla twice the ſize of the calyx, with four, five, or ſix almoſt oval obtuſe diviſions; filaments faſtened to the tube of the corolla, from the baſe to the middle; anthers incumbent, yellow; germ oblong, ſtriated; ſtyle ſhorter than the ſtamens; ſtigmas thick, obtuſe, yellow. A native of Jamaica, where it is eſteemed one of the beſt timber-trees. 12. C. *flaveſcens*. Poir. 9. Aubl. 1. 226. tab. 89. (C. farmentoſa; Lam. Ill. 1907.) "Leaves ovate-oblong, acuminate, ſmooth, quite entire; racemes lateral; drupes obtuſe." A ſhrub, producing from the roots ſeveral woody, ſarmentous ſtems, eight or nine feet long, ſpreading upon the neighbouring plants and trees. *Leaves* alternate, petioled, nerved, reticularly veined, ſix or ſeven inches long, and three broad. *Flowers* yellowiſh, in lateral racemes, on a rather long common peduncle; calyx with five or ſix deep, roundiſh, acute diviſions; corolla funnel-ſhaped; tube enlarged above the calyx; border with four or ſix round, ſpreading lobes; ſtamens five or ſix; anthers arrow-ſhaped; germ greeniſh. *Drupe* purpliſh; nut enveloped with a dry and firm membrane. *Seeds* affording a glutinous matter. A native of Cayenne and Guiana. 13. C. *ſpineſcens*. Linn. Mant. 206. Mart. 2. Lam. 1904. Poir. 10. Willd. 4. "Leaves egg-ſhaped, acute, ſerrated, ſcabrous; petioles becoming thorns." *Branches* ſtiff, erect, tomentous, ferruginous. *Leaves* alternate, tomentous underneath; petioles very ſhort, jointed, breaking off at the joint when the leaves fall, the part that remains ſharpening into a thorn, as in volkameria. *Flowers* in axillary, ſimple, or bifid racemes, equal in length to the leaf; calyx campanulate, with five obſcure teeth; corolla campanulate, five-toothed, twice the length of the calyx; ſtigmas acute. *Drupes* black, ſeſſile, about the ſize of gooſeberries. 14. C. *toqueve*. Lam. 1911. Poir. 12. Willd. 10. Aubl. Guian. 1. 228. tab. 90. "Leaves cordate-ovate, acuminate, quite entire, villous; racemes compound." A much-branched, ſpreading ſhrub, five or ſix feet high; branchlets brittle, villous, ruſſet. *Leaves* from four to ſix inches long, three or four broad, alternate, nearly ſeſſile, rough and villous above, tomentous and pale green underneath. *Flowers* white, in axillary and terminal racemes; common peduncle long, villous, leafleſs; calyx almoſt tubular, five-toothed; tube of the corolla ſhort; border ſpreading, with five roundiſh lobes; ſtamens five; filaments the length of the corolla; germ a little villous at the ſummit. *Drupe* yellowiſh, fleſhy, one-celled. A native of Guiana. 15. C. *macrophylla*. Linn. Sp. Pl. 4. Mart. 5. Lam. 1901. Poir. 13. Redouté Pict. Muſ. Par. Annals of Muſeum of Nat. Hiſt. vol. i. Annals of Botany, 1. 127. (Colococcus platyphyllus; Brown Jam. 168. Prunus racemoſa foliis maximis; Sloan. Jam. 184. Hiſt. 2. 130. tab. 221. fig. 1.) "Leaves ovate-oblong, villous, veined, very large; racemes forming a corymb; calyx cup-ſhaped." A tree from forty-five to ſixty feet high. *Trunk* never more than ſixteen inches thick; branches cylindrical, villous while young, ſeveral times two or three-forked, diverging, and declined towards the earth. *Leaves* from ſix to thirteen inches long, from three to ſeven broad, alternate, deflected, clothed with ſhort rough ſcattered hairs, entire, or edged with ſmall ſharp teeth; nerves obliquely tranſverſe, prominent underneath; petiole ſhort, cylindrical, channelled. *Flowers* white; calyx oval, villous, with five upright, ſtraight, obtuſe teeth; tube of the corolla cylindrical, entirely villous; ſegments of the border elliptical, deflected, a little curled, rounded at the tip; ſtamens five, longer than the corolla; anthers verſatile, with two cells ſeparated at the baſe, and attached to the filaments by their backs; germ oval, acute. *Drupe* red, ſpherical, about the ſize of a pea, two-celled. A native of Jamaica. 16. C. *ſebeſtena*. Linn. Sp. Pl. 3. Mart. 3. Lam. 1898. tab. 96. fig. 1. Poir. 14. Willd. 5. Bot. Mag. 794. Bot. Rep. tab. 157. (C. foliis ſubrepandis; Jacq. Amer. 42. C. nucis juglandis folio; Plum. Gen. Amer. 105. C. foliis amplioribus; Brown Jam. 202. Sebeſtena ſcabra; Dill. Elth. 341. tab. 255. fig. 331. Caryophyllus ſpurius; Sloan. Jam. 136. Hiſt. 2. 20. tab. 64. Cateſb. Car. 2. 91. tab. 91. Novella nigra; Rumph. Amb. 2. 226. tab. 75. Brown Fl. Ind. 59.) "Leaves egg-ſhaped, ſomewhat repand, ſcabrous; calyx cylindrical." A ſhrub ſeven or eight feet high. *Stems* ſeveral, erect, ſmooth, cylindrical, branched. *Leaves* alternate, on ſhort petioles, ſlightly ſerrated when young, the older ones more or leſs repand, the upper ones entire. *Flowers* deep yellow or ſcarlet, in large terminal racemes; pedicels one, two, or three-flowered; calyx with three diviſions near the top; corolla funnel-ſhaped; border with five oval, obtuſe, crenulate diviſions; ſtamens five; ſtigmas recurved. *Drupe* inverſely pear-ſhaped; nut deeply furrowed. A native of the Eaſt and Weſt Indies. It is not improbable that the above quoted ſynonyms refer to more than one ſpecies; but no botaniſt has hitherto found ſufficiently diſcriminating ſpecific characters. The Eaſt Indian plants have yellow, the Weſt Indian ſcarlet flowers. 17. C. *africana*. Lam. 1896. (C. ſebeſtena β; Poir. Willd. Sebeſtena alpini? Lam. Wanzey; Bruce's Travels, 5. 57, with a figure.) "Leaves roundiſh-oval, entire; panicle terminal; calyxes top-ſhaped; nut of the drupe triquetrous." A tree. *Trunk* dividing into four or five thick branches, about three feet and a half from the ground. *Flowers* ſnow-white, funnel-ſhaped, entire, and folded back at the margin. A native of Abyſſinia. 18. C. *aſpera*. Willd. 6. Forſt. Prod. 109. "Leaves egg-ſhaped, acuminate, rough; flowers in cymes, wrinkled." A native of the iſland of Tongatabu. 19. C. *dichotoma*. Willd. 7. Forſt. 110. "Leaves oblong-egg-ſhaped, ſcarcely crenate; corymbs dichotomous." A native of New Caledonia. 20. C. *ſalviſolia*. Poir. 16. "Leaves ovate-lanceolate, obtuſe, wrinkled, very rough, reticularly veined underneath; racemes lateral." *Branches* ſmooth, ſtriated, cinereous, or yellowiſh, ſomewhat pubeſcent when young. *Leaves* two inches long, one inch broad, alternate, very firm, coriaceous; petioles two or three lines long, ſhort, firm, rough. *Racemes* ſtiff, villous, beſet with whitiſh hairs. Native country unknown, communicated by Dupuis to Juſſieu, and preſerved in his Herbarium. 21. C. *domingenſis*. Lam. 1905. "Leaves egg-ſhaped, entire, rough, whitiſh underneath; panicle terminal; calyxes cylindrical." *Branches* dark brown, thick, angular, very rough. *Leaves* from ſix to eight inches long, four or five broad, alternate, thick, coriaceous, nerved, reticularly veined; petioles almoſt cylindrical, ſhort, thick, very rough. *Flowers* in panicled racemes, ſhorter than the leaves; racemes unequal, erect, cylindrical, ſtiff, ſcabrous, a little pubeſcent; pedicels one-flowered. A native of St. Domingo. 22. C. *lævigata*. Lam. Ill. 1912. Poir. 18. "Leaves egg-ſhaped, veined, ſhining; panicles lateral; ſtamens villous near the baſe." *Branches* ſlender, filiform, cinereous, cylindrical, knotty. *Leaves* alternate, petioled, rather ſmall, quite entire, obtuſe, or a little acute, narrowed at the baſe, coriaceous, ſmooth on both ſides, reticularly veined. *Panicles* ſhort, but longer than the leaves, ſmooth, branched; calyxes ſmooth, ſhort, ſtriated; corolla open, ſomewhat campanulate; border five-lobed. A native of the Weſt Indies. 23. C. *ſenegalenſis*. Juſſ. MSS. Poir. 19. "Flowers tetrandrous; leaves membranous, egg-ſhaped, acute, ſmooth; racemes ſhort." A tree about twenty feet high. *Branches* dark brown, ſlender, cylindrical, quite ſmooth,

ſmooth. *Leaves* alternate, four or five inches long, about three inches broad, thin, nerved, and reticularly veined; petioles two inches long and more, ſmooth, compreſſed. *Flowers* in panicled racemes, ſcarcely longer than the petioles; pedicels very ſhort, one-flowered; calyx with three diviſions; corolla with four diviſions half way down. Brought from Senegal by Adanſon. 24. C. *exaltata*. Lam. Ill. 1910. Poir. 21. "Leaves egg-ſhaped, acute at the baſe, rough; corymb terminal; flowers quinquefid." A large tree. *Branches* ſmooth, ſtriated. *Leaves* about four inches long and two broad, alternate, quite entire, obtuſe, ſomewhat acuminate, coriaceous, almoſt ſhining; petioles very ſhort, ſtriated, ſlightly compreſſed. *Corymb* a little longer than the leaves; pedicels very ſhort, thick, one-flowered, calyx ſhort, ſmooth, campanulate, with five ſmall acute teeth. *Drupe* globular, the ſize of a pea, two-celled. A native of Guiana. 25. C. *nervoſa*. Lam. Ill. 1906. Poir. 22. "Leaves alternate and oppoſite, ovate-oblong, acuminate, nerved; panicle ſhort; bractes awl-ſhaped." A tree. *Branches* cinereous, thick, angular, rough. *Leaves* from eight to ten inches long, four or more broad, alternate, entire, ſmooth, deep green and ſhining above, pale yellow underneath; nerves ſtrong, oblique, parallel, a little branched or confluent towards the edges of the leaf; petioles very ſhort, thick, knotty at the baſe. Firſt diviſions of the panicle almoſt dichotomous; branches ſhort, thick, almoſt woody, ſmooth; calyxes ſmooth, with five ſhort oval diviſions. A native of Guiana. 26. C. *rotundifolia*. Poir. 23. Ruiz. and Pav. Flor. Peruv. 2. 24. tab. 148. Prunus Sebeſtena; Pluk. Almag. 306. Phytog. tab. 217. fig. 2. "Leaves roundiſh and oval, crenate, ſcabrous; peduncles corymbo-dichotomous." A ſhrub about twelve feet high. *Stems* ſtraight, often almoſt procumbent, cylindrical; branches numerous, very long, ſupple, zig-zag, villous when young. *Leaves* from two to three inches long, and two broad, alternate, petioled, wrinkled, veined, rough, rather hiſpid. *Flowers* yellow, large; calyx tubular, ſtriated, with five ſhort acute teeth; corolla funnel-ſhaped; tube the length of the calyx, dilated at the orifice; border with five plaited, oval, acute diviſions; filaments awl-ſhaped, villous at the baſe; anthers oval-oblong, concave; germ oval, acuminate; ſtyle the length of the ſtamens. *Drupe* whitiſh, half enveloped by the calyx and a viſcid pulp; nut oval, acuminate, five-furrowed, two-celled. The fructification often varies from ſix to eight in the number of its parts. A native of Peru, in dry ſandy ground, and by the ſides of the roads. 27. C. *dentata*. Poir. 24. "Leaves egg-ſhaped, angularly-cut, toothed; panicle dichotomous, large, divaricated, branches petioled, hirſute." *Branches* a little zig-zag, brown or cinereous, cylindrical, rough, cloathed with ſhort ſtiff whitiſh hairs. *Leaves* from three to five inches long, from two to four broad, alternate, rough with ſmall whitiſh points and deep green above, paler and yellowiſh underneath; ſome ſcarcely toothed, others moderately cut, a little angular, with ſhort acute teeth; nerved and reticularly veined; petioles about an inch long, ſlender, cylindrical, villous. *Flowers* white, almoſt campanulate; panicle terminal; ramifications numerous, growing gradually ſhorter, ſtiff, pubeſcent; pedicels very ſhort, one-flowered; calyx ſhort, almoſt campanulate; tube of the corolla ſhort, dilated at the orifice; border large, very open, with five or ſix very ſhort lobes. A native of Curaçao. 28. C. *micranthus*. Mart. 11. Poir. 25. Willd. 12. Swartz. Prod. 47. Flor. Ind. Occid. 1. 460. "Leaves elliptical, acute, entire, membranous, veined; racemes compound, looſe." *Branches* cinereous, a little twiſted, wrinkled, ſmooth. *Leaves* alternate, coriaceous, quite entire, deep green and almoſt ſhining above, paler underneath, obtuſe or ſomewhat acuminate; petioles ſhort, ſtriated. *Flowers* very ſmall; calyx very ſhort, ſmooth, ſtriated. A native of Jamaica on woody mountains. 29. C. *ſinenſis*. Lam. 1914. Poir. 26. "Leaves oblong, obtuſe, villous at the axils of the nerves; panicles ſhorter than the leaves." *Branches* ſlender, filiform, ſmooth, ſomewhat ſtriated, cylindrical, ſlightly compreſſed near the ſummit. *Leaves* two or three inches long, half an inch broad, alternate, quite entire, a little narrowed at the baſe; petioles filiform, leſs than an inch long, ſmooth. *Flowers* whitiſh, in lateral and terminal panicles; calyx whitiſh green, ſhort, open, campanulate after the time of flowering, ſmooth, four or five-lobed, obtuſe at its orifice; corolla funnel-ſhaped, lobed, about twice the length of the calyx. *Drupe* ſmall, oval, nut two-celled. A native of China. 30. C. *indica*. Lam. Ill. 1913. Poir. 27. "Leaves egg-ſhaped, petioled, naked; flowers panicled; tube of the corolla entirely concealed in the calyx." *Branches* ſmooth, cylindrical, long. *Leaves* from one to four inches long, from one to two broad, alternate, quite entire, obtuſe or ſomewhat obtuſe, membranous, ſmooth, nerved and reticularly veined; petioles an inch and half long, ſlender, ſupple. *Flowers* in long lateral and terminal branched panicles; branches alternate, terminated by ſmall pendulous racemes; pedicels ſhort, unequal; calyx whitiſh, campanulate, ſmooth, lobed and appearing gnawed at the edge, very open after the time of flowering; corolla ſmall; border ſhort, open. *Drupes* ſmall, oval, two-celled. A native of the Eaſt Indies; diſcovered by Sonnerat. 31. C. *elliptica*. Mart. 12. Poir. 28. Willd. 12. Swartz. Prod. 47. Flor. Ind. Occid. 1. 461. "Leaves oblong, attenuated at the tip, entire, ſomewhat coriaceous; racemes compound, diffuſe; drupes acuminate." A large tree with ſpreading branches. *Leaves* alternate, ſmooth on both ſides, ſhining, nerved and veined; petioles ſemi-cylindrical, channelled underneath, ſmooth. *Flowers* white, in terminal racemes, almoſt ſeſſile, unilateral; calyx coriaceous, elliptical, tubular, ſmooth, from two to five-cleft; tube of the corolla enlarged at its baſe, ſcarcely longer than the calyx; border with five linear, lanceolate, reflexed diviſions; filaments bearded; anthers oblong, inclining, glandular at the ſummit; germ oblong; ſtyle cylindrical. *Drupe* about ſix lines long, ſupported by the enlarged very open calyx; nut wrinkled. A native of Jamaica and St. Domingo. 32. C. *patagonula*. Mart. 7. Willd. 17. Hort. Kew. 1. 259. (Patagonula americana; Linn. Sp. Pl. Lam. Ill. 271. Pl. 96. Poir. Dill. Elth. 306. tab. 226. fig. 293.) "Leaves oblong-lanceolate, ſmooth on both ſurfaces; upper part ſerrated; branchlets hairy." A ſhrub, with the habit partly of privet and partly of alaternus. *Stem* ſtraight, cinereous, ſpotted with white; ends of the branches covered with long hairs. *Leaves* alternate, obtuſe or acute, entire and narrowed into a petiole at the baſe. *Flowers* in a kind of terminal corymb; calyx very ſmall, but much enlarged after the time of flowering, with five deep diviſions; corolla wheel-ſhaped; tube very ſhort; border flat, with five oval acute diviſions; filaments five, as long as the corolla; anthers ſimple; germ oval, acute; ſtyle permanent, the length of the ſtamens. *Fruit* an oval, acuminate capſule? A native of Patagonia.

This ſpecies, we believe, was firſt referred to cordia by Mr. Dryander in Hortus Kewenſis. Linnæus made it a ſeparate genus, partly on account of the enlargement of the calyx during the ripening of the fruit; but this is a circumſtance common to other ſpecies of cordia; and partly

on account of the fruit which appears to be a capfule; it is, however, not fufficiently known, and Juffieu doubts whether it be really a capfule.

CORDIA *retufa;* Vahl. Mart. See EHRETIA *buxifolia*.

CORDIA, in *Gardening*, comprifes plants of the flowering fhrubby exotic kind: of which the fpecies moftly cultivated is the febeften or rough leaved cordia. (C. *febeftena*.) See the preceding article. It is of a beautiful fcarlet colour, making a fine appearance. A fmall piece of the wood thrown on a pan of lighted coals perfumes the whole houfe with a moft agreeable fmell. It is faid to be from the juice of the leaves combined with that of the fruit of a fpecies of fig, that the fine red colour with which they dye their cloths in Otaheite is manufactured.

Method of Culture. This is a plant which is raifed by fowing feeds obtained from the Weft Indies as foon as poffible after they arrive, in pots of light earth, plunging them in a common hot bed or bark bed, and when the plants have two or three months' growth pricking them out fingly in fmall pots, replunging them in the hot bed, to forward their rooting afrefh; being afterwards conftantly continued in the ftove or hot houfe. They require frequent watering in the fummer feafon.

Thefe are plants which are very ornamental in ftove collections, where they can only be kept.

CORDIAL. See CARDIAC.

CORDIAL *waters*. See *Compound* WATERS.

CORDIERI, NICCOLO, in *Biography*, called likewife by the Italians Il Franciofino, becaufe a native of France, was born in Loraine in the year 1567. He came to Rome in his childhood, and applied himfelf with unremitting affiduity to the ftudy of defign and modelling, as well from the fineft remains of ancient art, as from the life. He foon became a fculptor of confiderable ability and eminence, infomuch that he was more than once honoured by the vifits of the pontiffs Clement VIII. and Paul V. while at work. Amongft his principal performances, which are enumerated by Baglione, are four large ftatues in a chapel at Santa Maria Maggiore, reprefenting David, Aaron, St. Bernardo, and St. Athanafius. This artift died at Rome in the year 1612, and was buried at the church of the Trinita del Monte. Baglione.

CORDIERS, Fr. rope-makers. There is an immenfe number of them employed in France for the ufe of the artillery. But there was a certain clafs of them who enjoyed barracks under part of the fortification of the arfenal on the river Seine and had the privilege of working there, under the walls of the arfenal, on condition of being always in readinefs to furnifh cordage for the artillery.

CORDILLERAS, in *Geography*. See ANDES.

CORDON, in *Fortification*, is a row or layer of ftones, rounded on the outfide towards the ditch, and placed between the termination or upper part of the flope of the wall or revetement, and that part of it, which is on the outfide of the parapet and ftands perpendicularly. The cordon ferves to prevent this difference between the lower and upper part of the revetement, from being offenfive to the eye, and is at the fame time ornamental.

The cordon of the revetement of the rampart is often on a level with the terre-plain of the rampart. Certain writers are of opinion, that it might be placed to more advantage fome feet lower, particularly when there is a wall in front of the parapet, and a fpace between them for going the rounds and fhielding them from the enemy's fire.

CORDON, in *Military Operations* and *Hiftory*, is a chain of pofts, or an imaginary line of feparation, between two armies either in the field or in winter-quarters, or for covering a particular frontier or tract of country.

CORDON, in *Geography*, a fmall ifland in the Pacific ocean, near the weft coaft of Nicaragua, at the entrance of the bay of Realejo.

CORDON-JAUNE; the order of, or of the yellow ftring, in France, was inftituted by the Duke de Nevers in 1606, and abolifhed the fame year by Henry IV. of France.

CORDON, in *Ornithology*, a name given by Buffon to the AMPELIS *cotinga* of Gmelin, and the purple-breafted chatterer of Pennant and Latham.

CORDONA, or CARDONA, in *Geography*, a mountain of Valentia in Spain, is compofed entirely of rock-falt, 4 or 500 feet high and about 3 miles in circumference: Mr. Bowles informs us, that there are no traces of gypfum near this mountain, as in moft fimilar inftances is the cafe. In the climate of Spain, this mafs of falt remains undiffolved by the rains, or the waters of a river which wafhes it. Mr. Townfend carried a fragment of this falt with him through Spain, without the leaft fign of deliquefcence, but on his return to England he foon found it furrounded by a pool of water, owing to the coldnefs and humidity of our atmofphere. In Spain this rock-falt, like the fluorfpars of Derbyfhire, is employed to make fnuff-boxes, vafes, and other ornaments and trinkets.

CORDOVA, ADRIANO *of*, in *Biography*, fo called from the place of his nativity, a confiderable town in Spain, was a barefooted Carmelite who applied himfelf to hiftorical painting with fuccefs. It is regretted, however, that from a too great modefty or diffidence of his own powers, he was induced to deface fo many of his pictures as foon as he had finifhed them. The few that remain are at Cordova, the moft remarkable of which is a Crucifixion with St. John, Mary Magdalene, and other figures of half length, in the manner of Rafaele Sadelen, in the convent of the Carmelites. This artift died at Cordova in the year 1630. Cumberland.

CORDOVA, or *Cordoua*, in *Geography*, a city of Andalufia in Spain, forming a kind of femi-circular amphitheatre on the right bank of the Guadalquivir, in an extenfive and fertile plain at the foot of that ridge of mountains, named the Sierra Morena, 84 miles N.E. of Seville; 112 N. of Malaga; 210. S.W. of Madrid, in N. lat. 37° 40′. It is the ancient *Corduba*, the firft Roman colony in Spain, and probably on that account called *Colonia Patricia*, or fimply *Patricia*, as appears from an infcription on an antique marble in the church of St. Marina:

D. M. S.
M. Lucretius. Verna Patricienfis. Ann. LV.
Pius in Suos. H. E. S.
Sit T. T. Levis.

Cordova has been ftyled the mother of men of genius. From the very foundation of this city it was the feat of learning and fciences. Strabo fays, that the ancient books of the Turdetani, their poetry, and their laws written in verfe, were preferved at Cordova. Its academy was celebrated for rhetoric and philofophy; it had alfo a Greek profefforfhip. The elder Seneca, and Lucius Annæus Seneca, preceptor to Nero, were born at Cordova, as well as Lucan the poet, whofe grandfather Acilius Lucanus, celebrated for his eloquence, ftudied here. So did Gallio, another famous orator; Portius Ladro, of whofe works there remains one harangue; and Manclus, mafter of the elder Seneca. Tully, in his oration for the poet Archias, mentions

tions feveral poets of Cordova who were eftablifhed at Rome among others, Sextilius Henna, of whofe writings there is only one elegy extant, in which he laments the death of the Roman orator.

After the fall of the Roman empire, Cordova was fubject to the dominion of the Goths, until the Gothic monarchy of Spain was overthrown by the Saracens, under the command of Tarik. A Roman captive and profelyte who had been enfranchifed by the caliph of Damafcus, affaulted Cordova with feven hundred horfe. He furprifed the town, and drove the Chriftians into the great church, where they defended themfelves above three months; and of all the Spanifh military chiefs the governor of Cordova is recorded as the only one, who fell, without conditions, a prifoner into the hands of the Saracens.

Abdelaziz, the fon of Mufa, to whom the adminiftration of Spain, under the caliph of Damafcus, was confided, conceived the defign of erecting an independent throne at Cordova; but no fooner was a fufpicion of his intentions diffufed than a powerful confpiracy was formed againft him. As he was repairing alone to the mofque of Cordova, he was attacked and murdered by the confpirators.

On the affaffination of Abdelaziz, Ayub affumed the adminiftration of Spain. He was foon removed by the fuperior favour or merit of Alahor, who, like Abderame one of his fucceffors, vainly attempted the conqueft of the weft.

Under twenty fucceffive lieutenants of the caliphs, Spain imbibed, in a few generations, the manners of the Arabs; and by affuming the name of Spaniards, the Arabs afferted their original claim of conqueft.

In the mean time the rival houfes of Ommijah and of Abbas, the uncle of Mahomet, convulfed the eaft by their pretenfions, from the Indus to the Euphrates. Their conteft was decided on the banks of the Zeb. Mervan XIV., and laft caliph of the houfe of Ommijah, was forced to yield to the enthufiafm of the Abbaffides, conducted by Abdallah the uncle of his competitor. The vanquifhed caliph croffed the Euphrates, and without halting in Paleftine, pitched his laft camp on the banks of the Nile, where he was attacked by Abdallah, and the lance of an Abbaffide terminated the reign and life of Mervan.

In the profcription of the Ommiades, a royal youth of the name of Abdalrahman alone efcaped from the rage of his enemies, and was received on the coaft of Andalufia with open arms. The Arabian chiefs, who reverenced the memory of the immediate fucceffors of Mahomet, drew their fabres in his fupport. The defeat of the Zeb was avenged on the banks of the Guadalquivir; that river was fwelled with the bodies of the flaughtered Abbaffides; and the throne of the victorious Abdalrahman was eftablifhed at Cordova in the year 755 of our era.

During a profperous reign of thirty years, Abdalrahman I. encouraged agriculture, commerce, and the arts. Cordova became the centre of induftry, of politenefs, and of genius. His fon Haffam, who fucceeded him, not only patronized, but was even a proficient in the arts. He finifhed the famous mofque, which had been begun by his father, and threw over the Guadalquivir a bridge which remains a lafting monument of his fkill.

Under the fecond Abdalrahman a perpetual fupply of pure water was conducted through pipes and aqueducts into the heart of Cordova, and numerous mofques augmented its magnificence.

Learning flourifhed under Alkaham the fecond. He founded the univerfity of Cordova, and the birth-place of the Senecas, and the Lucans, afferted again its pretenfions to literary fame. He collected fo immenfe a quantity of manufcripts, that before the end of his reign the royal library is reported to have contained the almoft incredible number of fix hundred thoufand volumes, of which the catalogue alone filled forty-four.

But the pomp of the third Abdalrahman, who reigned from the year 912 till 961, appears ftill more incredible. His wives, concubines, and black eunuchs, amounted to fix thoufand three hundred perfons. He was attended to the field by a guard of twelve thoufand horfe, whofe belts and fcimitars were ftudded with gold. To perpetuate the name of his favourite Sultana, he conftructed, three miles from Cordova, the palace and gardens of Zehra or Arizapha. The edifice was fupported by above a thoufand columns of the fineft marble; the walls of the hall of audience were incrufted with gold and pearls. A formidable army fecured the profperity which his dominions derived from his wife adminiftration. The royal city of Cordova contained fix hundred mofques, nine hundred baths, and two hundred thoufand houfes. Eighty large cities, three hundred towns, and twelve thoufand villages obeyed his fway, and yet, in lefs than fifty years after his deceafe, the kingdom of Cordova was diffolved, and the houfe of Ommijah overwhelmed.

His fon, Alkaham the fecond, whom we have already mentioned as the founder of the univerfity of Cordova, died in 976, and left the throne to Haffem his fon, a feeble infant, and the reins of adminiftration to the celebrated vizir Mahomet Abenamir, who from his valour acquired the furname of Almanzor or the Defender. He fuccefsfully ftruggled againft civil and foreign commotion, and at his death, his renown was refpected in his defcendants. The office of vizir became hereditary in his family. His fons ruled with a power as abfolute as that of the caliphs; their infolence provoked the ambition of other chiefs; the exclufive pretenfions of the houfe of Ommijah were difregarded, the grandfon of the great Abdalrahman was plunged into a dungeon, and the glory of the throne of Cordova, which under the Ommiades had fhone with fuch a luftre, during a little more than two centuries, was overfhadowed by a long night. The limits of the Saracen dominions gradually receded. Several petty principalities were formed on the ruins of their empire, which was at length confined within the boundaries of Grenada.

In the mean time the univerfity of Cordova preferved for a long period of years the reputation which it had acquired under Alkaham II. It was at Cordova that Avempace and Algazel, two fages mentioned by St. Thomas, taught moral philofophy; that Alial Cohacen and Alieben Rezel acquired their profound erudition; and that Abenzuel, the great aftrologer and phyfician, furnamed the Wife, received his education. Within its walls were formed thofe thirty philofophers and phyficians, who arranged the works which, under the name of Avicenna, were dedicated to prince Garalai, to whom they have been falfely attributed.

Among the learned Moors, to whom Cordova gave birth, are Albermarcar, Abramo, Mefulco, Rafhez Almanzor, known by a number of curious works, and a hiftory of the conqueft of Spain, Aben Regid who likewife wrote on the divifion and conqueft of Spain, and Averroës, called, by way of eminence, the commentator.

Cordova has preferved nothing of its ancient grandeur, except a vaft enclofure filled with houfes half in ruins. Its population from 300,000, which it was in the time of the Moors, is reduced to 15,000. Its long, narrow, and ill-

paved

paved ftreets are almoft deferted; moft of the houfes are uninhabited; and the multitude of churches and convents which it contains, are befieged by a crowd of vagabonds covered with rags. Although the art of foftening leather and giving a brilliant polifh to its furface was invented here, Cordova has but a few tan-yards. Its induftry is confined to fome manufactures of woollen cloth, ribbands, laces, and hats. Rents and provifions are low; and the value of eftates has fallen one half in the courfe of the century.

The bifhop of Cordova is fuffragan of the archbifhop of Seville. His annual income exceeds 3000*l.* fterling. St. Raphael, the patron of Cordova, has a magnificent gilt ftatue at one of the gates, which forms a fingular contraft with the wretchednefs that reigns within the town.

The only remarkable edifice of Cordova is its famous cathedral, which formerly ferved as a mofque to the Moors, and ftill retains the name of Mezquita. It forms a long fquare of one hundred and fifty-eight paces by one hundred and thirty-eight, and is well lighted, but too low. About fix hundred columns of blackifh marble placed in Quincunx are well preferved; but they do not reach the ceiling; they are fcarcely more than ten or twelve feet high, and have neither bafe nor capital; they are joined to each other by two arches placed one above the other, covered with plaifter, and fupported with ftone work whitened over. The refult of the whole is not altogether agreeable to the eye, and the cathedral is more remarkable for its oddity than for any very ftriking beauties, though nothing would equal its magnificence were the height proportioned to the extent. Its exterior prefents only a maffy and irregular edifice with enormous fquare pillars.

By the fide of the cathedral is a fmall grove, the fafcinating remains of the tafteful luxury of the Moors. It is planted with orange-trees, the tufted foliage of which ferves as an afylum to great numbers of birds, and hangs over feveral fountains which conftantly cool the air.

The ancient palace of the Moors has been converted into ftables, in which one hundred ftallions are ufually kept. Their genealogy is carefully preferved; the name and age of each are written over the ftall in which he ftands. The beautiful horfe of Cordova is reckoned the moft perfect. There is a curious manufcript in the Efcurial marked D.CCC.XCVII on horfes and horfemanfhip, written by a Moorifh general, and dedicated to the third king of the race of Benneffaret, who reigned in the year 1301.

The country round Cordova abounds in oranges and lemons, and produces excellent wine. Gibbon's Rome. J. Talbot Dillon's Travels through Spain, fecond edit. 4to. London, 1782. Bourgoing's Tableau de l'Efpagne. Peyron's Effays on Spain. F. A. Fifcher's Travels in Spain, in 1797 and 1798.

Archbifhop Roderic Ximenes, in his "Hiftoria Arabum," informs us, that Cordova was paved fo early as the middle of the ninth century, or about the year 850, by Abdalrahman II. the 4th Spanifh caliph. This prince, who knew the value of the arts and fciences, and who favoured trade fo much, that in his reign abundance prevailed throughout the whole land, caufed water to be conveyed into this city, which was then his capital, by leaden pipes, and ornamented it with a mofque, and other elegant buildings.

Cordova, a province of South America, being, by the new divifion of 1782, an intendency of the viceroyalty of Buenos Ayres, about 100 leagues in length, and 70 in breadth, interfected by feveral chains of mountains, and watered by feveral rivers. This diftrict is chiefly celebrated for woollen manufactures, being feated on the eaftern fide of a grand and high branch of the Andes.

Cordova, a neat clean town, in the above-mentioned diftrict, diftant 156 miles from Buenos Ayres, and pleafantly fituated near a wood, at the foot of a branch of the Andes. This town was founded about the year 1550, by Juan Nunez de Prado; and in 1570 erected into an epifcopal fee. Its chapter confifts of the bifhop, dean, archdeacon, chantor, rector, and treafurer; but it has neither canons nor prebendaries. Cordova is fituated between the river Primero, fo called becaufe it is the firft of five in the neighbourhood, which flow in the fame direction, and a hill, on a level but fandy foil, fo that the rains fpeedily pafs, though the vapours be unwholefome. The city approaches a fquare form; but the cathedral is irregular, from the want of fymmetry in the towers. There are many good and ftrong houfes in the city, but feldom high, though the roofs be elevated; and there are three convents, and two colleges, one of which the Francifcans have abfurdly ftyled the univerfity. Few places of equal extent can difplay equal wealth; all the inhabitants, Spaniards as well as Creoles, being noted for activity and induftry. The chief trade is in mules, which are brought from the fouthern provinces; and having fed them in the fields, they conduct them to the fair of Salta, where they are fold to merchants from Peru, at 8 or 10 dollars each; but fome fend them, on their own account, to be fold in the Peruvian markets, the value being proportioned to the diftance. The inhabitants may be 600; and the flaves, moftly of different mixtures, do not procure their freedom fo eafily as in other parts of America. As meat is very cheap, and the flaves weave and make their own clothes, they are at once eafily maintained, and very ufeful; nor do they wifh for freedom, being neither fatigued nor oppreffed. The female flaves are excellent wafher-women, and go into the river with the water above their middle; nor are they deficient in other kinds of induftry. The ladies of Cordova are meanly clothed, and careful obfervers of the cuftoms of their anceftors; whence the flaves are not permitted to wear any cloth but that manufactured in the country. The wine, and a confiderable part of the grain, are procured from Mendoza; while brandy is brought, in leathern bags or bottles, from S. Juan de la Frontera, 30 leagues to the N.W. of Mendoza, on the northern extremity of the province of Cuyo. N. lat. 31° 30′. W. long. 63° 15′.

Cordova, *Mountains of*, are a chain paffing N. and S. on the W. of that province, regarded by fome as a branch of the Andes, and faid to be covered with perpetual fnow. Thefe mountains, according to Helms, fometimes prefent red and green granite, and gneifs, while the grand chain of the Andes confifts of argillaceous fchiftus. As the ridge of mountains becomes gradually higher, the population increafes; but at Ramaufo, 60 miles from Cordova, they again branch, and fo far from one another, that from that place to Tucuman the traveller paffes through a faline plain, 70 Spanifh miles in length, and for the moft part barren and defart, from which the mountains are feen at a diftance. The whole ground is covered with a white incruftation of falt; and bears no plants except the "falfola kali," which grows here to the height of four Parifian yards. The decayed town of "St. Jago de Eftero" is fituated in this plain.

Cordova, a confiderable town of North America, in Mexico, the chief article of its trade being fugar, for which it has 33 mills. Eftalla fays, there are 260 families of Spaniards, 126 of Meftizos, and 273 of Mexican Indians. Thiery defcribes Cordova as a large town, with numerous domes, towers, and fteeples, and a large fquare in the centre, with

with Gothic arcades on three fides, the cathedral filling the fourth, and a fountain of delicious water in the middle. The ftreets are wide, ftraight, and paved, and the houfes moftly of ftone; but the inhabitants are indolent. The fituation is in a kind of natural paffage towards the province of Mexico; the vegetation being rich and beautiful, on a foil of red clay, from 10 to 15 feet in depth, producing all the fruits of the two hemifpheres. N. lat. 19° 15′. W. long. 97° 40′.

Cordova, *New*. See Cumana.

CORDOUAN, *the Tower of*, an extremely well-conftructed pharos or light-houfe, at the mouth of the river Gironde, in France; 66 miles N.W. of Bourdeaux, and 15 miles S.W. of La Rochette; in N. lat. 45° 35′ 15″. It was rebuilt by Louis XIV. in the year 1665. The formidable mafs of rocks on which it ftands is formed by the reefs that fkirt the fhore. The tower itfelf is 160 feet high, the great lanthorn 15; and from 200 to 350 pounds of pit-coal are confumed in it every night. The watchmen are generally relieved every fortnight; they take care, however, to provide themfelves with at leaft one month's provifions, becaufe the boats cannot approach the rocks but when the fea is perfectly calm. F. A. Fifcher's Travels in Spain, Letter vi.

CORDUBA, Cavr. Francesco, in *Biography*, a painter and engraver of Italy, by whom we have a fet of 44 etchings, middling fized upright plates, from the fountains in the gardens about Rome, enlivened by figures much in the ftyle of Callot. He marks his plates thus: "Eques Franc. Corduba del et Sculp." Strutt. Heinecken.

Corduba, in *Botany*, Cluf. See Asparagus *albus* and *Aphyllus*.

Corduba, now *Cordova*, in *Ancient Geography*, a town of Spain, S.E of Mellaria, upon the river Bœtis. It was in this town, as Strabo informs us, that the Romans fixed their habitation, when they firft entered Spain. But if it be true that it was founded by Marcellus, as Strabo himfelf fays, we are led to imagine, that from the time when the Romans firft inhabited it to the period when Marcellus conducted a colony hither, it could not have been very confiderable. However, Silius Italicus fays, that it fubfifted from the time of the fecond Punic war. However this be, it was from the epoch of Marcellus that it bore the title of a patrician colony, from his having eftablifhed in it families of this order. Corduba was the firft place which the Romans had in Spain, diftinguifhed by the appellation of *Conventus*, and with the privilege of coining money. It afterwards became fo confiderable, that Strabo compares it, with regard to its commerce, with Gades; and he alfo extols the extent and fertility of the adjacent country. It was no lefs celebrated for its literary reputation, as it was the refidence of the two Senecas, and of the poet Lucan. On fome medals, bearing the name of Corduba, we fee on one fide a well-dreffed female head, and on the other a winged figure, holding a cornucopia; but the greateft number of medals belonging to this city are infcribed with "Colonia Patricia." It is probable that it was called by the firft name before the eftablifhment of the colony, and afterwards by the other. See Cordova.

CORDUENA, a town of Armenia. See Gorduena.

CORDULA, or Cordyla, *Portus*, a port of Afia in Pontus, upon the Euxine fea, according to Arrian, who places it between mount *Sacer* and *Hermonaffa*, S.E. of *Trapezus*.

CORDUS, or Sordus, the name given to an ancient people of Gallia Tarragonenfis, who dwelt in the vicinity of the Pyrenées, upon the coaft of the Mediterranean fea.

Cordus, Aulus Cremutius, in *Biography*, a fenator and hiftorian of Rome, during the reigns of its firft two emperors. In his hiftory of the civil wars, and of the reign of Auguftus, he refers to C. Caffius, and denominates him "the laft of the Romans." For this offence he was impeached, and put on his trial; during which he manfully vindicated his caufe, and in his defence exclaimed, "Pofterity will pay to every man his due honour, nor, if I am condemned, will there be wanting thofe who will cherifh the memory, not only of Brutus and Caffius, but of me alfo." This was not the effufion of an enthufiaft, but the confidence to which his virtue and talents gave him a juft claim. His prediction has been abundantly fulfilled; and it affords us pleafure, at the diftance of nearly two thoufand years, to record the heroifm of a man who difdained to fear the arm of power, and who held in contempt the tyrant Sejanus, whofe name has defcended with as much infamy attached to it, as that of Cordus has with unfullied honour. Forefeeing that he fhould be condemned by the tribunal appointed to hear his caufe, he refolved to put an end to his life, by abftaining from his daily food. On the fourth day, finding himfelf well nigh exhaufted by hunger and debility, he fent for his beloved daughter, Marcia, from whom he had concealed his intention, and, embracing her with tender affection, apologized for keeping this only fecret from her, adding, "I am now half-way on the road, and you neither ought to call me back, nor can do it." She departed; and while his accufers and judges were debating what courfe to purfue, he breathed his laft in peace. The fenate ordered his books to be burnt; and though fome copies were fpared, which his daughter caufed to be made as public as poffible, yet nothing now remains except an eulogy of Cicero, preferved in the Suaforia of M. Seneca. Of their value an eftimate may be formed by the character given of them by Seneca. Speaking to Marcia, he fays, "You have well deferved of Roman literature, and of pofterity, to whom will defcend a faithful record of events, which coft the author fo dear: you have well deferved of himfelf, whofe memory will live and flourifh, as long as it is thought worth while to know the hiftory of Rome; as long as there fhall remain any one, who fhall wifh to recur to the acts of his anceftors, any one who fhall be defirous of knowing what a Roman once was; what, when all necks were bowed beneath the Sejanian yoke, was the character of an unconquerable fpirit, free in his head, his heart, his hands." Rom. Hift.

Cordus, Euricius, by Melchior Adam called *Henry Urban*, celebrated for his fkill in medicine and in poetry, was a native of Simmerfhuys in Heffe. To affift himfelf in the profecution of his ftudies, he employed fome of his early years in inftructing the fons of fome of the neighbouring gentry. In performing this office, he had the good fortune to attract the notice of Erafmus. In 1521 he went to Italy, where he attached himfelf in a particular manner to the ftudy of botany; collecting and examining a number of rare plants, and diligently comparing them with the defcriptions of them left by Diofcorides. At Ferrara he took the degree of doctor in medicine, which he afterwards taught at Erfurt and Marpurg. In 1535 he went to Bremen, where he fpent the fmall remainder of his life, which terminated, when he was only of a middling age, in the year 1538. He was author of feveral, and fome very valuable, works. His "Treatife on the Englifh Sweating Sicknefs" was publifhed at Fribourg, in 1529, 4to.; and in 1532, he gave a Latin verfion

verfion of the Theriaca, and Alexipharmica of Nicander. His "Botanologicon, five Colloquium de Herbis," was printed at Colonna, in 1534, which is commended by Haller, and was feveral times reprinted; and his "De Abufu Urofcopiæ," in 1546, at Frankfort. His Latin poems were publifhed in the Deliciæ Poet. Germ. His fon,

Cordus, Valerius, who followed in the fteps of his father, and who acquired a ftill greater portion of fame for his botanical refearches, was born February 18th, 1515. The early part of his education he received under his father, who fent him for further improvement to Wittenberg, and other German univerfities. Applying almoft exclufively to the ftudy of botany, he ranged over the neighbouring countries, in fearch of plants, of which he made a confiderable collection, many of them not before known or noticed. In 1542 he went to Italy, and vifited the univerfities of Padua, Pifa, Lucca, and Florence; every where converfing with the moft eminent of the profeffors. In his way to Rome, he had the misfortune to be wounded in his leg, by the kick of a horfe; but not thinking it dangerous, and continuing his excurfions, in fearch of plants, the wound, by the time he arrived at Rome, was fo much inflamed as to occafion a fever, which put an end to his life in September, 1544, when he was only 29 years of age. He left feveral works, among them a "Hiftory of Plants," many of them never before defcribed. It was publifhed by Conrad Gefner. Alfo, "Annotations on Diofcorides;" "Difpenfatorum Pharm omnium quæ in ufu funt Noribergæ;" "De Spermate Ceti, vulgi dict." &c. Haller Bib. Botan. Eloy Dict. Hift. Gen. Biog.

CORDWAINERS, or Cordiners, the term whereby the ftatutes denominate *fhoe-makers.*

The word is formed from the French *cordonnier,* which Menage derives from *cordouan,* a kind of leather brought from *Cordoua,* whereof they formerly made the upper-leathers of their fhoes. Others derive it from *corde, rope,* becaufe anciently fhoes were made of cords; as they ftill are in fome parts of Spain, under the name of *alpargates.* But the former etymology is better warranted: for, in effect, the French workmen, who prepared the *cordouas,* are ftill called *cordouanniers.*

In Paris they have two pious focieties, under the titles of *Freres Cordonniers, Brothers Shoemakers,* eftablifhed by authority towards the middle of the feventeenth century; the one under the protection of St. Crifpin, the other of St. Crifpianus, two faints who had formerly honoured the profeffion. They live in community, and under fixed ftatutes and officers; by which they are directed both in their fpiritual and fecular concerns. The produce of their fhoes goes into a common ftock, to furnifh neceffaries for their fupport; the reft to be diftributed among the poor.

By ftat. 1. Jac. I. c. 22. the mafters and wardens of the cordwainers company in London are to appoint fearchers and triers of leather; and leather is not to be fold before it is fearched and fealed. See Company.

CORDYLA, in *Botany,* Lour. Cochinch. Bofc. Dict. Hift. Nat. clafs and order, *monadelphia decandria.*

Gen. Ch. *Cal.* campanulate, with four acute divifions. *Cor.* none. *Stam.* Filaments twenty-four, united at the bafe. *Pift.* Germ fuperior; ftyle one; ftigmas fimple. *Peric.* Berry pedicelled, oval, acute, one-celled. *Seeds* fix, oval.

Sp. C. *parvifolia.* A large tree. *Leaves* fmall, oblong, emarginate, fmooth. *Flowers* in fmall, lateral, folitary tufts. A native of the eaftern coafts of Africa.

Cordyla, in *Ichthyology,* an American fifh, the *Scomber cordyla* of Gmelin, the *Guara-tereba* of Marcgraave, and the *Trachurus brafilienfis* of Ray.

CORDYLINE, in *Botany,* Roy. See Dracæna *draco,* and Yucca *gloriofa et draconis.*

CORDYLOCARPUS, (from κορδυλη, *a club,* and καρπος, *fruit,* alluding to the form of the filique.) Willd. 1248. Desfont. (Sinapi; Encyc.) Clafs and order, *tetradynamia filiquofa.* Nat. Ord. *Siliquofæ,* Linn. *Cruciferæ,* Juff.

Gen. Ch. *Cal.* four-leaved, caducous; leaves linear, nearly clofe. *Cor.* four-petalled, cruciform, open; claws the length of the calyx; border oval, quite entire. *Stam.* Filaments fix, erect, filiform; two lateral ones fhorter; anthers almoft erect, fmall, oval. *Pift.* Germ fuperior, cylindrical, fwollen at the upper end; ftyle very fhort; ftigma obtufe. *Peric.* Silique jointed; the laft joint diftant, globular, fwollen, terminated by the permanent ftyle. *Seeds* feveral, convex, fomewhat compreffed, oblong.

Eff. Ch. Calyx nearly clofe. Silique cylindrical, jointed; the laft joint more diftinctly feparated.

Sp. 1. C. *muricatus.* Poiret in Encyc. 1. Willd. 1. Desf. Atl. 2. 72. tab. 152. "Siliques one-celled, fpreading; laft joint muricate; leaves partly lyrate." *Root* annual. *Stems* about two feet high, erect, fcabrous, hifpid, efpecially on the lower part, flightly ftriated, branched; branches alternate, axillary. *Leaves* fmooth, or clothed with a few diftant hairs; lower ones oblong, or elliptical, decurrent; fome quite entire, others lyrate; upper ones lanceolate, alternate, flightly finuated, or a little toothed. *Flowers* alternate, almoft feffile, in a terminal raceme; calyx fmooth, or fomewhat villous, coloured; corolla pale yellow. *Siliques* fmooth, or a little villous. *Seeds* four or five. Difcovered by Desfontaines about Mayane, in the kingdom of Algiers. 2. C. *lævigatus.* Willd. 2. Poir. 2. (Sinapi græcum; Tourn. Cor. 17. It. 1. 398. tab. 35. Erucaria aleppica; Gært. 298. tab. 143. fig. 9. Vent. Jard. de Cels. tab. 64.) "Siliques two-celled, preffed; terminal joint fmooth; leaves pinnatifid." *Stem* a foot high, erect, quite fmooth; branches alternate, widely fpreading. *Leaves* fomewhat flefhy, alternate, fmooth, petioled; fegments linear, entire, channelled. *Flowers* in terminal upright racemes; corolla purple, or pale red. A native of the iflands of the Archipelago.

CORDYLUS, in *Ancient Geography,* a town of Afia, placed by Steph. Byz. in Pamphylia.

Cordylus, in *Zoology,* a fpecies of lizard, the Lacerta *cordylus* of Gmelin and Linnæus, with a fhort verticillated tail, denticulated fcales, and a fmooth body. It is found in Afia and Africa. Its body is livid or blackifh.

CORE, in *Rural Economy,* a name applied to a diforder incident to fheep, occafioned by the prefence of fmall flat worms fituated in the liver. The greateft chance of removing this complaint is by changing the fheep into a more airy and dry pafture.—It alfo fignifies the heart of the wood of trees, and likewife of fome forts of fruit, as the apple, pear, &c.

Core *Bank,* in *Geography,* a narrow ifland of America, on the coaft of N. Carolina, about 40 miles long, and fcarcely 2 broad. N. lat. 34° 22′ to 34° 55′. W. long. 76° 26′ to 76° 50′.

Core *Sound* lies on the coaft of N. Carolina, fouth of, and communicating with, Pamlico.

COREA, or Coreæ, in *Ancient Geography,* a place at which Paleftine commenced on the northern fide, according to

to Josephus; who says it was near Scythiopolis and a fortress named Alexandrium.

Corea, in *Geography*, called by the Chinese *Kao-li*, and by the Mantchew Tartars *Sol-ho*, a kingdom of Asia, in the form of a peninsula, extended between China and Japan, and every where surrounded by the sea, except towards the north, where it is connected with Chinese Tartary, which bounds it on the north; it is bounded on the east by the sea and isles of Japan; on the south by the straits of Corea, separating it from Japan, and by the ocean; and on the west by the Yellow sea, which parts it from China. This kingdom is commonly reckoned to be 200 leagues in length from N. to S. and 100 in breadth from E. to W. The great number of shoals and sand-banks which surround the coasts of this peninsula, render access to it by sea equally dangerous and difficult. Its least distance from Japan is only 25 leagues. The origin of the Coreans is very obscure. It appears, however, that this peninsula was at first inhabited by different tribes, which composed several states; and that, in process of time, they united under the same government, and formed one kingdom, which was called *Kao-li*. The Coreans were most probably of Tartarian extraction. This kingdom is governed by a sovereign, who exercises absolute authority over his subjects, although he himself is a vassal and tributary of the emperor of China. On every succession to the crown, the prince receives on his knees the investiture of his states, granted, or at least, confirmed by the emperor, and distributes among the emperor's envoys the sum of 800 taels, and several other customary presents. The minister of Corea afterwards repairs to Pe-king, to prostrate himself before the emperor, and present him the tribute. The princess, who has espoused the king, cannot assume the title of queen, until she has received it from the court of Pe-king.

The Japanese conquered this kingdom about the end of the 16th century; but the Coreans, assisted by the Tartars, who had subdued China, drove them from their country. The Mantchews, thus masters of Corea, endeavoured to compel their new subjects to shave their heads, after their manner, and to adopt the Tartar dress. This innovation irritated their minds, and occasioned a general revolt throughout the kingdom of Corea, which was at length appeased by the prudent attention of the reigning family. The interior geography of this kingdom is little known: we are informed, however, that it is divided into eight provinces, containing 40 districts, 33 cities of the first class, 58 of the second, and 70 of the third. King-kitan, or Kinka-tao, situated in the province of King-hi, is the capital of the whole kingdom, and the ordinary residence of the sovereign. This prince is absolute master of all the wealth of his subjects, which he inherits after their death. He is very rigid in the administration of justice; and particular punishments are appointed for murder, robbery, and adultery. Every seventh year all the freemen of the different provinces are obliged to go to court in rotation, and to keep guard round his person for two months; so that, during this year, the whole country is in motion and under arms.

The Coreans are well-formed, ingenious, brave, and tractable. They are fond of dancing and music, and peculiarly docile in acquiring the sciences, which they are said to study with ardour. Men of learning are distinguished from other classes of people by two plumes of feathers, which they wear in their caps. When merchants present any books for sale to the Coreans, they shew their respect by dressing in the richest attire, and burn perfumes before they treat concerning the price. The northern Coreans are of a larger size, and more robust than those of the south; they are addicted to arms and become excellent soldiers; using, in combat, cross-bows and very long sabres. The Coreans do not inter their dead till three years after their decease; they wear mourning for a father or mother three years, and for a brother three months. When they perform the ceremony of interment, they place around the tomb the clothes, chariot, and horses of the deceased, and any thing else of which he was fond when alive; all which they leave to be carried away by those who assisted at the funeral. Their houses consist only of one story, and are very ill built; in the country, they are of earth, in cities, generally of brick; but they are all thatched with straw. The walls of their cities are constructed after the Chinese manner, with square turrets, battlements, and arched gates. These people have borrowed their writing, dress, religious worship, ceremonies, belief of the transmigration of souls, and the greater part of their customs, from the Chinese. Their language, however, is different. (See China.) Their women are subject to less restrictions than those of China; and they also differ from the Chinese with regard to their marriage ceremonies. In China, fathers and mothers often marry their children without their consent and even without their knowledge; but in Corea, the contracting parties choose for themselves, nor do they consult the inclinations of their parents, or allow them to interpose any obstacles in the way of their union. The principal productions of Corea are wheat, rice, and ginseng. This country also produces gold, silver, iron, fossil salt, castor and sable's skins, a beautiful yellow varnish, the splendour of which is almost equal to gilding, and which distils from a tree resembling the palm tree, small horses about three feet high, and white paper. Small brushes for painting are made here of the hair of a wolf's tail, which are much esteemed in China. The paper of Corea, of which a considerable quantity is annually imported into China, is made of cotton; it is as strong as cloth, and those who write upon it make use of a small hair brush or pencil: without the precaution of rubbing it over gently with a little alum-water, it would not bear the ink of European pens. With this paper the Coreans partly pay the tribute due to the emperor, supplying the palace with it every year. The Chinese purchase it, not for the purpose of writing, but for filling up the squares of their sash-windows, because, when oiled, it resists the wind and rain much better than theirs; they also use it as wrapping-paper; and it is likewise serviceable to their tailors, who rub it between their hands till it becomes as soft and flexible as the finest cotton cloth, instead of which they often employ it in lining clothes. If it be too thick for the purpose intended, it may be easily split into two or three leaves; and these leaves are even stronger, and less liable to be broken, than the best paper of China.

The sea-coasts of Corea abound with fish; many whales are found there every year towards the north-east, several of which, it is said, bear in their bodies the darts and harpoons of the French and Dutch, from whom they have escaped in the northern extremities of Europe. If this be true, it seems to indicate the existence of a passage from thence into the seas that lead to the north of America. We refer the reader for farther information with regard to this country to Du Halde and Grosier.

Corea, *Strait of*, that part of the sea which separates the southern part of the continent of Corea from the Japan islands, between N. lat. 34° and 36°, and E. long. 130° and 132° 30′. The channel, says Perouse (Voyage, vol. ii. p. 17, Eng. ed.), that separates the coast of Japan from the continent may be 15 leagues wide, but it is reduced to 10 leagues by rocks which uninterruptedly border the southern coasts of Corea, from Quelpaert, and which continued, till we had doubled the S.E. point of that peninsula, so that we were

were able to keep very clofe to the continent, diftinguifh the houfes and towns on the coaft, and reconnoitre the bays. We faw, fays Peroufe, on the fummits of the mountains fome fortifications exactly fimilar to European forts. It is highly probable the principal means of defence, employed by the Coreans, are directed againft the Japanefe. This part of the coaft is very favourable to navigation, for there appears no caufe of danger; and at 3 leagues in the offing the depth of water is 60 fathoms over a muddy bottom; but the country is mountainous, and appears very arid. The fnow was not entirely melted in fome hollows (May, 1787); and the foil feemed but little fufceptible of cultivation. The habitations, however, are very numerous. We counted a dozen fampanes, or junks, failing along the coaft, and feeming in no refpect to differ from thofe in China, their fails being alfo made of matting. See DAGELET, *Ifland of.*

COREATIS, in *Ancient Geography*, a place of India, near the mouths of the Indus, according to Arrian.

CORED, in *Geography*, a town of Egypt; 16 miles N.E. of Belbeis.

CORED *Herrings.* See HERRINGS.

COREGGIO, in *Biography.* See CORREGGIO.

COREGLIO, in *Geography*, a town of Italy, in the ftate of Lucca; 15 miles N. of Lucca.

COREGONI, in *Ichthyology*, a divifion of the SALMO, including thofe with fcarcely confpicuous teeth.

COREIA, in *Antiquity*, a feftival in honour of Proferpine, named *Core*, Κορη, which, in the Moloffian dialect, fignifies a beautiful woman.

CORELLA, in *Geography*, a town of Spain, in Navarre, on the Alhama; 6 leagues from Tudella.

CORELLI, ARCANGELO, in *Biography.* The performance and compofitions of this admirable mufician, form an æra in inftrumental mufic, particularly for the VIOLIN, and its kindred inftruments, the *tenor* and *violoncello*, which he made refpectable, and fixed their ufe and reputation, in all probability, as long as the prefent fyftem of mufic fhall continue to delight the ears of mankind. Indeed, this moft excellent mafter had the happinefs of enjoying part of his fame during mortality; for fcarce a contemporary mufical writer, hiftorian, or poet, neglected to celebrate his genius and talents; and his productions have contributed longer to charm the lovers of mufic by the mere powers of the bow, without the affiftance of the human voice, than thofe of any compofer that has yet exifted. Haydn, indeed, with more varied abilities, and a much more creative genius, when inftruments of all kinds are better underftood, has captivated the mufical world in, perhaps, a ftill higher degree; but whether the duration of his favour will be equal to that of Corelli, who reigned fupreme in all concerts, and excited undiminifhed rapture full half a century, muft be left to the determination of time, and the encreafed rage of depraved appetites for novelty.

Corelli was born at Fufignano, near Imola, in the territory of Bologna, in February 1653. He is faid by Adami to have received his firft inftructions in counterpoint from Matteo Simonelli of the Papal chapel; but the general opinion is, that his mafter on the violin was Giambatifta Baffani, of Bologna. It has been faid (Life of Handel, 1760, p. 46.) without authority, that Corelli went to Paris in the year 1672, but was foon driven thence by the jealoufy and violence of Lulli. That he vifited Germany after he had finifhed his ftudies, we are affured by Gafpar Printz (Satyr. Tomponift, 3ten. Theil. p. 227.) who informs us, that he was in the fervice of the duke of Bavaria, in 1680. Soon after this period, he feems to have returned to Italy, and fettled at Rome, where, about 1683, he publifhed his firft "Twelve Sonatas." In 1685, the fecond fet appeared, under the title of "Balletti da Camera," which, the fame year, gave rife to a controverfy between the author and Paolo Colonna, concerning the diatonic fucceffion of fifths, between the firft treble and the bafe of the allemand in the fecond fonata. In 1690, Corelli publifhed the third opera of his fonatas; and in 1694, the fourth, which, confifting of movements fit for dancing, like the fecond, he called "Balletti da Camera."

In the works of the poet Guidi, publifhed at Verona, 1726, it is recorded that, in 1686, when our king James II. piouſly fent an ambaffador to pope Innocent XI. to make a tender of his duty as a faithful fon of the Romifh church, at a grand academia which Chriftina queen of Sweden, then a profelyte, and refident in the Alma Citta di Roma, gave on the occafion, the mufic was compofed by Bernardo Pafquini, and the band, amounting to one hundred and fifty performers on bowed-inftruments, *inftrumenti d' arco*, led by Arcangelo Corelli.

About this time, when the opera was in a very flourifhing ftate at Rome, Corelli led the band as principal violin.

But his folos, the work by which he acquired the greateft reputation during his life time, did not appear till the year 1700, when they were publifhed at Rome, under the following title: "Sonate à Violino, e Violone, ò Cembalo, Opera quinta, Parte prima, Parte feconda, Preludii, Allemande, Corrente, Gighe, Sarabande, Gavotte e Follia." This work was dedicated to Sophia Charlotta, electrefs of Brandenburgh. His great patron at Rome was cardinal Ottoboni, the general encourager of polite arts and learning, to whom, in 1694, he dedicates his "Opera Quinta," and in whofe palace he conftantly refided, *col fpetiofa carattere d' attuale fervitore* of his eminence, as he expreffes himfelf in the dedication.

Crefcimbeni (Comment. della Volg. Poefia, vol. i. chap. xi. Roma 1702.) fpeaking of the fplendid and majeftic *academia*, or concert, held at cardinal Ottoboni's every Monday evening, fays, that this performance was regulated by Arcangelo Corelli, that moft eminent profeffor of the violin: *famofiffimo profeffore di violino.*

In 1708, we have an honourable teftimony of his high rank in the profeffion, given at Venice in the firft edition of the "Armonico prattico al Cembalo," by Francefco Gafparini, who calls him, "virtuofiffimo di violino, e vero Orfeo di noftro tempo," (cap. vii.) And Adami, in fpeaking of Simonelli, Correlli's firft mafter in counterpoint, fays, that he made many fcholars, "among whom, the moft celebrated was the famous Corelli, the chief glory of the age, with the fame of whofe five works, already publifhed, the world is filled; and the fixth, confifting of concertos, which he is now (1711) polifhing for the prefs, will complete his immortality."

A very particular and intelligent friend, upon whofe judgment and probity we have a moft perfect reliance, having had a converfation with Geminiani about five or fix years before his death, and a friend of his at that time having had in meditation the writing a hiftory of mufic, he committed to paper, when he got home, the chief particulars of his converfation, fuppofing they might be of fome ufe to his friend; but as the plan he had in view has been long laid afide, we have been favoured with the anecdotes and particulars that were obtained from Geminiani, which, as they chiefly concern Corelli, and were communicated by one of his moft illuftrious fcholars, who heard and faw what he relates; we fhall infert them here.

"At the time that Corelli enjoyed the higheft reputation, his

his fame having reached the court of Naples, and excited a deſire in the king to hear him perform; he was invited, by order of his majeſty, to that capital. Corelli, with ſome reluctance, was at length prevailed on to accept the invitation; but, leſt he ſhould not be well accompanied, he took with him his own ſecond violin and violoncello. At Naples he found Aleſſandro Scarlatti, and ſeveral other maſters, who entreated him to play ſome of his concertos before the king; this he for ſome time declined, on account of his whole band not being with him, and there was no time, he ſaid, for a rehearſal. At length, however, he conſented; and in great fear performed the firſt of his concertos. His aſtoniſhment was very great to find that the Neapolitan band executed his concertos almoſt as accurately at ſight, as his own band, after repeated rehearſals, when they had almoſt got them by heart. *Si ſuona*, (ſays he to Matteo, his ſecond violin) *à Napoli!*

"After this, being again admitted into his majeſty's preſence, and deſired to perform one of his ſonatas, the king found one of the adagios ſo long and dry, that being tired, he quitted the room, to the great mortification of Corelli. Afterwards, he was deſired to lead in the performance of a maſque compoſed by Scarlatti, which was to be executed before the king; this he undertook, but from Scarlatti's little knowledge of the violin, the part was ſomewhat awkward and difficult: in one place it went up to F; and when they came to that paſſage, Corelli failed, and was unable to execute it; but he was aſtoniſhed beyond meaſure to hear Petrillo, the Neapolitan leader, and the other violins, perform that which had baffled his ſkill. A ſong ſucceeded this in C minor, which Corelli led off in C major; *ricomminciamo*, ſaid Scarlatti, good-naturedly. Still Corelli perſiſted in the major key, till Scarlatti was obliged to call out to him, and ſet him right. So mortified was poor Corelli with this diſgrace, and the general bad figure he imagined he had made at Naples, that he ſtole back to Rome in ſilence.

"It was ſoon after this, that a hautbois player, whoſe name Geminiani could not recollect, acquired ſuch applauſe at Rome, that Corelli, diſguſted, would never play again in public. All theſe mortifications, joined to the ſucceſs of Valentini, whoſe concertos and performance, though infinitely inferior to thoſe of Corelli, were become faſhionable, threw him into ſuch a ſtate of melancholy and chagrin, as was thought, ſaid Geminiani, to have haſtened his death."

This account of Corelli's journey to Naples is not a mere perſonal anecdote, as it throws a light upon the comparative ſtate of muſic at Naples and at Rome, in Corelli's time, and exhibits a curious contraſt between the fiery genius of the Neapolitans, and the meek, timid, and gentle character of Corelli, ſo analagous to the ſtyle of his muſic.

In 1712, his concertos were publiſhed in a beautiful edition, engraved at Amſterdam, by Eſtienne Roger and Michael Charles le Cene, and dedicated to John William, prince palatine of the Rhine; but, alas! the author ſurvived the publication of this admirable work but ſix weeks; the dedication bearing date at Rome, the 3d day of December 1712, and he died on the 18th of January 1713!

He was buried in the church of the Rotunda or Pantheon, in the firſt chapel on the left hand of the entrance of that beautiful temple, where a monument, with a marble buſt on it, was erected to his memory, near that of the great painter Raphael, by Philip William, count palatine of the Rhine, under the care of Cardinal Ottoboni; on which is the following inſcription:

D. O. M.
Archangellio Corellio a Fuſignano
Philippi Willelmi Comitis Palatini Rheni
S. R. I. Principis ac Electoris
Beneficentia
Marchioni de Ladenſburg
quod eximiis Animi Dotibus
et Incomparabili in Muſicis modulis peritia
ſummis Pontificibus apprime carus
Italiæ atque exteris Nationibus Admirationi fuerit
indulgente Clemente XI P. O. M.
Petrus Cardinalis Ottobonus S. R. E. Vic. Cam.
et Galliarum Protector
Lyriſti Celeberrimo
inter Familiares ſuos jam diu adſcito
ejus Nomen Immortalitati commendaturus
M. P. C.
Vixit Annos LIX. Mens X. Dies XX.
Obiit. IV. Id. Januarii Anno Sal. MDCCXIII.

During many years after his deceaſe, there was a kind of commemoration of this admirable muſician in the Pantheon, by a ſolemn ſervice, conſiſting of pieces ſelected from his own works, and performed by a numerous band, on the anniverſary of his funeral. A ſolemnity which continued as long as his immediate ſcholars ſurvived, to conduct and perform in it. The late Mr. Wiſeman, who arrived at Rome before the diſcontinuance of this laudable cuſtom, aſſured us that his works uſed to be performed, on this occaſion, in a ſlow, firm, and diſtinct manner, juſt as they were written, without changing the paſſages in the way of embelliſhment. And this, it is probable, was the way in which Corelli himſelf uſed to play them.

Of the private life and moral character of this compoſer, little new information can now be acquired or expected; but if we may judge of his equanimity and natural diſpoſition by the mildneſs, ſweetneſs, and even tenor of his muſical ideas, his temper muſt have endeared him to all his acquaintance, as much as his talents.

Indeed, the account that is given of his dying worth 6000*l.* beſides a valuable collection of pictures, and bequeathing them all to his patron Cardinal Ottoboni, does more honour to his parſimony and gratitude, than judgment; a muſician leaving money to a cardinal, while he had a relation or neceſſitous friend in the world, ſeems to favour more of vanity, than true generoſity. And the cardinal, himſelf, manifeſted his opinion of this bequeſt, by keeping only the pictures, and diſtributing the reſt of Corelli's effects among his poor relations, to whom they naturally appertained.

To attempt to give a character here of Corelli's compoſitions, which have been ſo long heard and univerſally admired, may to many of our readers appear wholly uſeleſs; yet as they are thrown aſide as antiquated lumber by ſome, and regarded as models of perfection by others, our wiſh to rank each muſician in his true place, with equity and fairneſs, inclines us to make a few reflexions on the genius and works of this maſter, before we quit the ſubject.

As Corelli originally ſtiled the ſecond and fourth opera of his ſonatas, "*Balletti da Camera*," from the dancing and familiar movements contained in them; the firſt and third ſet, from their gravity of ſtyle and movement, may be called "Sonate da Chieſa." The ſame diſtinction may be made with propriety in his concertos, and even ſolos; the firſt

 eight

eight of the former, and ſix of the latter, being much more ſolemn and eccleſiaſtical than the reſt.

With regard to the intrinſic worth of his four books of ſonatas at preſent, notwithſtanding the exquiſite pleaſure they may have afforded ourſelves and others, during youth, it is very much diminiſhed by the general improvement of melody, knowledge of the bow, and boldneſs of modulation, which have freed invention from former ſhackles, and generated new ideas and effects. Indeed, during the time of Corelli, and long after, every one who knew the mechanical laws of harmony, however ignorant of the violin, ſet about compoſing ſonatas, ſolos, and concertos, for it; but the great maſters of that inſtrument, whoſe genius and invention have kept pace with their hand, have now nearly cruſhed all ſuch inſipid and impotent attempts.

Corelli's ſolos, as a claſſical book for forming the hand of a young practitioner on the violin, has ever been regarded as a moſt uſeful and valuable work, by the greateſt maſters of that inſtrument. We were told by Mr Wiſeman at Rome, that when he firſt arrived in that city, about twenty years after Corelli's deceaſe, he was informed by ſeveral perſons who had been acquainted with him, that his "Opera Quinta," on which all good ſchools for the violin have been ſince founded, coſt him three years to reviſe and correct. Tartini formed all his ſcholars on theſe ſolos; and Signor Giardini has told us, that of any two pupils of equal age and diſpoſition, if the one was to begin his ſtudies by Corelli, and the other by Geminiani, or any other eminent maſter whatever, he is ſure that the firſt would become the beſt performer.

The concertos of Corelli ſeem to have withſtood all the attacks of time and faſhion with more firmneſs than any of his other works. The harmony is ſo pure, ſo rich, and ſo grateful; the parts are ſo clearly, judiciouſly, and ingeniouſly diſpoſed; and the effect of the whole, from a large band, ſo majeſtic, ſolemn, and ſublime, that they preclude all criticiſm, and make us forget that there is any other muſic of the ſame kind exiſting.

Geminiani, according to our friend's memorandums, whence an extract has already been given, aſſerted that "Corelli availed himſelf much of the compoſitions of other maſters, particularly of the maſſes in which he played at Rome; that he acquired much from Lulli, particularly the method of modulating in the legatura, and from Bononcini's famous Camilla." This was not very intelligible: nor does the charge appear well founded; as Lulli has made but little uſe of the *legatura*. With theſe maſſes we are unacquainted; but we find frequent imitations of the more natural paſſages of Scarlatti, particularly in the beautiful adagio of his eighth concerto, in which there is a great reſemblance to a movement in a cantata which was ſet by Scarlatti in 1704, eight years prior to the publication of Corelli's concertos.

Geminiani's character of Corelli, upon the whole, however, ſeems very juſt; he ſaid, that "his merit was not depth of learning, like that of Aleſſandro Scarlatti; nor great fancy, or rich invention in melody or harmony; but a nice ear and moſt delicate taſte, which led him to ſelect the moſt pleaſing harmonies and melodies, and to contract the parts ſo as to produce the moſt delightful effect upon the ear." At the time of Corelli's greateſt reputation, Geminiani aſked Scarlatti what he thought of him, who anſwered, that "he found nothing greatly to admire in his compoſition, but was extremely ſtruck with the manner in which he played his concertos, and his nice management of his band, the uncommon accuracy of whoſe performance gave the concertos an amazing effect even to the eye as well as the ear:" for, continued Geminiani, "Corelli regarded it as eſſential to the *enſemble* of a band, that their bows ſhould all move exactly together, all up, or all down; ſo that at his rehearſals, which conſtantly preceded every public performance of his concertos, he would immediately ſtop the band if he diſcovered one irregular bow."

There ſeems ſome juſtice in Geminiani's opinion, that Corelli's continual recourſe to certain favourite paſſages betrays a want of *reſource*. They were ſo many *bar reſts* for his invention. All the varieties of Corelli's harmony, modulation, and melody, might perhaps be compriſed in a narrow compaſs. The muſical index to his works would not be long.

Indeed Corelli was not the inventor of his own favourite ſtyle, though it was greatly poliſhed and perfected by him. Torelli's concertos, though poſthumous, were publiſhed three years before thoſe of Corelli; and we know not how long they had been compoſed, or how often performed, previous to publication.

For a model of his graver ſonatas in the firſt and third ſet, he certainly had thoſe of Baſſani in his mind; and for the lighter ſort, he had many models. His ſolos ſeem drawn from his own ſource more entirely than any of his other productions.

There was little or no melody in inſtrumental muſic before Corelli's time. And though he has much more grace and elegance in his *cantilena* than his predeceſſors, and ſlow and ſolemn movements abound in his works; yet true pathetic and impaſſioned melody and modulation ſeem wanting in them all. He appears to have been gifted with no uncommon powers of execution; yet, with all his purity and ſimplicity, he condeſcended to aim at difficulty, and manifeſtly did all he could in rapidity of finger and bow, in the long unmeaning allegros of his firſt, third, and ſixth ſolos; where, for two whole pages together, common chords are broken into common diviſions, all of one kind and colour, which nothing but the playing with great velocity and neatneſs could ever render tolerable. But like ſome characters and indecorous ſcenes in our beſt old plays, theſe have been long omitted in performance.

Indeed his knowledge of the power of the bow, in varying the expreſſion of the ſame notes, was very much limited. Veracini and Tartini greatly extended theſe powers; and we well remember our pleaſure and aſtoniſhment in hearing Giardini, in a ſolo that he performed at the oratorio, 1769,

 play

play an air at the end of it with variations, in which, by repeating each ftrain with different bowing, without changing a fingle note in the melody, he gave it all the effect and novelty of a new variation of the paffages.

However, if we recollect that fome of Corelli's works are now more than a hundred years old, we fhall wonder at their grace and elegance; which can only be accounted for on the principle of eafe and fimplicity. Purcell, who compofed for ignorant and clumfy performers, was obliged to write down all the fafhionable graces and embellifhments of the times, on which account his mufic foon became obfolete and old fafhioned; whereas the plainnefs and fimplicity of Corelli have given longevity to his works, which can always be modernifed by a judicious performer, with very few changes or embellifhments. And, indeed, Corelli's productions continued longer in unfading favour in England than in his own country, or in any other part of Europe; and have fince only given way to the more fanciful compofitions of the two Martini's, Zanefti, Campioni, Giardini, Bach, Abel, Schwindl, Boccherini, Stamitz, Haydn, Mozart, and Pleyel.

After the publication of Corelli's works, the violin feems to have increafed in favour all over Europe.

CORENDELIN, in *Geography*, a town of Swifferland, in the canton of Soleure; 10 miles N. of Soleure.

CORENTIN, a confiderable river of South America, in Dutch Guiana.

COREOPSIS, in *Botany*, (from κορις, a *bug*, and οψις, *appearance*, alluding to a fancied refemblance between the feed and the infect.) Linn. gen. 981. Schreb. 1325. Willd. 1538. Gært. 1037. Juff. 188. Vent. 2. 528. (Coriope; Enc.) Clafs and order, *fyngenefia polygamia fruftranea*. Nat. Ord. *Compofitæ oppofitifoliæ*, Linn. *Corymbiferæ*, Juff.

Gen. Ch. *Cal.* many-leaved, generally double, fometimes fimple, and fomewhat imbricated. *Cor.* compound; florets of the difk numerous, hermaphrodite, fertile, tubular, five-toothed; florets of the ray female, abortive, ligulate, fpreading, large. *Stam.* Filaments five, capillary, very fhort. *Pift.* Germ compreffed; ftyle filiform; ftigma bifid. *Recep.* generally chaffy. *Seeds* folitary, compreffed, crowned with a two or three-horned border.

This genus differs from bidens in having a ray, and from verbefina in having the florets of the ray barren.

Sp. 1. C. *ferulæfolia*. Willd. 1. Jacq. Hort. Schæn. 3. 65. tab. 373. "Leaves bipinnated; pinnulæ linear-lanceolate, with ribs half their breadth." *Root* perennial; outer-leaves of the *calyx* numerous, reflexed. A native of Mexico. 2. C. *verticillata*. Linn. Sp. Pl. 1. Mart. 1. Willd. 2. Bot. Mag. 156. (C. foliis verticillatis; Gron. Virg. 131. Chryfanthemum; Pluk. Mant. 48. tab. 344. fig. 4.) "Leaves decompound-pinnated; fegments filiform." *Root* biennial. *Stem* from a foot and half to three feet high, erect, ftriated. *Leaves* feffile, oppofite, but often appearing to grow in whorls in confequence of being cut to the bafe into linear fegments, which are curved in various directions. *Flowers* terminal; florets of the difk brown; of the ray yellow; calyx fhort; outer leaves narrow, loofe, fhorter than the others. A native of Virginia and Louifiana. 3. C. *delphinifolia*. Lam. 2. (Ceratophyllus Delphinii foliis; Vaill. act. 1720. Ehret. pict. tab. 9. fig. 1.) "Leaves tripartite-pinnated; fegments linear, channelled on the upper furface." Nearly allied to the preceding, but conftantly diftinguifhed from it by its foliage and habit. *Root* perennial. *Stem* a foot and half high, erect, fmooth, ftriated. *Leaves* oppofite, connate, feffile, divided at the bafe into three pinnated fegments. *Flowers* terminal; florets of the difk brown, on a fomewhat prominent receptacle; of the ray yellow, acute, entire, or bifid; outer fcales of the calyx narrow, loofe, obtufe. A native of Virginia. It may perhaps be doubted which of the laft two is the verticillata of Linnæus. 4. C. *tenuifolia*. Willd. 3. Ehrt. Beitr. 7. 168. "Leaves three or five in a whorl, pinnated; pinnæ linear, three-parted or undivided; difk the fame colour with the ray." *Root* perennial. A native of Carolina. Willdenow fuppofes this fpecies to be the verticillata of La Marck; but he cannot be right, if it have the difk and ray of the fame colour; for La Marck, who defcribed from a living plant, exprefsly fays, that the difk of his verticillata is brown, and its ray yellow. It is on this circumftance alone, that the feparate exiftence of tenuifolia feems to depend. 5. C. *coronata*. Linn. Sp. Pl. 2. Mart. 2. Willd. 4. (Ceratophyllus foliis pentapteris; Vaill. act. 1720. 328. Bidens pentaphylla; Plum. Sp. 10. ic. 53. fig. 2.) "Leaves pinnated, ferrated, marked with lines, fmooth." *Root* annual. The plant is altogether that of Bidens frondofa; but it has the flowers of C. verticillata, with a large ray of eight ftriated, oval florets. A native of Virginia. 6. C. *trichofperma*. Willd. 5. Mich. am. 2. 139. "Leaves pinnated, lanceolate, ferrated, fmooth; fcales of the outer calyx ciliate-ferrated." A native of Upper Carolina, in moift ground. 7. C. *ariftata*. Willd. 5. (C. ariftofa; Mich. am. 2. 1. 140.) "Leaves pinnated, ferrated, pubefcent; horns of the feed very long, divaricated." A native of North America in the country of the Illinois. 8. C. *leucorhiza*. Mart. 18. Lour. Cochin. 508. "Leaves pinnated; pinnæ five, ferrate-gafhed; ray fix-flowered; feed three-horned." *Root* fpindle-fhaped, flefhy, white. *Stem* a foot and half high, herbaceous, erect, quadrangular, grooved. *Leaves* quinate, lanceolate. *Flowers* entirely faffron-coloured, few together, on terminal peduncles; florets of the ray fix; egg-fhaped, quite entire; horns of the feed befet with inverted briftles; calyx erect, many-leaved. A native of China. 9. C. *mitis*. Willd. 7. Mich. amer. 2. 140. "Lower leaves bipinnatifid; upper ones linear, three-parted; feeds naked." Calyxes generally fimple, fometimes fomewhat calycled. A native of marfhes in Carolina. 10. C. *leucantha*. Linn. Sp. Pl. 6. Mart. 3. Lam. 6. (Bidens leucantha; Willd.) "Leaves pinnated, ferrated: florets of the ray of a different colour from thofe of the difk." *Root* annual. *Stem* three or four feet high, quadrangular, fmoothifh; the oppofite fides channelled; branches oppofite. *Pinnæ* five, feldom three, egg-fhaped, undivided, fmooth, equal, even; the three outer often confluent, almoft decurrent by the outer fide, quite entire at the tip; petioles channelled, connected on both fides by villous hairs. *Flowers* terminal, alternate, two or three, on longifh peduncles; inner fcales of the calyx five; outer five, fmaller, more diftinctly feparated; florets of the ray five, egg-fhaped, three-toothed, three nerved underneath; difk fmall, convex, yellow. *Seeds* three-horned, hifpid backwards. Linn. A native of Virginia. La Marck thinks it not diftinct from C. coronata. 11. C. *odorata*. Lam. 7. (C. chryfantha; Linn. Sp. Pl. 5. Mart. 4. Willd. 7. Bidens americana triphylla; Plum. Sp. 10. ic. 53. fig. 1.) "Leaves ternate, ferrated, fmooth; floret of the ray of a different colour." *Root* fweet-fcented, whitifh, fibrous. *Stem* about three feet high, quadrangular, fmooth, fweet-fcented. *Leaves* oppofite; generally compofed of three egg-fhaped, acute, fmooth, toothed-leaflets. *Flowers* terminal, folitary; florets of the ray white; of the difk yellow, refembling the common camomile. *Seeds* two-horned; receptacle almoft hemifpherical. Plum. MSS. A native of the Weft Indies, and South America. Linnæus, in his fpecific character, defcribes the ray as fimilar in colour to the difk, and if he had not quoted Plumier as his only

only synonym, we should have thought La Marck referred to a different plant. 12. C. *biternata*. Willd. 19. Lour. Coch. 508. "Leaves twice ternate, ovate-lanceolate, serrated; panicle diffuse; ray six-flowered." *Stem* two feet high, herbaceous, quadrangular, four-grooved. *Flowers* entirely yellow. *Seeds* with two branched horns. *Receptacle* flattish, naked. A native of China about Canton. The naked receptacle is inconsistent with the generic character. 13. C. *aurea*. Mart. 13. Willd. 9. Hort. Kew. 3. 252. "Leaves serrated; root ones three-parted; stem ones trifid or entire, lanceolate-linear." *Root* perennial. A native of North America. 14. C. *tripteris*. Linn. Sp. Pl. 9. Mart. 5. Lam. 3. Willd. 10. (C. Virginianum, folio anagyridis; Moris. hist. 3. 21. tab. 3. fig. 44.) "Lower stem leaves pinnated, upper ones ternate, uppermost simple, petioled; leaflets lanceolate-linear." *Root* perennial. *Stems* three or four feet high (six or seven; Mill.) erect, cylindrical, smooth, branched near the summit. *Flowers* solitary, in a loose corymbus, with a yellow ray and brown disk; florets of the ray pointed, entire or with two teeth. A native of Virginia. 15. C. *senifolia*. Willd. 11. Mich. am. 2. 138. "Leaves quite entire, ternate, sessile." A native of sandy hills in Carolina. 16. C. *alba*. Linn. Sp. Pl. 8. Mart. 6. Lam. 8. Willd. 12. (C. scandens; Brown. Jam. 321. Chrysanthemum americanum, ciceris folio glabro; Herm. par. tab. 124. Pluk. alm. 101. tab. 160. fig. 3.) "Leaves generally ternate, wedge-shaped, serrated." *Root* perennial. *Stems* a foot and half long, slender, incapable of supporting themselves, branched. *Leaves* often quinate, smooth. *Flowers* terminal, peduncled; florets of the ray about eight, white; sometimes with a tinge of purple, rather large; those of the disk orange-yellow. *Seeds* two-horned. A native of St. Cruz, one of the Antilles. 17. C. *fœtida*. Mart. 20. Willd. 13. Cav. ic. 1. 55. tab. 77. "Leaves heart-shaped, three-lobed, acuminate, serrated, middle lobe longer." *Root* annual. *Stem* six feet high, erect, cylindrical, branched, cloathed with a short glutinous nap. *Leaves* glutinous, fœtid, opposite; petioles long, connate at the base. *Flowers* in a corymb, entirely yellow; calyx-leaves sixteen, ovate-acute, keeled; eight outer ones blackish-green, hirsute, glutinous; florets of the ray eight, three-nerved, somewhat emarginate. *Seeds* inversely egg-shaped, obscurely three-sided, compressed, with two white capillary horns. A native of Mexico. 18. C. *reptans*. Linn. Sp. Pl. 3. Mart. 7. Lam. 9. Willd. 14. Smith spicil. 20. tab. 22. (Chrysanthemum trifoliatum scandens; Sloan. Jam. 125. hist. 1 261. tab. 154. fig. 2, 3.) "Leaves serrated, egg-shaped; upper ones ternate; stem creeping." *Root* annual, small, fibrous. *Stem* five feet high, weak, climbing, square at the base, somewhat cylindrical above, striated, branched. *Leaves* opposite, acute, veined, soft, slightly downy, bright green, paler underneath; petioles channelled, hairy. *Flowers* entirely gold-coloured; peduncles from three to five, from the axils of the top leaves, erect, cylindrical, striated, hairy, single-flowered; sometimes with two or three lanceolate bractes at the base; calyx nearly cylindrical; a few of the outer leaves spreading; florets of the ray four-toothed, veined; anthers half excluded, brown; germ linear, ciliate at the edges, stigmas downy above, obtuse. Smith. A native of Antigua. 19. C. *heterophylla*. Willd. 15. Cav. ic. 3. 34. tab. 268. "Leaves scabrous; those from the root, panduriform, repand; on the stem, lanceolate, serrated, attenuated at the base, nearly sessile." A native of Mexico. 20. C. *baccata*. Linn. jun. Supp. 380. Mart. 8. Lam. 11. Willd. 16. "Leaves egg-shaped, serrated: seeds resembling a berry." *Stem* eight feet high, herbaceous, erect. *Leaves* opposite, petioled, three-nerved. *Flowers* yellow, peduncled, often three together, terminal; calyx-leaves sixteen, lanceolate, recurved, the length of the disk; florets of the ray three-toothed. *Seeds* naked, nearly globular, black, somewhat tetragonous, sitting on a convex receptacle and forming an aggregate not unlike the compound berry of rubus; down none. A native of Surinam. The naked seeds exclude it from this genus, independent of the peculiar structure of the fruit. 21. C. *auriculata*. Linn. Sp. Pl. 7. Mart. 9. Lam. 4. Willd. 17. Mich. Amer. 2. 138. (Chrysanthemum hirsutum virginianum; Pluk. Alm. 101. tab. 83. fig. 5. and tab. 242. fig. 4. C. virg. trifoliatum; Moris. Hist. 3. 20. tab. 3. fig. 45.) "Leaves quite entire, egg-shaped; lower ones ternate." *Root* perennial. *Stem* a foot and half or two feet high, filiform, cylindrical, slightly villous, a little branched towards the top. *Leaves* opposite, connate; lower ones with two small leaves at the base which make them appear auricled, smooth above, slightly villous underneath; petioles channelled. *Flowers* entirely yellow, terminal; florets of the ray eight, large, five-toothed. A native of Virginia. 22. C. *lanceolata*. Linn. Sp. Pl. 10. Mart. 10. Lam. 5. Willd. 18. Mich. Am. 2. 137. (Bidens succisæ folio; Dill. Elth. 55. tab. 48. fig. 56. B. caroliniana; Mart. Cent. tab. 26.) "Leaves lanceolate, quite entire, ciliated." *Root* biennial. *Stems* several, a foot and half high, decumbent at the bottom, thence rising obliquely. *Root-leaves* long, spread on the ground, thickish, narrowed towards the base, resembling those of scabiosa succisa. *Flowers* large, yellow; peduncles long, smooth; florets of the ray eight or nine, deeply four-toothed. *Seeds* with three horns. A native of Carolina. 23. C. *crassifolia*. Mart. 14. Willd. 19. Hort. Kew. 3. 253. "Leaves inversely egg-shaped, oblong, obtuse, quite entire, pubescent." *Root* perennial. A native of Carolina, flowering from August to September. 24. C. *latifolia*. Willd. 20. Mich. Amer. 2. 137. Lam. Illust. tab. 794. fig. 2? "Leaves egg-shaped, acuminate, crenate-toothed; seeds naked." A native of Carolina, on high mountains. 25. C. *angustifolia*. Mart. 15. Willd. 21. Hort. Kew. 3. 253. "Leaves alternate, linear-lanceolate, quite entire, even surfaced; florets of the ray oblong, trifid; middle segment larger." A native of Carolina and Florida. 26. C. *alata*. Willd. 22. Cav. ic. 3. 30. tab. 260. "Stem winged; leaves alternate, scabrous, roundish egg-shaped, wedge-shaped at the base, triplinerved." *Root* perennial. A native of Mexico. 27. C. *alternifolia*. Linn. Sp. Pl. 11. Mart. 12. Lam. 10. Willd. 24. Jacq. Hort. 2. tab. 110. Gært. tab. 171. fig. 9. (Chrysanthemum virginianum, alato caule. Moris. Hist. 3. 25. tab. 7. fig. 75, 76. Pluk. Alm. 100. tab. 159. fig. 3.) "Leaves lanceolate, serrated, alternate, petioled, decurrent." Linn. "Stem winged; leaves lanceolate, on short petioles, serrated; flowers in corymbs; florets of the ray lanceolate." Willd. *Root* perennial. *Stems* several, from five to seven feet high or more, erect, firm, simple. *Leaves* about five inches long, rugged on both sides, of a dirty green colour, narrowed at the base; the lower ones three or four together or two opposite; the rest alternate. *Flowers* yellow, in a terminal corymb; calyx many-leaved, spreading very much; florets of the ray distant, two-horned. A native of North America, from Canada to Virginia, flowering in October and November. 28. C. *ovata*. Willd. 23. Cav. ic. 3. 41. tab. 280. "Stem winged; leaves alternate, oblong, nearly sessile, serrated; flowers in corymbs; florets of the ray elliptical." *Root* perennial. Very similar to the preceding, perhaps only a variety. A native of Mexico. 29. C. *procera*. Willd. 25. Hort. Kew. 3. 253. "Leaves elliptical, acuminate, serrated, petioled,

tioled, veined, decurrent; lower ones whorled; upper ones alternate." *Root* perennial. A native of North America, flowering in September and October. Professor Martyn conjectures that this is the alternifolia of Linnæus, and that the alternifolia of Hortus Kewensis is a different plant. 30. C. *radiata*. Mill. Mart. 17. "Leaves linear-lanceolate, sharply serrated, opposite; ray of the flower large, entire." *Root* annual. Stems four feet high, erect. *Leaves* from three to four inches long, three quarters of an inch broad, acuminate, on short petioles. *Flowers* two from each of the upper joints of the stem, opposite; peduncles, long, slender, bearing two or three pairs of small leaves or bractes, one-flowered; florets of the ray seven, oval, entire; of the disk numerous, dark-coloured. A native of South Carolina, flowering in August; raised by Miller from seeds sent by Dr. Dale.

Coreopsis *Bidens*; Linn. See Bidens *cernua*.

Coreopsis *foliis linearibus integerrimis*; Gron. See Rudbeckia *angustifolia*.

Propagation and Culture. Most of the perennial species are hardy and may be readily increased by parting the roots. The second and fourteenth require a light loamy earth and sunny exposure. The annuals should be sown in a hot-bed and afterwards transplanted into a warm border.

Coreopsis, in *Gardening*, contains plants of the flowering herbaceous perennial kind; of which the species cultivated are the whole leaved coreopsis, or tick seed sun-flower. (C. *verticillata*.) The three leaved coreopsis. (C. *tripteris*.) The alternate leaved coreopsis. (C. *alternifolia*.) The span leaved coreopsis. (C. *lanceolata*.)

Method of Culture. The mode of propagation in these plants is easily effected, either by slipping or dividing the roots in autumn when the stalks decay, planting them out where they are to remain, keeping them clean from weeds, and cutting down the stalks annually in autumn when they begin to decay. The third and fourth sorts may be rendered more forward by the use of a hot-bed. All these plants are well calculated for the more large borders and clumps, introducing them in the vacant spaces between shrubs, as they exhibit a plentiful bloom till late in the autumnal months.

Coresium, in *Ancient Geography*, a lake or marsh in the island of Crete. Steph. Byz.

CORESSUS, one of the four towns of the island of Ceos, according to Suidas. Ptolemy calls it *Ceressus*; Strabo, and also Steph. Byz. denominate it *Corissia*.

Coressus, or *Coresus*, a name given by Xenophon, Diodorus Siculus, &c. to a high mountain of Asia Minor in Ionia, about 40 stadia from the city of Ephesus. At the foot of this mountain was a town of the same name, called by Steph. Byz. *Corissos*, which he represents as a town of Ephesus, because of its dependence upon it. He says that it derived its name from the following circumstance. Diana, having been delivered of Latona, and having brought her hither asked of the people of the country to whom this place belonged? they replied "Κορη, σος." Virgin, it is yours. In this fable is traced the etymology of the name.

CORETA, in *Botany*, Brown. See Corchorus *siliquosus*.

CORETT, in *Ichthyology*, the name of a large East Indian fish of the tunny kind, and suspected to be no other than the common tunny, or Scomber *Thynnus*. It grows to six or seven feet long. Its eyes are large, and their irises yellow; its tail is broad and forked, and in colour of a yellowish green; its belly-fins are yellowish, and its belly of a fine bright glossy blue, with a silvery cast. It is generally caught with hooks, and is a very fine tasted fish. Ray.

CORETUM, in *Ancient Geography*, a gulf of Palus-Mæotis, according to Pliny; who says that a mountain of rocks separated this gulf from the lake of Buges, into which the river Hypanis discharged itself.

COREVA, or Coreba, a place of Africa propria, on the route from Turburba to Tacape, between Valli and Musti, according to Antonine.

COREUR, a town of India on this side of the Ganges, according to Ptolemy. It is thought to be the same with *Cereura*.

CORFE CASTLE, in *Geography*, is an ancient market-town, situated near the centre of the Isle of Purbeck in Dorsetshire, England; at the foot of a range of hills, on a rising ground, declining to the east. Its origin must undoubtedly be attributed to the castle, which existed previous to the year 980: though the town itself does not appear to have been of any importance till after the conquest, it being wholly unnoticed in Domesday book. The manor and castle seem always to have descended together. Though this is an ancient borough by prescription, it was not incorporated till 18th Eliz., when sir Christopher Hatton obtained a charter, investing the inhabitants with liberties similar to those of the Cinque-ports, with various other privileges: these were confirmed by James I. and Charles II. The government of the town is vested in a mayor, and eight barons who have served the office of mayor. The earliest return to parliament was in 14 Eliz.; the right of election is possessed by all persons within the borough who are seized in fee, in possession, or reversion, of any messuage, or tenement, or corporal hereditament, and in such as are tenants for life or lives, and in want of such freehold, in tenants for years, determinable on any life or lives, paying scot and lot. The town consists chiefly of two streets of stone buildings. The church, a large ancient fabric, comprises a nave, chancel, two ailes, and a large embattled tower: twelve irregular arches support the roof, and four pillars, in the Saxon style, but all different, are connected with the porch. The number of houses in the late return was 152; and of inhabitants 741; many of whom find employment in the neighbouring clay-works and stone quarries; and a few in knitting stockings. A weekly market is held on Thursdays. This town is 116 miles S.W. from London. The district which includes Corfe castle, and is about ten miles in length and eight in breadth, contains twelve or thirteen sunday schools, distributed through the different parishes; each being governed by a committee of the principal inhabitants, subject to the superintendance of a general committee who meet at Corfe castle as occasion may require. The average number of children who attend these schools is about 400. Dorsetshire was one of the first counties in which Sunday schools were established. Some excellent regulations, relative to the general management of these institutions, may be seen in Hutchins's Dorset, vol. i. p. 308, 2d edit.

The castle at Corfe "stands a little north of the town, opposite to the church, on a very steep rocky hill, mingled with hard, rubbly chalk-stone, in the opening of those ranges of hills that inclose the east part of the isle. Its situation between the ends of these hills deprives it of much of its natural and artificial strength, being so much commanded by them, that they overlook the tops of the highest towers; yet its structure is so strong, the ascent of the hill on all sides but the south so steep, and the walls so massy and thick, that it must have been one of the most impregnable fortresses in the kingdom before the invention of artillery. It was of great importance in respect to its command over the whole isle; whence our Saxon ancestors justly styled it Corf gate, as being the pass and avenue into the best part of the isle." (Hutchins's Dorset, i, 280.) The castle is separated from

the town by a ftrong bridge, of four very high, narrow, femicircular arches, croffing a deep moat, now dry. The bridge leads to the gate of the firft ward, which remains nearly entire, probably from the thicknefs of the walls, which, from the outward to the inner facing, is in fome parts full nine yards. On the higher part of the hill, at fome diftance from the centre of the fortrefs, ftands the keep or citadel, which ftill retains nearly its original height, and commands a very extenfive profpect to the north and weft.

The precife period when this caftle was built is uncertain; but from concurrent circumftances its erection is afcribed to king Edgar. That it did not exift previoufly to the year 887, when the nunnery at Shaftefbury was eftablifhed, is certain, from an inquifition taken 54 Hen. III.; wherein the jurors returned, "that the abbefs and nuns at Shafton (Shaftefbury) had, without moleftation, before the foundation of the caftle at Corfe, all wrecks within their manor of Kingfton, in the ifle of Purbeck."

Between two and three miles eaftward of Corfe, is *Nine Barrow Down*, an eminence fo named from nine *large* barrows fituated on it in a line, fuppofed to be of Britifh conftruction. The whole number of barrows on this down are fixteen of various dimenfions; moft of them circular, and very regularly fhaped. A fhallow trench furrounds eight or ten; and near them is a hollow or cavity. The higheft part of the down rifes 642 feet above low water mark.

At a fmall diftance, north weft of Corfe, is *Grange* or *Creech Grange*, the feat of John Bond, efq.; it anciently was part of the poffeffions of the abbey of Bindon, and the occafional refidence of the Abbot. Hutchins's Hiftory of Dorfetfhire.

CORFINIUM (*S. Pelino*), in *Ancient Geography*, a town of Italy, the capital of the Peligni, fituated at a fmall diftance from the Aternus, on a delightful plain furrounded by mountains. In the time of the Social war, A. U. C. 662, the allies fortified it, and made it a place of arms. During the civil wars, Cæfar obliged Domitian to retire hither, befieged him there, and took the place.

CORFU, in *Geography*, the ancient Corcyra (which fee), an ifland of the Mediterranean, at the mouth of the Adriatic, near the coaft of Albania, about 15 leagues long and 8 wide. In ancient times the inhabitants of this ifland formed a powerful republic; in fucceeding times it belonged to the king of Naples; and it was afterwards fold for 30,000 ducats to the Venetians, who maintained a fleet of galleys in the port, and a ftrong garrifon to defend this and the neighbouring iflands. It was feized by the French in 1797; and by an article in the treaty of Campo Formio, in 1797, the French republic was allowed by his majefty, the emperor, king of Hungary and Bohemia, to poffefs, in full fovereignty, the ci-devant Venetian iflands of the Levant, *viz.* Corfu, Zante, Cephalonia, St. Maure, Cerigo, and other iflands dependent on them, together with all the ci-devant eftablifhments in Albania, which are fituate lower down than the gulf of Lodrino. In 1799 this ifland was taken by the Ruffians, and, together with Cephalonia and Zante, &c. conftitute an independent republic under the protection of Ruffia.

This ifland is faid to contain about 50,000 perfons, and is divided into four bailiwicks or governments. The religion of Corfu is partly that of the Latin and partly that of the Greek church. The latter has for its chief a proto-papa, or head-prieft, elected in an affembly of the clergy and nobility; he is immediately dependent on the patriarch of Conftantinople, and poffeffes all the epifcopal powers. His office lafts five years, and he then returns to the clafs of ordinary papas, with the privilege of wearing a crimfon girdle. His revenue is confined to the perquifites of his office, the amount of which he continues to increafe, as an indemnity for the expence he incurred in procuring his nomination. To the cathedral there are canons attached, as to that of the Latin church; but they have no fixed prebend. The only advantage accruing from their canonicate is that of being at the head of the clergy, together with the honour of wearing a violet girdle, and a fmall taffel of the fame colour to their hats. The number of churches in Corfu is very confiderable. Each officiating prieft is annually elected by the affembled parifhioners; but he has no fixed falary. Moft of the churches, efpecially thofe in the country, have been built by private perfons, who, as proprietors, nominate the papa. The richeft of thefe churches is that in which are depofited the relics of St. Spiridion, to whom the Greeks pay a peculiar devotion; and the feftival of this faint is celebrated with the greateft pomp. The night between Holy Thurfday and Good Friday is remarkable for the number of proceffions which perambulate the city.

In the ifle of Corfu are feveral convents of men and women, which tend very much to opprefs the inhabitants. The ignorance of the Greek clergy, efpecially in the rural parts, is fo great as to be proverbial; the moft learned among them being hardly capable of writing and reading their own language.

The air of this ifland is healthy, the land fertile, and the fruit excellent. Oranges, citrons, the moft delicious grapes, honey, wax, and oil are very abundant. Some places are mountainous and barren, and good water is fcarce. Salt forms a great part of its riches.

Corfu, the capital of the fore-mentioned ifland, the feat of a bailiff, a proveditor, a captain, &c. and the fee of an archbifhop. It is fortified, and defended by two fortreffes; the town has a good harbour and a confiderable trade. N. lat. 39° 42′. E. long. 20° 2′.

CORGA, a country of India, near the coaft of Malabar, bounded on the N. and E. by the Myfore country, on the S. by the country of the Nayrs, and on the W. by the fea.

CORGATHEA, in *Ancient Geography*, a town of India, according to Ptolemy.

CORGOLOIN, in *Geography*, a town of France, in the department of the Côte d'Or, and diftrict of Beaune; 5 miles N. of Beaune.

CORI, anciently *Coria*, a town of Italy, in the Campagna di Roma; 10 miles S. of Paleftrino.

CORIA, or Curia, in *Ancient Geography*, a town of the ifle of Albion, in the country of the Damnii, according to Ptolemy. The conjectures about the fituation of this place are various and doubtful; but, upon the whole, that of Mr. Baxter feems to be the moft probable, who places it at Kirkintilloch, a place of great antiquity, upon the wall, about 6 miles from Glafgow.—Alfo, a town of Albion, belonging to the Otadeni, and fuppofed to be Corbridge in Northumberland by Camden and Baxter; but Horfley imagines it to have been fituated much farther north, probably at Jedburgh, and fufpects it to have belonged to the Gadeni.—Alfo, a place of Greece, in the Peloponnefus; near the town of Helice, according to Ælian.—Alfo, a town of Italy, near Rome. See Cori.

Coria, in *Geography*, a town of Spain, in the province of Eftremadura, the fee of a bifhop. It contains two churches, two convents, and two hofpitals; near it are medicinal fprings; 90 miles E. of Toledo, and 110 E.S.E. of Madrid. N. lat. 39° 36′. Long. 10° 28′ E. of Peak of Teneriffe.—Alfo,

—Also, a town of Spain, in the country of Seville, on the Guadalquivir; 7 miles from Seville.

CORIACO, a town of S. America, in the province of Cumana, on a gulf to which it gives name; 40 miles E. of New Cordova. It contains about 6500 persons.

CORIALLUM, in *Ancient Geography*, a place of Gaul, in the Lyonnensis secunda; near the cape de la Hogue, according to d'Anville.

CORIANDER, in *Agriculture*, the name of a plant which is cultivated in the field by the farmer in some districts, though not to any very great extent. In both Essex and Kent it is, however, occasionally met with as a field crop.

In its culture it is advised, that the seed should be sown in the autumnal season, on rich, friable land, which has been well prepared by tillage; and that when the plants have risen above the surface of the ground, they should be hoed out to the distance of about four inches every way, clearing them well from all sorts of weeds. It is supposed that by this management they will become strong, and produce a greater quantity of good seed.

The advantages of cultivating this sort of crop are thus stated in the fourth volume of the Letters and Papers of the Bath Society.

Sowed ten perches of land with coriander seed, the soil a good sandy loam.

Expences.

	£.	s.	d.
Three ploughings	0	1	6
Sowing and harrowing	0	0	1
Four pounds of seed, at 3 *d.*	0	1	0
Harvesting	0	0	3
Ripling	0	1	0
Rent	0	2	0
	0	5	10

Produce.

	£.	s.	d.
87 pounds of coriander seed, at 3 *d.*	1	1	9
Deduct expences	0	5	10
Profit	0	15	11

or 15 *l.* 18 *s.* 4 *d.* per acre.

The author of the paper observes, that he has since made several larger experiments in this article, but that none has proved so good a crop as the preceding, yet all of them such as to afford a good profit. There is a ready sale for the seed with the distillers, druggists, and confectioners. The former purchase very large quantities: the price varies from 16 *s.* to 42 *s.*

According to Mr. Vancouver, in his Account of Essex Husbandry, the mode of cultivation is thus performed. "The culture of coriander, which has been much attended to in the neighbourhood of Tolshunt Darcey, is, he says, thus managed: old lay-ground is ploughed in the beginning of March, and after the surface is completely pulverized, the seed is sown fourteen pounds to the acre; thrice hoeing and setting out the plants four inches square will cost one guinea per acre. Average produce, 10 *cwt.* per acre, 12 *s.* per *cwt.* This is considered to be a very good preparation, after once ploughing, for wheat; and as the land is generally ploughed in two yard ridges, or stitches of eight furrows wide, a row of beans is generally planted with the coriander, on each side of the open furrows between the stitches, and are usually harvested at the same time.

"It is frequently the case in this district to cultivate a triple sort of crop, consisting of coriander, carraway, and teasel.

"When (says the above writer) carraway is sown with the coriander, from the care and attention necessarily bestowed on distinguishing the plants, the hoeing seldom costs less than one guinea and a half per acre; but the carraway is not regularly set out for a crop till after the coriander is harvested, at which time a very expensive hoeing becomes indispensably necessary.

"Teasel is sometimes cultivated in the same field, the seed being sown with the coriander and carraway; but as neither the carraway nor teasel come completely and regularly the second year, both crops are usually allowed to stand for the third summer. This is esteemed good management for old coarse pasture grounds, which, after three ploughings, are commonly sown with wheat, and then clean chalked."

The following directions are given for this culture, by Mr. Sewell of Maplestead: "about the beginning of March, plough some old pasture land; if it has been pasture for a century, the better; and the soil should be a very strong clayey loam. Mix 12 *lbs.* of carraway, 10 *lbs.* of coriander, and 12 *lbs.* of teasel seeds together, which is sufficient for one acre; sow directly after the plough and dress (he supposes harrow) the land well. When the plants appear of sufficient strength to bear the hoe (which will not be until about ten weeks after sowing), it must not be omitted, and in the course of the summer it will require three hoeings, and one at Michaelmas; each will be about 8 *s.* per acre. The coriander is annual, and is fit to cut about the beginning of July: it should be left in the field after cutting, and threshed on a cloth, in the same manner as rape seed.

"About April following, your teasel and carraway will want a good hoeing, done deep and well, and another hoeing about the beginning of June; these two hoeings are to be done at 7 *s.* per acre each. The carraway will be fit to cut the beginning of July, and must be threshed in the same manner as coriander. The teasel will not be ready till the middle of September, when those heads which are beginning to turn brown are cut off the stem, with a stalk a foot long, and 25 of them are tied in a bunch, 24 of the bunches are fixed on a small stick, and called a row, 240 of which make a load in bulk, equal to a ton of hay from the meadow. The work of cutting and bunching the teasel can only be done by those who have been well acquainted with and learned the mode; it must be looked over, and the heads cut at several times, as they ripen. The teasel and carraway are perennial, and some of the plants do not perfect their seeds till the third or fourth year, though in general you have a crop the second year, and the seeds that are scattered from the crop the second year often come to perfection the fourth year; he has known instances of this being continued for seven years. The usual way is to plough directly after the crop is gathered the third year, and sow wheat, of which commonly a good crop is obtained, the land being in fine order, from the turf being rotted, and the repeated hoeings. See Teasel.

"The first appearance of teasel, after it is sown, is much like a lettuce, coriander like a parsnip, and carraway like carrots. The produce of carraway has often been, on the very rich old lays in the hundreds or low lands of the county, 20 *cwt.* per acre. There is always a demand for it in the London market, sometimes so low as 12 *s.* per *cwt.*, and it has been up to 50 *s.* per *cwt.*; mostly on an average at 21 *s.*

Coriander is alſo very productive on good land, often producing 24 *cwt.* per acre, ſometimes not more than 6 or 7 *cwt.*, the price being ſometimes 30*s.* per *Cwt.*, often ſo low as 10*s.*, average in general about 16*s.*, London market. Teaſel is uſed only amongſt the manufacturers of ordinary cloth and baizes, to raiſe the wool on them that covers the thread. As we have a large buſineſs of that kind carried on in this part of the country, we have a regular demand for teaſel; the average price 12*l.* per load, the produce ſometimes a load per acre, often not more than one-fourth of a load. The land can only be filled with plants, and the more one kind predominates, the leſs muſt reaſonably be expected of the crop that ſucceeds. It is moſtly ſown on land ſo ſtrong, as to require being a little exhauſted to bring it fit for bearing corn. In moſt of the land ſown with carraway and coriander the teaſel is omitted, as being a more troubleſome and uncertain crop, and generally the product of carraway is much greater without than with teaſel.

"In many parts of this diſtrict there are gardening-farmers who travel about and contract for breaking up old graſs land, in order to ſow carraway. The farmer ploughs to a great depth, and does whatever horſe-work is wanted, finding the land alſo at a rent of 15*s.* per acre on ſome farms, and the produce is divided. It is reckoned a more profitable way of breaking up graſs than for common crops; but, much depending on a variable price, is reckoned hazardous; though the carraway men have intelligence enough among themſelves to aim at not overſtocking the market.

"It is obſerved, that the coriander is always the firſt crop, the carraway being ſown with it as clover is with barley to ſucceed it; and it is left from three to ſix years, according to the ſucceſs; great hoeing is beſtowed on it to keep the land clean: when it returns to the farmer, if there be twitch he fallows, if not, he ſows wheat. With ſome farmers their half receipt from 30 acres has varied from 180*l.* to 300*l.* a year."

Coriander, in *Botany*. See Coriandrum.

CORIANDRUM, (κοριον, or κοριαννον; Theophras. Dioſcor. Coriandrum; Plin. Suppoſed to be ſo called from κορις, *a bug*; the bruiſed leaves ſmelling like that offenſive inſect.) Tourn. Cl. 7. § 3. gen. 2. Linn. gen. 356. Schreb. 488. Willd. 552. Gært. 109. Juſſ. 220. Vent. 3. 16. Claſs and order, *pentandria monogynia*. Nat. Ord. *Umbellatæ*, Linn. *Umbelliferæ*, Juſſ.

Gen. Ch. *General umbel* flat. *Partial umbel* generally with abortive flowers in the centre. *General involucre* one-leafed, or none. *Partial involucre* going half way round; or none. *Calyx proper* five-toothed, ſtanding out. *Cor.* Petals five, equal or unequal, emarginate, inflexed. *Stam.* Filaments five; anthers roundiſh. *Piſt.* Germ inferior; ſtyles two, diſtant; ſtigmas capitate. *Peric.* none. Fruit ſpherical, dividing into two. *Seeds* two, concave.

Eſſ. Ch. Petals inflexed, emarginate. General involucre one-leafed or none; partial, going half way round, or none. Fruit ſpherical, or ſcrotiform.

Sp. 1. C. *ſativum.* Linn. Sp. Pl. 1. Mart. 1. Lam. 1. Willd. 1. Gært. tab. 22. fig. 2. Lam. Illuſt. Pl. 196. fig. 1. Woodv. Med. Bot. tab. 181 Eng. Bot. Pl. 67. Bauh. Pin. "Fruit globular." *Root* annual, ſtrong-ſcented. *Stem* about a foot and half high, erect, ſmooth, ſlightly ſtriated, cylindrical, generally branched and divaricated. *Leaves* compound; lower ones pinnated; leaflets roundiſh-wedge-ſhaped, lobed and toothed; upper ones twice-ternate; ſegments linear. *General and partial umbels* many-rayed. *General involucre* of one linear leaf; *partial involucre* from three to five-leaved, going half way round; leaves lanceolate. *Flowers* white, tinged with red; proper calyx very conſpicuous; outer petals of the outer flowers large, forming a kind of ray round the umbel. *Fruit* obſoletely ribbed, aromatic. A native of the ſouthern parts of Europe and of China; naturalized in Suffolk about Ipſwich, and in ſome parts of Eſſex. Every part of the plant, when freſh, has a very offenſive ſmell; but the dried ſeeds have a tolerably grateful ſmell, with a moderately warm and ſlightly pungent taſte. They are ſtomachic and carminative, and are commonly ſold by the confectioners encruſted with ſugar. When taken in large quantities they are ſaid to be deleterious, but Dr. Withering aſſerts that he has known ſix drams of them taken at once, without any remarkable effect. They give out their virtue totally to rectified ſpirit, but only partially to water. The Edinburgh college uſe them in the bitter infuſion and the preparations of ſenna, to cover the diſagreeable taſte, and prevent the griping tendency of theſe medicines. 2. C. *teſticulatum.* Linn. Sp. Pl. 2. Mart. 2. Lam. 2. Ill. Pl. 196. fig. 2. Willd. 2. (C. minus teſticulatum; Bauh. Pin. 158. Pluk. alm. 120. tab. 169. fig. 2.) *β.* C. ſylveſtre fœtidiſſimum; Bauh. Pin. 158. "Fruit didymous." *Root* annual. *Stem* ſcarcely a foot and half high, angular, branched. *Leaves* once or twice pinnated; leaflets deeply cut into narrow acute ſegments. *Umbels* ſmall, often ſimple. *Partial involucre* none, outer *petals* not forming a ray. *Seeds* ſeparating below, almoſt cohering above, a little wrinkled, but not ſtriated. A native of the ſouth of Europe.

Propagation and Culture.—Both ſpecies are raiſed from ſeeds ſown in the autumn, in an open ſituation, on a bed of good freſh earth. When the plants are come up, nothing farther is neceſſary but to hoe them to about four inches diſtance every way, and to keep them clear from weeds. The firſt ſpecies is cultivated in Eſſex, mingled with carum carui, or carraway; both ſolely for the ſake of the ſeeds. See Carum Carui. To prevent the largeſt and beſt part of the ſeed being loſt, women and children are employed to cut every plant ſeparately, and to put it immediately into a cloth, in which it is carried to ſome convenient part of the field, and there threſhed upon a ſail-cloth. The produce of an acre is from ten to fourteen hundred weight. See Coriander, in *Agriculture.*

CORIARIA, (ſo called from its uſe in tanning hides.) Lin. Gen. 1129. Schreb. 1540. Juſſ. 441. Vent. 43. Redoul; Enc. Claſs and order, *diœcia decandria* (Polygamia; Gowan.) Nat. Ord. undetermined.

Gen. Ch. *Flowers* dioicous, ſometimes monoicous or polygamous. *Male. Cal.* Perianth very ſhort, five-leaved; leaves ſomewhat egg-ſhaped, concave. *Cor.* Petals (Gland. Juſſ.) five, very ſmall, placed on a diſk on the outſide of the ſtamens. *Stam.* Filaments ten, very ſhort; anthers erect, oblong, with two cells ſeparate at the baſe. *Female Cal.* like the male. *Cor.* Petals, as in the males, converging. *Stam.* as in the males, but abortive. *Piſt.* Germs five, compreſſed, united; ſtyles long, briſtle-ſhaped; ſtigmas ſimple. *Peric.* none. *Seeds* five, kidney-ſhaped, covered by the ſucculent petals which take the appearance of a berry; Linn. (*Peric.* Capſules five, connivent, ſmall, one-ſeeded, not dehiſcent, covered on the ſide by the enlarged and thickened glands, making the fruit look like half a berry; Juſſ.)

Eſſ. Ch. Calyx five-leaved; corolla five-petalled; anthers ten, almoſt ſeſſile. Styles five. Seeds five, covered by the ſucculent petals.

Sp. 1. C. *myrtifolia.* Linn. Sp. Pl. 1. Mart. 1. Poir. 1. Lam.

Lam. Ill. Pl. 812. (Rhus myrtifolia monfpeliaca; Baub. Pin. p. 414.) "Leaves almoft feffile, ovate-oblong, flowers in racemes." A fhrub four or five feet high. *Stems* fmooth, cinereous; branches oppofite, loofe, flexible; young ones quadrangular. *Leaves* oppofite, entire, fmooth, acute, green on both fides, nerved, fmaller on the flowering branches. *Racemes* fimple, terminating the young lateral branches; bractes folitary, fmall, awl-fhaped; peduncles twice the length of the bractes; calyx and corolla pale green; flowers fometimes monoicous, and fometimes hermaphrodite. A native of the fouth of France, and of Africa about mount Atlas. 2. C. *rufcifolia*. Linn. Sp. Pl. 2. Mart. 2. Poir. 2. Feuill. Peruv. 3. 17. tab. 12. "Leaves cordate egg-fhaped, feffile." A tree from twenty to twenty-five feet high. *Trunk* the thicknefs of a man, branched from the bottom. *Leaves* an inch and half long, an inch broad. *Leaves* oppofite, ternate on the young branches, almoft embracing the ftem. *Flowers* as in the preceding fpecies. A native of Chili. 3. C. *microphylla*. Poir. 3. "Leaves very fmall, egg-fhaped, obtufe, nearly feffile; flowers fpiked, lateral." A fhrub. *Stems* quadrangular; branches numerous, crowded, filiform, flexible, fhort. *Leaves* four or five lines long, three broad, oppofite, firm, entire, flightly heart-fhaped, green above, paler underneath, nerved. *Flowers* on fmall filiform peduncles, with folitary acute bractes. A native of Peru. 4. C. *farmentofa*. Mart. 3. Poir. 4. Forft. Flor. Auft. 71. "Leaves cordate egg-fhaped, on fhort petioles; ftem procumbent, diffufe. A native of New Zealand.

CORIARIO. See Arto Leone.

CORIBRASSUS, in *Ancient Geography*, an epifcopal town of Afia, in Pamphylia.

CORICANI. See Coritani.

CORICÆ *infulæ*, fmall iflands between the ifland of Crete and the Peloponnefus. Pliny.

CORICEON *promontorium*, a promontory S. of the peninfula of Ionia, which advances towards the ifle of Chios, in which is found Erythræ.

CORICEUM, in *Antiquity*, the undreffing-room belonging to the Gymnasium.

CORIDERVA, in *Geography*, a rock fituated about $2\frac{1}{2}$ miles S.W. from Ila, one of the weftern iflands of Scotland.

CORIDIS Folio, in *Botany*; Herm. See Linearia.

CORIDOR, is ufed, in *Architecture*, for a gallery, or long ifle, around a building leading to feveral chambers at a diftance from each other, fometimes wholly inclofed, and fometimes open on one fide.

Coridor, or *Corridor*, in *Fortification*, the fame as the *covert-way*, which fee.

CORIDORGIS, in *Ancient Geography*, a town of Germany, fituated on the Danube, between Medoftanium and Phurgifates. Ptolemy.

CORIENTES, in *Geography*, a cape of Mexico, or New Spain, on the N. Pacific ocean. N. lat. 20° 50′. W. long. 105° 30′.—Alfo, a cape of fouth America, on the coaft of Peru, in the Pacific ocean. N. lat. 4° 50.—Alfo, a cape of Africa, on the eaftern coaft in the Indian fea. S. lat. 24° 15′. E. long. 33° 31′.—Alfo, the name of the fouth-weftermoft point of the ifland of Cuba. N. lat. 21° 38. W. long. 84° 30′.

Corientes, *Los*. See Corrientes.

CORILLA, in *Biography*, the Arcadian name given to the celebrated *Improvifatrice*, Maria Maddalena Morelli Fernandez, of Piftoia; honoured at Rome with the laurel crown, 16 Feb. 1776, in the fame manner as Petrarca. Taffo, and Perfetto, had been before. An account of this tranfaction, beautifully printed at Parma, by Bodoni, in 1779, contains her diploma and all the difcourfes, poems, fonnets, &c. written on the occafion, with the examination which fhe underwent, concerning her knowledge of the moft important fubjects upon which fhe was required to *Improvifare*, or treat extemporaneoufly, in verfe publicly at the Campidoglio in Rome. The Italian title of this narrative is, "Atti della folenne coronazione fatta in Campidoglio della infigne poetefia D-na. Maria Maddalena Morelli Fernandez Piftoiefe, Tragli Arcadi Corilla Olimpica." Twelve members of the Arcadian academy were felected out of 30, publicly to examine this new edition of a *Tenth Mufe*, which has been fo often dedicated to ladies of poetical and literary talents. Three feveral days were allotted for this public exhibition of poetical powers on the following fubjects: facred hiftory, revealed religion, moral philofophy, natural hiftory, metaphyfics, epic poetry, legiflation, eloquence, mythology, fine arts, and paftoral poetry.

In the lift of examiners there appear a prince, an archbifhop, three monfigneurs, the pope's phyfician, abati, avocati, all of high rank in literature and criticifm. Thefe, feverally, gave her fubjects, which, befides a readinefs at verfification in all the meafures of Italian poetry, required fcience, reading, and knowledge of every kind. In all thefe fevere trials, fhe acquitted herfelf to the fatisfaction and aftonifhment of all the principal perfonages, clergy, literati, and foreigners then refident at Rome; among the latter was our fovereign's brother, the duke of Gloucefter.

Near 50 fonnets by different poets, with odes, canzoni, terze rime, ottave, canzonette, &c. produced on the fubject of this event, are inferted at the end of this narrative and defcription of the order and ceremonials of this fplendid, honourable, and enthufiaftic homage, paid to poetry, claffical tafte, talents, literature, and the fine arts.

This renowned lady merits fome notice as a mufician, as well as poetefs; as fhe fung her own verfes to fimple tunes with a fweet voice, and in good tafte. She likewife played on the violin; but at Florence, where we faw and heard her, in 1770, fhe was accompanied on the violin by the celebrated and worthy pupil of Tartini, Nardini. At this time fhe was not more than 30; and had a pleafing, dignified, and intelligent countenance. See in the mufic pl. No. the two airs to which fhe fung at Florence, extempore verfes on fubjects given.

CORIM. See Hasta *militaris*.

CORINÆUM, in *Ancient Geography*, a promontory of Afia Minor in Ionia; part of mount Mimas.

CORINDIUR, a town of India, on this fide of the Ganges. Ptolemy.

CORINDUM, in *Botany*. Tourn. See Cardiospermum.

CORINE, in *Zoology*, the Antilope *Corinna* of Gmelin, has very flender, fhort, fmooth, ftraightifh horns, bent flightly into the form of a lyre; the upper parts of the body are yellowifh-tawny, the under parts white, with a dufky ftripe along the fides, and two lines on each fide of the face, the upper one white and the other black. This animal, which inhabits Senegal, is lefs than a roe; the neck, body, and flanks are of a tawny-yellow colour, the infides of the thighs and belly are white, and a dark line, along the fides, divides the two colours; the knees are tufted with hair; the

the ears are large; the horns are about fix inches long, almoft upright, bending a little outwards in the middle, and fomewhat approaching at the tips, the lower parts being furrounded with circular wrinkles. This fpecies refembles the kevel in colour, fize, fwiftnefs, and mufky odour; but differs very much from it in the figure of the horns; though Gmelin, after Pallas, fufpects that it is the female of that fpecies.

CORINEA, in *Ancient Geography*, a country of Afia, in Armenia Major. Ptolemy places it between the fources of the Tigris and Euphrates, and to the fouth of Thofpitide.

CORINEUM, a town fituated on the fouthern coaft of the ifle of Cyprus, between Citium and Salamis. It was epifcopal, and called by Hierocles, in his Notitia, Coren.

CORINIUM, a town of Albion, belonging to the Dobuni, and allowed to be Cirencefter in Gloucefterfhire.—Alfo, an ancient town of Illyria on the Adriatic gulf; fuppofed to be the prefent *Cori.*

CORINTH, Corinthus, a city of Greece in the Peloponnefus, upon a gulf of the fame name. This city was the capital of a fmall ftate, fituate on the ifthmus of Corinth, having the bay of that name, now called "Golfo di Lepanto," and the ifthmus or neck of land, which joins Peloponnefus to the continent, on the north; Sicyon, on the weft; the gulf of Saron, on the eaft; and the kingdom of Argos, on the fouth. Its utmoft extent from eaft to weft was about half a degree, and from north to fouth, about half that fpace. It had no rivers of any note; but abounded with mountains, the chief of which was called "Acrocorinthium," at the foot of which the city of Corinth was built, and on the top ftood the citadel. It was alfo famed for the fountain Pyrene, facred to the mufes; though others place this fountain on the hill Helicon, and moft others again, on that of Parnaffus.

Corinth is faid to have been founded by Sifyphus, the fon of Æolus, and grandfather of Ulyffes, about the year of the world 2490, as fome fay, or according to others 2500; B. C. 1507, and about fix years before Deucalion's flood, B. C. 1503. The ancient name of this city is faid to have been Ephyra, which it took from a nymph of that name, reported to have been the daughter of Oceanus and Tethys, or, according to others, of Myrmex, the wife of Epimetheus, the fon of Japetus, and brother of Prometheus. At this time it was but an inconfiderable town, though it rofe afterwards to be the metropolis of the kingdom, and one of the nobleft and moft opulent cities in Greece.

Corinth, the new name of this city, has been varioufly derived; fome have deduced it from the Greek κοριθος, *fatiety* or *abundance*, implying the opulence of the place; but the ancient inhabitants trace the origin of the appellation to Corinthus, the fon, as fome have faid, of Jupiter, or, according to others, of Marathon, and brother of Sicyon. However, moft authors afcribe the name, as well as the building, or rebuilding of it, to Corinthus, the fon of Pelops. Corinth was alfo called "Heliopolis," or the city of the Sun, probably, as Gronovius conjectures, from the ruggednefs and barrennefs of its fituation and territory, for fuch, as Strabo tells us, it really was.

Corinth, befides the citadel already mentioned, had two port-towns, *viz.* Lecheum fituate on the bay of Corinth, and Cenchrea on that of Samos, and connected with the city by a double wall of about 12 ftadia or half a league in length; diftant from the city 70 ftadia or about 3 leagues. Thefe were the only two havens; and, indeed, the only two cities of any note, next to Corinth, that belonged to this territory. Thefe were fo well fituated for naval commerce, and fo near the metropolis, that they made ample compenfation for the barrennefs of the foil. Thefe two naval roads which opened a way into the Ionian and Ægean feas, might eafily have gained for them a fuperiority, if not a command, over all Greece, if this advantageous fituation had not inclined them more to commerce than war. For their citadel being almoft impregnable by nature, and commanding both feas, they could eafily cut off all communication betwixt one half of Greece and the other; fo that it was not without reafon called one of the fetters of Greece. But being led by their genius and difpofition to improve their advantages more for navigation and commerce than for martial exploits, they became in procefs of time fo exceedingly opulent, that the little influence they had over the other ftates was owing rather to their wealth than their valour. By the gradual increafe of their opulence, partly from commerce, and partly from the influx of ftrangers that flocked hither from Europe and Afia, their city became at length one of the moft confiderable and fplendid in Greece; being adorned with a great variety of fumptuous buildings, fuch as temples, palaces, theatres, porticos, cenotaphs, baths, and other edifices; all enriched with a beautiful kind of columns, capitals, and bafes, from which the Corinthian *order* took its name, together with numberlefs ftatues executed by the moft famous artifts. Such indeed were its wealth, magnificence, and excellent fituation, that it was thought by the Romans equally worthy of empire with Carthage and Capua. It would carry us far beyond our limits minutely to defcribe even the principal edifices that adorned this famous city; but in order to enable the reader to form fome judgment of its extent and magnificence, we fhall recite fome few particulars, referring to Paufanias "in Cor." for a more ample account. We have already obferved that this city was feated at the foot of a high hill, on which ftood the citadel. To the fouth it was defended by the hill itfelf, which is there extremely fteep. Very ftrong and lofty ramparts protected it on the other fides. Its circumference was 40 ftadia, or about $1\frac{1}{2}$ league; but as the walls extended along the fides of the hill, and furrounded the citadel, it might be reckoned upon the whole at 85 ftadia or near $3\frac{1}{4}$ leagues. The road to the citadel had fo many windings, that the fummit could not be attained, without paffing through an interval of 30 ftadia. The fituation of the citadel and its ramparts rendered it fo ftrong, that it could only be taken by treachery or famine. At the entrance was the temple of Venus, with the ftatue of the goddefs clad in brilliant armour, and accompanied by another of the god of love, and a third of the fun, who was adored in this place before the worfhip of Venus was introduced. In the way to the citadel was a chapel dedicated to the Egyptian Ifis, and another to the Pelagian Ifis. Two others were dedicated, one to Serapis of Canopus, and the other to another Serapis. The fpring Pyrene, where Bellerophon is faid to have found the horfe Pegafus, was ornamented with fumptuous embellifhments, confifting of feveral caves in form of grottoes, all covered with white marble, from which the cold and limpid water of that fountain fell into a large bafon. The forum was decorated with temples and ftatues; the theatre was a grand and beautiful edifice of white marble, in which the affembly of the people deliberated on affairs of ftate, and the mufical contefts and other entertainments were exhibited at the feftivals. The ftadium, or courfe, was alfo conftructed of white marble. The temple of Neptune was a grand building; its avenue was lined on one fide with the ftatues of all thofe athletæ who had won the prize at the Isthmian *games* (which fee), and on the

the other with ftately pines planted in regular rows. The temple itfelf, though not very fpacious, was adorned with a multitude of brazen Tritons, or fea-gods. Here were alfo the chariots of Neptune and of his wife Amphitrite, drawn by horfes covered all over with gold, except their hoofs, which were of ivory. The two deities were carved in a ftanding pofture, and Neptune had young Palæmon riding on a dolphin by his fide. The bafes of the chariots were likewife adorned with curious baffo-relievos, and the temple itfelf with a multitude of other embellifhments. Diana of Ephefus was alfo exhibited in a public place together with two gilt wooden ftatues of Bacchus. Fortune alfo had a temple, and her ftatue was made of Perfian marble; and near this temple was that which was dedicated to the mother of all the gods. There were feveral other ftatues; among which we may felect an Apollo, furnamed Clarius, in bronze; a Venus by Hermogenes of Cythera, two Mercuries, three ftatues of Jupiter, a Minerva in bronze, mounted on a pedeftal, the baffo-relievos of which reprefented the Mufes. The city of Corinth abounded with public baths, the number of which was augmented by the emperor Adrian; but thofe of Neptune, conftructed by Eurycles of Sparta, were the moft famous. The temple of Venus at Corinth is faid by Strabo to have been fo rich, that it maintained more than 1000 courtezans, who were devoted to her fervice, and which drew hither a multitude of ftrangers. The feftivals of the Aphrodifia were celebrated in this city by harlots, as we learn from Athenæus (Deipnos. l. xiii. c. 6.); who alfo informs us, that they who fupplicated the goddefs Venus, promifed to dedicate fome females to her rites, and they obtained what they requefted.

At firft the commerce of Greece was carried on by land, and entered or left the Peloponnefus by the road of the ifthmus. The Corinthians took occafion to impofe a duty on the tranfit of all commodities, and derived from this duty a certain degree of opulence. In order to avoid the dangers of the fea, proverbially ftormy, between the ifle of Crete and Cape Malea in Laconia, merchants chofe to tranfport their goods to the feas terminating at the ifthmus. Thus, the merchandize of Italy, Sicily, and the weftern nations, was landed at the harbour of Lecheum; and that from the iflands of the Ægean fea, the coafts of Afia Minor, and of the Phœnicians, at the port of Cenchrea. In procefs of time, commodities were conveyed by land from one harbour to the other, and means contrived for tranfporting even the veffels. Corinth, having thus become the mart of Afia and Europe, continued to collect duties on foreign merchandize, covered the fea with fhips, and formed a navy to protect her commerce. Her induftry was excited and encouraged by fuccefs; fhe built fhips of a new form, and firft produced (triremes) gallies, with three branches of oars. Her naval force procured her refpect; all nations poured their productions into her emporium. The fea was covered with reams of paper, and failcloth, brought from Egypt, ivory from Libya, the leather of Cyrene, incenfe from Syria, Phœnician dates, Carthaginian carpets, corn and cheefe from Syracufe, pears and apples from Euboea, Phrygian and Theffalian flaves, together with a multitude of other articles which were continually brought into the ports of Greece, and particularly into thofe of Corinth. The games of the ifthmus alfo drew together to this city a prodigious number of fpectators. Thefe refources increafing the wealth of the ftate, workmen of every kind were protected, and exerted themfelves with new emulation.

Corinth abounded not only with warehoufes, but with manufactures of her own. Among other articles, the inhabitants made coverlets for beds, which were much fought after by foreign countries; fhe alfo collected a great number of the pictures and ftatues of the beft mafters. Her manufactures of brafs and earthen ware were held in great eftimation. Although Corinth poffeffed no copper-mines, her workmen contrived, by mixing that which fhe received from foreign countries, with a fmall quantity of gold and filver, to compofe a metal extremely brilliant, and almoft proof againft ruft. (See Æs.) Of this they made cuiraffes, helmets, fmall figures, cups, and veffels; no lefs efteemed for the workmanfhip than for the material, which were enriched with foliage and other chafed ornaments. Thofe on their pottery were equally beautiful.

The women of Corinth were admired for their beauty, and the men were diftinguifhed by their love of gain, and of licentious pleafure. Venus was their principal deity; and the courtezans confecrated to her fervice, attended, in the time of public calamities and imminent danger, at the facrifices, and walked in proceffion with the other citizens, finging facred hymns. The Corinthians, indeed, were fo much devoted to traffic and luxury, that they very much neglected the encouragement of the liberal arts and fciences, and alfo of that thirft for glory and conqueft, fo much valued by their neighbours. Neverthelefs, they cultivated a good difcipline, both in peace and in war; and this their opulence, with its effects on their difpofition and conduct, rendered abfolutely neceffary. Though they feldom, if ever, engaged in war, with a view of enlarging, but chiefly for the purpofe of defending their territories, protecting fome neighbouring ftate, or maintaining the liberty of Greece; yet this fmall kingdom furnifhed many brave and experienced officers to the other Grecian cities, who were frequently preferred to their own generals. The Corinthians were, in reality, the greateft affertors of liberty; and though they remained for fome centuries under a monarchical government, yet they always manifefted an averfion from tyranny, and an inclination to affift thofe who were oppreffed.

We have already obferved, that Sifyphus was fuppofed to be the founder of the Corinthian monarchy; which is faid to have continued in the lineal fucceffion of his family, for feven or eight generations; till it became extinct, or till it was expelled the kingdom by Alethes, one of the Heraclidæ, about thirty years fubfequent to their return, about B. C. 1074, in whofe family the kingdom of Corinth remained for a long interval, between three and four hundred years. Royalty was at length abolifhed, and the fovereign power was intrufted to 200 citizens, one of whom prefided over the reft under the appellation of "Prytanis," about the year B. C. 779. About the year 659 B. C., Cypfelus terminated this ariftocracy, by ufurping the fole government, and reftored the monarchy, which he retained for about thirty years. He was fucceeded by his fon Periander, who held the government for 44 years. Having banifhed his fon Lycophron to the ifland of Corcyra, the capital of which had been built by the Corinthians, in the year B. C. 703, Periander was reduced to the neceffity of recalling him, but his propofals were received by the exiled fon with indignation. He finally, however, refolved to abdicate the crown, and confine himfelf to Corcyra, whilft his fon, quitting that ifland, affumed the reins of government at Corinth. But the Corcyreans, dreading the arrival of Periander, defeated this project by putting Lycophron to death. Tormented by impotent rage, Periander died at 80 years of age, after a reign of 44 years. As foon as he had clofed his eyes, the Corinthians deftroyed every monument, and even the flight-

-eft traces of tyranny. His fucceffor reigned only three years; and after this fhort interval, the Corinthians, joining their troops to thofe of Sparta, eftablifhed a government which fubfifted for a long period, and which approached nearer to an oligarchy than a democracy, as no affairs of importance were fubmitted to the arbitrary decifion of the multitude. In the year 439 B. C. a war commenced between Corinth and Corcyra; and in the year 435 B.C. the Corinthians were defeated at fea by the Corcyreans, aided by the Athenians. And this conteft between Corinth and Corcyra, brought on the Peloponnefian war. In the year 395 B.C. the Athenians, Thebans, Argives, and Corinthians, formed an alliance againft the Lacedæmonians, and this gave occafion to the Corinthian war. For an account of the affiftance which Corinth afforded to the Syracufans, fee the article TIMOLEON. By the peace of Antalcidas B.C. 387, the Corinthians were obliged to withdraw their garrifon from Argos, which then became free and independent. When Alexander entered Babylon, the Corinthians fent ambaffadors to offer him the freedom of their city; and after firft treating the offer with contempt, he was afterwards induced to accept it with joy, when he was told, that this honour had been conferred only on Hercules. When Aratus of Sicyon, prætor of the Achæans, had taken poffeffion of the citadel of Corinth, B. C. 243, the Corinthians were prevailed upon to enter into the Achæan league; and about the fame time they iffued a decree, that the Romans fhould be admitted to celebrate the Ifthmian games, with the fame privileges as the Greeks. At a fubfequent period, B. C. 146, they infulted the Roman deputies, commiffioned by Metellus to appeafe the troubles occafioned in Peloponnefus by the Achæan league; but upon the arrival of the conful Mummius, Corinth was befieged; and after the defeat at the battle of Leucopetra, the conful entered the city, and abandoned it to be plundered by the foldiers. All the men who were left in it were put to the fword, and the women and flaves fold; and after the ftatues, paintings, and richeft moveables, were removed, in order to their being carried to Rome, the houfes were fet on fire, and the whole city was confumed. From that time the Corinthian brafs, which was in reputation long before, became yet more famous; for it is pretended, that the gold, filver, and brafs, which were melted, and which ran together in this conflagration, formed a new and precious metal. The walls were afterwards demolifhed, and rafed to their very foundations. This dreadful calamity was inflicted by order of the fenate, for punifhing the infolence of the Corinthians, who had violated the law of nations, in their treatment of the ambaffadors fent to them by Rome. The booty taken at Corinth was fold, and it produced a confiderable fum; no part of which Mummius referved for himfelf, but configned the whole to Rome, for the purpofe of being laid out in adorning the city. Amongft the paintings, it is faid there was a piece drawn by Ariftides, the moft celebrated painter in Greece, which reprefented Bacchus; the beauty of which was not known to the Romans, for Polybius had the mortification to fee it ufed by the foldiers as a table, upon which they played at dice. In the fale of the booty, it was adjudged to Attalus for 600,000 fefterces, or about 3625 *l.* fterling. Many other ftatues and paintings of the moft excellent mafters, preferved in the wreck of Corinth, were tranfported to Rome. Upon Polybius's return into Peloponnefus, he had the painful and mortifying fight of the deftruction and burning of Corinth, and the affliction of finding his country reduced into a province of the Roman empire. Corinth remained in a ruined and defolate ftate for many years. At length Cæfar, after he had fubdued Africa, and whilft his fleet lay at anchor at Utica, gave orders for rebuilding Carthage; and foon after his return to Italy, he likewife caufed Corinth to be rebuilt. Strabo and Plutarch agree in afcribing the rebuilding of Carthage and Corinth to Julius Cæfar; and Plutarch remarks this fingular circumftance with regard to thefe two cities, that as they were taken and deftroyed in the fame year, they were rebuilt and repeopled at the fame time. Under the eaftern emperors, Corinth was the fee of an archbifhop, fubject to the patriarch of Conftantinople. Roger, king of Naples, obtained poffeffion of it under the empire of Emanuel. It had afterwards its own fovereigns, who ceded it to the Venetians, from whom it was taken by Mahomet II., in the year 1458. The Venetians retook it in 1687, and held it till the year 1715, when they loft it to the Turks, in whofe poffeffion it has remained ever fince.

CORINTH, in *Modern Geography*, *Corinto*, or *Coranto*, a town of Greece, in the Morea, fituated near a narrow ifthmus of the fame name, which joins the Morea to the reft of Greece, between the gulf of Lepanto and that of Engia. It was formerly, as we have fhewn in the preceding article, a very rich and powerful city. At prefent it contains about 13 or 14 hundred inhabitants; each houfe has a garden, planted with orange and other fruit trees. It is 46 miles E. of Athens or Atini, and 342 S.W. of Conftantinople. N. lat. 38°. E. long. 22° 50′.

CORINTH, a townfhip of America, in Orange county, in Vermont, W. of Bradford, containing 578 inhabitants.

CORINTH, *Ifthmus of*, in *Ancient Geography*, the neck of land which joins Peloponnefus (the prefent Morea) to the upper part of Greece, and which is computed to be about fix miles wide. As this forms an obftacle to the paffage from the Ionian to the Ægean fea, it has been frequently propofed to dig a canal through it, forming a junction between thefe feas, and thus preventing the circumnavigation of the Peloponnefus. Pliny, who mentions this project, and who, without being fuperftitious, reprefents it as a rafh attempt, alleges the unhappy end of four princes who fet about it, *viz.* Demetrius of Phalera, Julius Cæfar, Caligula, and Nero. When Nero undertook this bufinefs, fuperftition difcouraged the attempt; and it was faid, that, at the firft ftroke into the earth, blood gufhed out, that groans iffued from the fubterranean caverns, and that phantoms had appeared to the inhabitants of thofe parts. Nero, however, defpifed thefe idle tales, and determined to proceed. He encouraged the Pretorian foldiers in their work by perfonal affiftance, and flattering hopes of fuccefs. The number of workmen whom he collected from all parts, and from all the gaols in the empire, was immenfe; and Vefpafian, as Jofephus informs us, furnifhed him with 6000 Jews, felected from a much greater number whom he had imprifoned. The work was begun on the fide next the Ionian fea, at the port called Lecheum, and in 75 days an interval of four ftadia was dug; and this was about the tenth part of the breadth of the ifthmus. On the laft of thefe days, Nero fent an order to difcontinue the work. Two reafons were alleged for this change of opinion and purpofe. By fome it was faid, that certain Egyptian mathematicians, whom the emperor had confulted, having taken the level of the two feas, eaft and weft of Peloponnefus, found the waters of the Ionian higher than thofe of the Ægean fea; fo that there was ground for apprehending that, if a communication were opened by a canal acrofs the ifthmus, the ifland of Ægina, and the low lands on the fide of the Ægean fea, would be overflowed and deftroyed. But this allegation is a mere pretence;

pretence; becaufe thefe two feas do actually communicate fouth of Peloponnefus, and therefore their waters muft be on a level. Confidering the pertinacious temper and extreme vanity of Nero, it is very probable that he would have perfifted, notwithftanding every objection of mathematicians, if he had not been alarmed by reports from Italy, where difturbances arofe in confequence of his abfence, and which made it neceffary for him to return, fo that he abandoned his enterprife. The news of a confpiracy at Rome terrified him exceedingly, and haftened his return. For an account of the games celebrated on this ifthmus, fee Isthmian *Games*.

Corinth, *Gulf of*, now the *gulf of Lepanto*, commencing, as fome of the ancients have faid, at the ifles called *Oxiæ*, having to the N. the mouth of the river Achelous and the Echinades, and to the S. the promontory called "Araxum Promontorium;" but, according to others, the gulf of Corinth denotes that portion of water forming a ftrait to the S. by the point called "Rhium," and to the N. by that called "Anti-Rhium." This gulf extends eaftward as far as Bœotia. In the interior part, it forms two fmall gulfs; the one, advancing to the N., between parts of the Locride and Phocide territories, called, after the town of Criffa to the N.E., "Criffæus Sinus;" the other was formed by the moft eaftern part of the gulf, and was called "Alcyonium Mare."

CORINTHIAN Brass. See Æs *Corinthium*.

Corinthian *Order*, in *Architecture*. This is generally enumerated as the third of the Grecian orders, and forms the ultimate term of richnefs and elegance proper to that ftyle of architecture.

The Corinthian order is principally diftinguifhed by its capital, which may be defcribed as confifting of a bell-fhaped body, covered with an abacus of a quadrilateral plan, with convex fides; two tiers of leaves furround the lower part of the capital, between which little ftalks or caulicoli rife up to the corners of the abacus, and thofe bending over form four volutes, and other volutes or ornaments occupy the centre of each fide. Confiderable varieties occur in ancient buildings; but this may be taken as a general analyfis, which will include all Corinthian capitals.

The account, given by Vitruvius, of the origin of this order, has been already detailed in the article *Civil* Architecture. It muft, however, be obferved, that the Egyptian buildings prefent many capitals of a bell-form, decorated with leaves, which bear a fufficient refemblance to the Corinthian capital, to juftify a fufpicion that this compofition may have been derived from the imitation of an Egyptian model.

Callimachus, to whom the invention of the Corinthian capital is attributed, is fuppofed to have lived about the 60th Olympiad, or 540 years before the Chriftian æra, which would give a very high antiquity to this order; but the firft diftinct account we have been able to find of its introduction in any building, is the following from Paufanias, l. viii. The ancient temple of Minerva at Tegea, in Arcadia, having been deftroyed, a fecond edifice was erected, under the direction of Scopas, far exceeding in fplendour and magnificence every building of the kind in the Peloponnefus. In this ftructure the three orders of architecture were employed. Within the enclofure were galleries fupported by Doric and Corinthian columns, furrounding the hypætheos or open area of the cella; and on the outfide of the temple were porticoes of the Ionic order. This building may be dated in the fourth century B.C. To judge from the extant remains of this order in Greece, which are comparatively neither numerous nor important, we fhould fay, that it had never obtained a degree of favour equal to the other two orders; but in the buildings of Rome, and in works in other countries under Roman influence and direction, quite the contrary is the cafe; and it is to thefe fources that we are to look for the beft examples of the Corinthian order.

Vitruvius, l. 3. c. 1. in treating of this order, obferves that Corinthian columns, excepting in their capitals, have their fymmetry the fame as the Ionic; but the height of the capital renders them proportionally taller, and more graceful: for the height of the Ionic capital is only a third part of the thicknefs of the column, whereas that of the Corinthian is the whole diameter of the fhaft. The other members, which are placed above the column, are taken from the Doric or Ionic orders; for the Corinthian has no entablature peculiar to itfelf, but has either triglyphs, mutules in the cornice, and guttæ in the epiftylium, as in the Doric manner; or elfe, according to the Ionic difpofition, the freize is ornamented, and dentils are placed in the cornice: fo that by thefe two orders, joined with a different capital, a third order is produced.

The preceding obfervation of Vitruvius, that the Doric entablature was fometimes applied to Corinthian columns, is in itfelf very extraordinary, and is not fupported by any antique examples; but the remark refpecting the Ionic entablature is found to be ftrictly true in a number of inftances, as we fhall proceed to fhew by the defcription of the following examples:

A temple at Jackly, near Mylafa. In this building there is a cornice, with dentils, a fwelled freize, an architrave, with three plain facias, and an Attic bafe.

The arch of Adrian at Athens. A cornice, with dentils, a plain freize, an architrave, with two plain facias, and an Attic bafe.

A building called the Incantada at Salonicha, the ancient Theffalonica. A cornice, with dentils, a fwelled freize, ornamented with flutings, an architrave, with three plain facias, an Attic bafe.

The temple of Vefta at Tivoli. A plain cornice, with uncut dentil-band, an ornamented freize, an architrave, with two plain facias, and an Attic bafe.

The temple of Antoninus and Fauftina at Rome. A plain cornice, with uncut dentil-band, ornamented freize, an architrave of two facias, divided by an Aftragal, and an Attic bafe.

The portico of Septimius Severus at Rome. A plain cornice, with a fmall uncut dentil-band, a plain freize, an architrave of three facias, divided by mouldings.

In all thefe inftances, the entablature and bafe are entirely fimilar to thofe commonly obferved in the Ionic order, from which thofe Corinthian examples only differ in the form of the capital; but in the examples which remain to be cited, it will appear that the Romans attempted to give the Corinthian order a more diftinct character, by appropriating to it a peculiar entablature and bafe, and thus made a complete order of what might be previoufly regarded, as Vitruvius appears to confider it, in the light of a compofite invention.

The Portico of the Pantheon. A cornice, with modillions, and an uncut dentil-band, a plain freize, an architrave of two facias, divided by mouldings, and a Corinthian bafe.

The temple of Peace at Rome. A cornice, with modillions and dentils, a plain freize, and an architrave of three facias, divided by mouldings.

The three columns of the Campo Vaccino, fuppofed to belong

belong to a temple of Jupiter Stator. A cornice, with modillions and dentils, a ſtraight freize, an architrave of three facias, divided by mouldings, and a Corinthian baſe.

The temple of Jupiter Tonans at Rome. A cornice, with modillions and dentils, a ſtraight freize, and an architrave of three facias, divided by mouldings.

The arch of Conſtantine. A cornice, with modillions and dentils, a plain freize, an architrave of three plain facias, and an Attic baſe.

A temple at Epheſus, ſuppoſed by Chandler to be the temple erected, by permiſſion of Auguſtus, to the god Julius. A cornice, with modillions and dentils, a ſwelled and ornamented freize, an architrave of three facias, divided by mouldings, and an Attic baſe.

The temple at Niſmes called the Maiſon Quarré. A cornice, with modillions and dentils, a ſtraight freize, an architrave of three facias, divided by mouldings, and an Attic baſe.

To render this account of the progreſſive improvement in the Corinthian order more complete and ſatisfactory, ſome inſtances may be given, in which the alteration remains imperfect, having only taken place partially, with a great reſemblance to Ionic forms.

A portico at Athens, ſuppoſed by Stuart to be the ancient Poikile. This building preſents a cornice, with mutules of two ſquare faces, an architrave, with two plain facias, and an Attic baſe.

The frontiſpiece of Nero at Rome. A cornice, with mutules of the ſame form as the laſt mentioned, an ornamented freize, and an architrave of two facias, divided by an ogee.

In theſe two inſtances, there are no dentils or dentil-bands in the cornices; and the mutules, by their ſituation and ſhape, appear rather to be a variation from the proper Ionic dentil than a new member.

Conſidering the Corinthian order in its moſt complete ſtate, we find it poſſeſſed of a peculiar entablature diſtinguiſhed from that of the other orders by a cornice with modillions and dentils, a ſtraight freize, and an architrave of three facias divided by mouldings. The column is marked by its capital, and alſo by a peculiar baſe called the Corinthian BASE. This deſcription is wholly applicable to the three columns of the campo Vaccino, which are probably the moſt complete and beautiful examples of the order extant. See *Plate* 29.

Of the modern architects, who have treated of this order, Palladio makes the column $9\frac{1}{2}$ diameters high, and gives only one-fifth part of this altitude to the entablature, which conſiſts of a cornice with modillion and dentils, a ſtraight freize, and an architrave of three facias divided by Aſtragals. The baſe is Attic. Scamozzi's deſign bears a great general reſemblance to Palladio's, but he gives ten diameters to the column. The entablature is one-fifth of this height, the cornice has modillions, only the architrave conſiſts of three facias divided by Aſtragals, and the baſe is Attic. Serlio, in his Corinthian order, has followed Vitruvius in giving it an Ionic entablature with dentils, and in the proportion of the capital. The column is nine diameters high, and has a Corinthian baſe. Vignola's is a grand and beautiful compoſition in which he has chiefly imitated the three columns. He gives the column ten diameters in height with a Corinthian baſe. The entablature is one-fourth of the height of the column, the cornice has modillions and dentils; a plain freize, and an architrave of three facias divided by mouldings.

The following Table will exhibit the proportions of ſome of the principal examples of the Corinthian order, premiſing that the different members are meaſured by the diameter at the bottom of the ſhaft; which is divided into ſixty minutes.

	Height of Column.	Height of Capital.	Architrave.	Freize.	Cornice.
Portico of the Pantheon	9D $34\frac{1}{4}'$	$67\frac{3}{4}'$	$42\frac{3}{4}'$	$39\frac{1}{2}'$	54′
Temple of Veſta at Rome - - - - -	10D 58′	$77\frac{1}{3}'$			
Temple of Veſta at Tivoli - - - - -	9D $21\frac{1}{4}'$	57′	30′	$37\frac{1}{2}'$	$32\frac{1}{3}'$
Temple of Antoninus and Fauſtina - - -	9D $36\frac{1}{2}'$	$68\frac{3}{4}'$	$43\frac{1}{2}'$	$40\frac{2}{3}'$	$52\frac{1}{2}'$
Three Columns Campo Vaccino - - - -	10D $6\frac{5}{6}'$	$66\frac{1}{3}'$	$43\frac{1}{2}'$	$43\frac{1}{3}'$	$69\frac{5}{12}$
A Building at Rome, commonly called the Baſilica of Antoninus	10D $11\frac{3}{4}'$	$69\frac{1}{2}'$	$43\frac{1}{3}'$	$32\frac{1}{2}'$	
The Arch of Conſtantine - - - - -	9D 37′	$65\frac{3}{4}'$	45′	40′	$58\frac{7}{12}'$
The Temple at Epheſus	10D 15′	64′	48′	$45\frac{1}{3}'$	48′
The Temple at Jackly	9D 31′	63′	$43\frac{2}{3}'$	40′	
Poikile at Athens - -	9D 32′	$64\frac{2}{3}'$	$39\frac{3}{4}'$	$34\frac{3}{4}'$	$38\frac{3}{4}'$
The Arch of Adrian at Athens - - - -	9D 52′	72′	41′	$38\frac{3}{4}'$	46′
The Incantada at Salonicha - - - - -	9D 31′	$66\frac{3}{4}'$	46′	$41\frac{1}{2}'$	$42\frac{1}{3}'$
Palladio - - - - -	9D 30′	70′	38′	$28\frac{1}{2}'$	$47\frac{1}{2}'$
Scamozzi - - - -	10D	70′	40′	32′	48′
Serlio - - - - -	9D	60′	30′	37′	39′
Vignola - - - - -	10D	70′	45′	45′	60′

"The Corinthian order," ſays ſir William Chambers, "is proper for all buildings where elegance, gaiety, and magnificence are required. The ancients employed it in temples, dedicated to Venus, to Flora, Proſerpine, and the nymphs of fountains; becauſe the flowers, foliage, and volutes with which it is adorned, ſeemed well adapted to the delicacy and elegance of ſuch deities." This account, though plauſible in theory, is wholly unfounded, and is, in fact, a mere modern refinement. The Romans, in borrowing their architecture from Greece, appear to have particularly appropriated the Corinthian order, they found it poſſeſſed of an ornamental character adapted to the ſplendour and magnificence of their taſte, and uſed it indiſcriminately on all occaſions, and in the temple of any deity in the ſame manner that the early Greeks uſed the Doric, and the Ionians the Ionic order. Thus the Romans erected Corinthian temples to Jupiter, Neptune, and Mars; and the Greeks built the temples of the ſame deities of the Doric order. The temples of Minerva at Athens and at Sunium are Doric; the temple of Minerva at Priene is Ionic. The temple of Jupiter Olympius at Elis, was of the Doric order; the temple of the ſame god, erected by Adrian at Athens, is Corinthian. The orders of architecture are national. Thus the numerous temples of the Grecian colonies in Sicily and Italy are uniformly Doric, marked by the moſt ſevere and maſſy ſimplicity. The cities of Ionia preſent the beſt examples of a chaſte and elegant Ionic; while the magnificent ſtructures of Balbec and Palmyra, are wholly of the Corinthian order, and in the moſt florid ſtyle of ornament.

CORINTHIANS, *Epiſtles to the*, in *Biblical Hiſtory*, are two letters, addreſſed by the apoſtle Paul to the inhabitants of Corinth,

Corinth, including both Gentile and Jewifh converts, and comprehended in the facred canon of the New Teftament. Some have inferred from 1 Cor. v. 9, that the apoftle had written another epiftle to the church at Corinth ; but Dr. Whitby (*in loc.*) obferves, that no fathers ever afcribed to St. Paul more than 14 epiftles, including that to the *Hebrews* ; nor does Eufebius mention any third epiftle to the Corinthians, amongft the true, controverted, or fpurious writings which pafs under his name. Moreover, no Chriftian writer ever cited any thing from this fuppofed epiftle ; and all the Greek fcholiafts declare, that the apoftle fpeaks in thefe words, " not of another, but of this very epiftle," which, fays Dr. Whitby, " is fufficient to juftify the verfion I have given of thefe words, I had written, or was writing, in this epiftle." Befides, his fuppofed epiftle to Laodicea is cited as a book exploded by St. Jerom; his epiftles to Seneca are in like manner cited by St. Jerom and St. Auftin; the acts of Paul are cited, and rejected by Origen and Eufebius; but none of them make any mention of more than two epiftles to the church of Corinth.

The *firft epiftle* was written about three years after the apoftle had left Corinth, to preach the gofpel in other parts of Greece ; and it was written at Ephefus, as appears from ch. xvi. 8, 9, 19, and Acts, xviii. 18, 19, according to Pearfon and Mill in the year 57, the third of the emperor Nero ; but, according to Lardner's computation of St. Paul's times and travels, in the fpring of the year 56, and this was alfo the opinion of Lenfant and Beaufobre. This epiftle was written in anfwer to fome important inquiries propofed by the Corinthians, and for the purpofe of correcting the various irregularities and diforders, of which they were guilty. The firft article under the head of abufes, with which they were chargeable, related to the parties and factions into which they had fallen, and the oppofition which was made by fome of them to St. Paul's apoftolical miffion. The firft four chapters comprehend this firft head. The fecond topic which the apoftle confiders was the cafe of a notorious offender in the Corinthian church, who had been guilty of moft fcandalous inceft with his father's wife. (See chap. v.) The third article which the apoftle exhibits againft the Corinthians is, that by a covetous and litigious temper they were led, in violation of the rules of Chriftian prudence and charity, and fometimes in oppofition to the principles of juftice, to profecute their brethren in the heathen courts. (Chap. vi. 1—11.) In the fourth place, the apoftle cautions them againft the fin of fornication, to which, in their Gentile ftate, they had been much addicted, and which fome feem to have reckoned among things that were indifferent, or to confider as of inferior enormity ; introducing ufeful reflections on matters of indifference, and illuftrating the heinous evil of fornication from views peculiar to the Chriftian religion. (Chap. vi. 12. to the end.) As Corinth was conveniently fituated for commerce, it abounded in riches, and was furnifhed with all the accommodations, elegancies, and fuperfluities of life. Hence, by too natural a confequence, the inhabitants were led into luxury, lewdnefs, and all manner of vice ; fo that they became infamous even to a proverb. Thus, Κόρίνθια γυνή, a Corinthian woman, is, in the language of the ancients, a lewd proftitute, according to the proverb (cited in Erafm. Adag. Cent. 7. p. 633. 720.) ἆ κόρινθια ἔοικας χοτροπωλησειν, *at Corinthia videris corpore quæftum factura.* And Κορινθιαζειν, Κορινθιαζεσθαι, is ἑταιρεύειν, *fcortationibus indulgere.* (Hefych. Phavor.) We have already obferved (from Strabo) that there was in it a temple dedicated to Venus, which πλείους ἢ χιλιας Ἱεροδούλους εκεκτητο ἑταιρας. See CORINTH.

Having thus largely, and with great fidelity and plainnefs, corrected fome lamentable diforders which prevailed among the Corinthians ; the apoftle proceeds to the other principal object of his epiftle, which was to anfwer certain queftions which they had propofed to him. Here he determines, *firft*, thofe which related to the marriage-ftate ; ftating, that in fome circumftances this ftate fhould be entered into, and continued in ; but in others, foreborne, particularly at that time ; and enjoining wives not to depart from their hufbands, and hufbands not to difmifs their wives. (Ch. vii. 1—11.) He then fhews, that marriages were not to be diffolved, as fome thought they might, on account of a difference in religion ; and he urges contentment with the ftations, in which they were called, whether they were married or fingle, bond or free. (v. 12 – 14.) And with regard to fingle perfons, he afferts the inexpediency of their marrying in the peculiar circumftances of the church at that juncture. (v. 25, to the end.) To the *fecond* query propofed, *viz.* how far they might comply with their heathen neighbours in " eating things facrificed to idols." he replies, by reminding them that though all Chriftians might well be fuppofed to know the vanity of thofe imaginary deities, to which the facrifices were offered, yet it might prove an occafion of grief and fcandal to fome, if the profeffors of Chriftianity fhould partake of thofe facrifices in their temples ; which, therefore, Charity would require them by all means to avoid. (Ch. viii.) He then, after waving, for his own part, the expectation of a maintenance from the Corinthians, ftates the right, which, as a minifter of the gofpel, he really had to be fupported by thofe among whom he laboured ; and this he argues both from natural equity, and fcripture-principles. (Ch. ix. 1, to the end.) He next refumes the argument againft partaking of entertainments upon " things offered to idols" in the heathen temples. (Ch. x. 1—13.) He proceeds to caution them againft all approaches to idolatry. (v. 14, to the end, ch. xi. 1.) In reply to a *third* query, concerning the manner in which women fhould deliver any thing in public, when urged to it by a divine impulfe, he firft fettles this point ; he then confiders various circumftances relating to public worfhip, and guards againft abufes in the celebration of the Lord's fupper, and alfo in the exercife of fpiritual gifts ; concluding with a recommendation and defcription of mutual charity. (Ch. xi. 2, to the end, ch. xii. ch. xiii. Ch. xiv.) As fome of the Corinthians doubted, and others denied, the refurrection of the dead, the apoftle eftablifhes this great and peculiar article of the Chriftian faith. (Ch. xv.) He then clofes the whole with fome neceffary counfels to the Corinthian churches and exhortations to fortitude and charity. (Ch. xvi.)

The *fecond epiftle* of St. Paul to the Corinthians was written during his ftay in Macedonia, whither he had gone from Ephefus, fomewhat more than a year after his former epiftle ; according to Pearfon in the year 57, and as Mill fuppofes near the end of that year ; or, as Dr. Lardner fuggefts, in September or October. (Ch. ix. 1—5. ch. viii. ch. xiii. 1.) It was conveyed by Titus, who was returning to Corinth in order to forward the collection intended for the poor Chriftians in Judea. Its evident defign is, in general, to illuftrate fome of the fame points upon which he had difcourfed in the former, according to the information which the apoftle had received from Titus concerning the circumftances and temper of the Corinthian church ; and the writer interfperfes and enforces fome occafional reflections and advices upon various fubjects, which he thought moft conducive to their inftruction and edification. From a view of the epiftle it is evident, that a great part of it is employed in reclaiming the Corinthian church from their undue attachment

tachment to Judaizing teachers, and from that party-ſpirit, which they had indulged, and in rekindling proper regards to the unadulterated doctrine of the goſpel, and to his own apoſtolical counſels. This leading deſign of the epiſtle is interrupted by the occaſional introduction of other matters, which can form no reaſonable objection to the accuracy and beauty of this excellent compoſition; for the tranſitions ariſe from ſome obvious and important ſentiments, which render them natural and juſt. In theſe digreſſions there is an admirable wiſdom; becauſe they relieve the minds of the Corinthians from that uneaſineſs, which they muſt have felt from a conſtant attention to ſo diſagreeable a ſubject as their unſuitable conduct towards the apoſtle himſelf. It is with the ſame kind of propriety and ſagacity, that the ſevere intimations, which the dignity of the apoſtolic character obliged St. Paul to drop againſt thoſe, who might perſevere in their oppoſition, are reſerved to the cloſe of the epiſtle; as they would feel with additional weight, in all probability, after their minds had been ſoftened with the reiterated expreſſions of his tender affection to the Corinthians in general, and the innocence and amiableneſs of his character had been repreſented in ſuch a variety of views. See Doddrige's Expoſition, vol. iv. Whitby's Comment. vol. ii.

We cannot cloſe this article, without referring to ſome pertinent and judicious remarks, made by archdeacon Paley, in his "Horæ Paulinæ," (an excellent work of original criticiſm and reaſoning,) on the undeſigned agreement or conformity that is manifeſt between theſe letters of St. Paul to the Corinthians, and the hiſtory of his life and travels in the book of Acts.

As it appears, from chap. vii. v. 1. that the firſt epiſtle was written to the Corinthians, in anſwer to one which he had received from them, this alone is a circumſtance that favours the authenticity of the epiſtle:—for it muſt have been a far-fetched contrivance in a forgery, firſt to have feigned the receipt of a letter from the church of Corinth, which letter does not appear; and then to have drawn up a fictitious anſwer to it, relative to a great variety of doubts and inquiries, purely economical and domeſtic; and which, though likely enough to have occurred in an infant ſociety, in a ſituation and under an inſtitution ſo novel as that of a Chriſtian church then was, it muſt have very much exerciſed the author's invention, and could have anſwered no imaginable purpoſe of forgery, to introduce the mention of at all. Particulars of this kind are ſuch as follow:—the rule of duty and prudence relative to entering into marriage, as applicable to virgins, to widows—the caſe of huſbands married to unconverted wives, of wives having unconverted huſbands—the caſe where the unconverted party chuſes to ſeparate, when he chuſes to continue the union—the effect which their converſion produced upon their prior ſtate, of circumciſion, of ſlavery—the eating of things offered to idols, as it was in itſelf, as others were affected by it—the joining in idolatrous ſacrifices—the decorum to be obſerved in their religious aſſemblies, the order of ſpeaking, the ſilence of women, the covering or uncovering of the head, as it became men, as it became women. Theſe ſubjects, with their ſeveral ſubdiviſions, are ſo particular, minute, and numerous, that though they be exactly agreeable to the circumſtances of the perſons to whom the letter was written, nothing but the exiſtence and reality of theſe circumſtances could have ſuggeſted to the writer's thoughts. Another particular deſerving of notice is, that in this correſpondence the Corinthians did not ſay one ſyllable about the enormities and diſorders which had crept in among them, and in the blame of which they all ſhared; but that the apoſtle's information, concerning the irregularities then prevailing at Corinth, had come round to him from other quarters. (Ch. i. 11, 12. v. 1, 2.) That the Corinthians ſhould, in their own letter, exhibit the fair ſide of their conduct to the apoſtle, and conceal from him the faults of their behaviour, was extremely natural, and extremely probable; but it was a diſtinction which would not have eaſily occurred to the author of a forgery; and much leſs likely is it, that it ſhould have entered into his thoughts to make the diſtinction appear in the way in which it does appear, *viz.* not by the original letter, not by any expreſs obſervation upon it in the anſwer, but diſtantly by marks perceivable in the manner, or in the order, in which St. Paul takes notice of their faults. For the particular traces of unintended and ſeemingly accidental coincidence between the facts that are recited in the two epiſtles, and thoſe that may be collected from the hiſtory, and which is altogether irreconcileable with a premeditated impoſture or forgery, we muſt refer the reader, converſant with ſubjects of this kind, and deſirous of farther information, to the work already cited, p. 72—151.

We may here obſerve, that there is another epiſtle of St. Paul to the Corinthians, beſides the two above mentioned, purporting to be an anſwer to an epiſtle from the Corinthians to him. This was tranſlated by Scroderus, from a copy in the Armenian language, which had been ſent to Mr. Whiſton, and was afterwards, from a more perfect copy procured at Aleppo, publiſhed by his ſons, as an appendix to their edition of Moſes Chorenenſis. No Greek copy exiſts of this epiſtle: it is not only unſupported by ancient teſtimony, but negatived and excluded; as it has never found admiſſion into any catalogue of apoſtolical writings, acknowledged by, or known to, the early ages of Chriſtianity. This epiſtle is an artful and ſpecious forgery, introduced with a liſt of names of perſons who wrote to St. Paul from Corinth, and preceded by an account, ſufficiently particular, of the manner in which the epiſtle was ſent from Corinth to St. Paul, and the anſwer returned. But they are names which no one ever heard of, and the account it is impoſſible to combine with any thing found in the Acts, or in the other epiſtles.

CORINTHUS, in *Ancient Geography*, a town of Greece, in Theſſaly.—Alſo, a town of Greece, in Epirus.

CORIO, in *Geography*, formerly a town of Piedmont, in Italy, belonging to the king of Sardinia, is now a town of France, in the department of the Po, chief place of a canton, in the diſtrict of Turin, containing 5132 inhabitants. The canton is compoſed of 5 communes, and reckons in all 6764 inhabitants.

CORIOLANO, Christofano, in *Biography*, a deſigner and engraver in wood, who is ſaid to have been a native of Nuremberg, but who afterwards eſtabliſhed himſelf at Venice. Heinecken conjectures that his real name was that of *Lederer*, a family ſtill exiſting in Saxony, and which Chriſtofano might tranſlate into Coriolano, according to the cuſtom of thoſe times.

Vaſari informs us, in his Life of Marc Antonio, that Chriſtofano engraved, from the deſigns of himſelf and his ſcholars, all the portraits prefixed to the lives of the different painters, ſculptors, and architects, in his extenſive work; and that he continued to enjoy the reputation of an excellent artiſt at Venice, where he was eſtabliſhed. If ſo, Chriſtofano Coriolano cannot have been born ſo late as 1560, which M. Huber ſuppoſes. Beſides the prints for Vaſari, many of thoſe in the *Ars Gymnaſtica Hieronymi Mercurialis*, the work of Ulyſſes Aldrovandini, are attributed to this maſter. But it is probable there were two artiſts of the ſame name. Huber.

Coriolano, Cav^r. Bartolommeo, ſuppoſed the ſon of the

the preceding artiſt, was born at Bologna, about 1590, and is ſaid to have perfected himſelf in deſign by ſtudying in the academy of Caracci. Guido, however, ſeems to have been the painter he moſt admired; and we are indebted to Bartolommeo for ſeveral excellent engravings in chiaro-ſcuro, from the drawings of that graceful painter. Theſe prints were produced, like thoſe of Ugo de' Carpi and Andrea Andreani, by means of three blocks of wood; one of which gave the outlines and the greateſt depths of ſhadow, as if hatched with a pen; the ſecond, the middle tints; and the third, the darker maſſes. He flouriſhed from 1620 to 1650. His prints are generally ſigned with his name, or with his initials, thus, B. C. Eques.

Amongſt his beſt prints are the following: "St. Jerome before a Crucifix," a half-length figure, dated 1636, after Guido; "the Daughter of Herodias, with the Head of John the Baptiſt," from the ſame; "the Fall of the Giants," a large upright print on four ſheets, from the ſame painter, dated 1647, and conſidered the chef d'ouvre of Coriolano. Heinecken. Huber.

Coriolano, Gio. Batista, the younger brother of Bartolommeo, was born at Bologna, about 1596, and ſtudied painting and deſign under Gio. Luigi. Valeſio. Some of the pictures of Gio. Batiſta exiſt in the churches of St. Anna and the Annonciata, at Bologna. He is better known by his numerous engravings in wood and copper, the former of which are preferred by the connoiſſeurs.

We ſhall only notice the following prints by this artiſt, who is ſaid to have died in 1649: "the Portrait of Fortunatus Licetus," 1639, in 4to.; "Chriſt crowned with Thorns," a middling-ſized upright plate, boldly etched from Lod. Caracci. Huber.

Coriolano, Teresa Maria, ſiſter to the two preceding artiſts, after having acquired ſufficient knowledge of deſign from the inſtructions of her father, ſtudied painting under Elizabetta Sirani. She alſo amuſed herſelf with etching, as appears by a ſmall print repreſenting the Virgin and Child. Huber.

CORIOLANUS, Caius Marcus, celebrated in Roman hiſtory, was deſcended from the family of the Marcii, and in his early years he diſplayed uncommon courage and nobleneſs of mind, united with ſtrong paſſion and the pride of high birth. He firſt diſtinguiſhed himſelf in the war againſt Tarquin, who was expelled; and obtained a civic crown, for having preſerved the life of a fellow-citizen. For his ſucceſs over the Volſcians, he was preſented with a fine horſe richly capariſoned, and a tenth part of the ſpoil. The former he accepted, but diſdained a greater ſhare of the booty than fell to his lot in common with others of the ſame rank. As a further favour, he demanded the releaſe of a Volſcian priſoner, who had been connected with him by the tie of friendſhip, which was immediately granted; and the ſurname of Coriolanus was unanimouſly conferred upon him, on account of his great ſervices in the capture of Corioli, the capital of the Volſcians, which happened in the year 493 B. C. About this time diſſenſions prevailed between the patricians and plebeians: Coriolanus ſided with the former, and was exceedingly ſevere againſt the plebeians. For ſome of his meaſures he was ſummoned before the tribunes, to which he paid no attention, till he conceived the ſafety of the ſtate required him to come forward in his own juſtification. Inſtead, however, of ſoftening the reſentment of the people by ſubmiſſion, he aggravated their diſpleaſure by the haughtineſs of his behaviour. He was now condemned to be thrown from the Tarpeian rock; but from this ſevere puniſhment he was ſaved by the courage of the patricians, in whoſe cauſe he had embarked. He was at length tried by the people, to whom he appealed by the ſcars he had received in fighting for his country, and by the lives he had ſaved in battle; but the tribunes ſucceeded in obtaining againſt him a ſentence of perpetual baniſhment. He heard the decree without emotion, and with a manly compoſure took leave of his mother, his wife, and children; but the ingratitude of his country made an indelible impreſſion on his mind. He was bent on revenge: he joined with the enemies of Rome, took many of the towns, and encamped within five miles of the city itſelf. The people now ſaw their error, and a deputation was ſent out to treat with him: he received them with haughtineſs, but would give them no hopes of a reconciliation. To a ſecond and third meſſage of the ſame kind he ſhewed himſelf inexorable. At length, his mother, wife, and children, came out to plead their country's cauſe. To their intreaties he could no longer refuſe his ear. Raiſing his venerable parent from the ground, on which ſhe had proſtrated herſelf, he exclaimed, "You have ſaved Rome, my mother, but you have deſtroyed your ſon." He retired to his tent, and ſoon after took meaſures for a retreat. When he had brought back the troops to the Volſcian country, he divided all the booty among the ſoldiers; on which account he ſo ingratiated himſelf with the men, that his own want of reſolution was forgotten. By ſome of the hiſtorians we are told he lived to a great age; though others maintain that he was ſlain in a tumult, excited againſt him for yielding to the prayers of his country. Plutarch.

CORIOLLA, Corioli, in *Ancient Geography*, a town of Italy, ſituated in the country of the Volſci, of which it was the metropolis. From this town, which no longer ſubſiſted in the time of Pliny, Marcius took the name of *Coriolanus*.

CORIOS, a river of Aſia, towards Carmania.

CORIOTRAGEMATODENDRON, in *Botany*, Pluk. See Myrica *quercifolia*.

CORIOVALLUM, in *Ancient Geography*, a town of Belgic Gaul, on the route from Colonia Trajana, between Teudurum and Juliacum. Anton. Itin.

CORIS, in *Botany*, (κορις; Dioſc.) Tourn. 652. Append. Linn. gen. 243. Schreb. 329. Willd. 374. Lam. Ill. 292. Juſſ. 96. Vent. 2. 288. Claſs and order, *pentandria monogynia*. Nat. Ord. *Lyſimachiæ*, Juſſ. *Primulaceæ*, Vent.

Gen. Ch. *Cal.* one-leafed, ventricoſe, five-toothed, crowned externally with ſtrong ſharp briſtles. *Cor.* monopetalous, irregular; tube the length of the calyx, cylindrical; border flat, five-parted; ſegments oblong, obtuſe, emarginate, unequal. *Stam.* five, briſtle-ſhaped, ſhorter than the corolla, declining; anthers roundiſh. *Piſt.* Germ ſuperior, roundiſh; ſtyle filiform, the length of the ſtamens; ſtigma ſimple. *Peric.* Capſule globular, placed at the bottom of the calyx, one-celled, five-valved. *Seeds* numerous, ſomewhat egg-ſhaped, ſmall.

Eſſ. Ch. Calyx ventricoſe, with thorn-like teeth. Corolla monopetalous, irregular. Capſule five-valved, included in the calyx.

Sp. C. *monſpelienſis*. Linn. Sp. Mart. Lam. Ill. Pl. 102. Willd. (C. cærulea maritima; Bauh. Pin. 280. Symphytum petræum; Cam. Epit. 699.) *Root* perennial. *Stems* ſeveral, about ſix inches high, more or leſs erect, cylindrical, branched, cinereous, or reddiſh. *Leaves* ſcattered, numerous, ſmall, linear; the upper ones in the wild plant edged with ſharp prickly teeth. *Flowers* red or white,

white, in denfe, egg-fhaped, terminal fpikes. A native of fandy fhores in the fouth of Europe.

Coris *lutea*; C. Bauh. See Hypericum *coris*.

Coris is alfo ufed in the Eaft Indies for a kind of fhells which pafs for money. See Bia and Cowry.

CORISCO, in *Geography*, two iflands of that name on the coaft of Guinea, belonging to Benin.

CORISPERMUM, in *Botary*, (from κορις, *a bug*, and σπερμα, *feed.*) Linn. Gen. 12. Schreb. 16. Willd. 26. Gært. 469. Lam. Illus. 12. Juff. 86. Vent. 2. 261. Clafs and order, *monandria digynia*. Nat. Ord. *Oleraceæ*, Linn. *Atriplices*, Juff. *Chenopodæ*, Vent.

Gen. Ch. *Cal.* none; Linn. Schreb. Willd. (two-leaved; leaves oppofite, compreffed, acuminate, incurved; Lam. Juff. Vent. Gært.) *Cor.* dipetalous; Linn. (none, Lam.) *Stam.* Filament one, but in the lower flowers often from two to five, filiform; anther roundifh. *Pift.* Germ fuperior, egg-fhaped, compreffed; ftyles two, capillary (one; Gært.) ftigmas acute. *Peric.* none. *Seed* fingle, oval, compreffed, flat or a little concave on one fide, convex on the other, with an acute margin.

Eff. Ch. Calyx or corolla two-leaved, or two-petalled, one of them wanting. Seed fingle, elliptical, plano-convex, with an acute margin.

Sp. 1. C. *hyffopifolium.* Linn. Sp. Pl. 1. Mart. 1. Lam. 1. Willd. 1. Lam. Illus. Pl. 5. "Flowers lateral; bractes like the leaves, linear, fmooth underneath." *Root* annual. *Stem* fcarcely a foot high, pubefcent towards the top, reddifh beneath, ftriated, branched. *Leaves* alternate, entire, with a white longitudinal nerve, and fomewhat membranous edges; lower ones two inches long, about a line broad, ending in a long point, diminifhing gradually towards the top of the ftem, without affuming the form of bractes. *Flowers* axillary within the upper leaves, feffile. *Seeds* emarginate. A native of Ruffia and the fouth of France. 2. C. *fquarrofum.* Linn. Sp. 2. Mart. 2. Lam. 2. Willd. 2. "Spikes lateral and terminal, fquarrous; bractes egg-fhaped, fhort, mucronate, fomewhat villous." *Root* annual. *Stem* a foot high or more, much branched, panicled, zigzag, cylindrical, almoft fmooth, greenifh, with purple ftriæ; lower branches almoft decumbent. *Leaves* about two inches long, alternate, linear, fmooth, nearly equally diftant from each other. *Spikes* an inch long or more; bractes very different from the leaves, with white membranous edges; flowers feffile. *Seeds* not emarginate. A native of Tartary and Siberia. There is a variety, perhaps a diftinct fpecies, found in the fouth of France, with weaker ftems and more flender generally terminal fpikes. 3. C. *orientale.* Lam. 3. "Leaves long, narrow, linear; flowers fomewhat panicled, growing only at the ends of the branches." *Root* annual. *Stems* about a foot high, flender, reddifh at the bafe, branched. *Leaves* narrowing towards the bafe. *Bractes* fmall, oblong, villous. A native of the Levnat.

Corispermum *foliis oppofitis*; Fl. lap. Gron. See Callitriche.

CORITA, in *Geography*, a town of Spain, in the province of Leon; 17 miles S.S.W. of Leon.

CORITANI, or Coriceni, inhabitants of ancient Albion, were fituated to the W. and N. of the Iceni, and, according to Camden, were the ancient inhabitants of the country, which is now divided into Northamptonfhire, Leicefterfhire, Rutlandfhire, Lincolnfhire, Nottinghamfhire, and Derbyfhire. Other antiquaries, however, are of opinion that their territory was not fo extenfive. The name of the Cor-Iceni plainly indicates that there was fome kind of affinity or connection between them and their neighbours, the Iceni. Some think they were two tribes of the fame nation, and that Cor-Iceni denotes the leffer Iceni, from *Carr*, a dwarf, and Iceni. Others imagine that both thefe Britifh tribes derived their name from the different kinds of animals which conftituted their chief riches, and the tending of which was their chief employment; the Iceni from *Uchen*, oxen; and the *Cor-Iceni*, from *Cor*, a fheep. However this be, if the two tribes did not form one nation, they were in very ftrict alliance, and fhared the fame fate; having been both reduced to fome degree of fubjection to the Romans by Oftorius Scapula, and totally fubdued by Suetonius Paulinus. The Romans made great changes in the country of the Cor-Iceni, by introducing agriculture, and by building many forts and ftations in it to keep them in fubjection. Lindum, now Lincoln, the ancient capital of the Cor-Iceni, became the feat of a Roman colony, and one of the moft confiderable cities which thefe people had in Britain; and it is mentioned both by Ptolemy and by Antoninus in both his journies. By following the courfe of the 6th journey of Antoninus, from London to Lincoln, we meet with a confiderable number of Roman towns and ftations within the territories of the Cor-Iceni; as Venonæ, now Claycefter; Ratæ, now Leicefter; Virometum, now Willoughby; Margidunum, now Eaft-Bridgeford; Ad-Pontem, now Southwell; and Crocolana, now Brugh, near Cottingham. The extenfive country of the Cor-Iceni was included in the Roman province called Britannia Prima.

CORITHUS, or Corythus, a town and mountain of Italy, in Etruria, according to Servius on Virgil; but Cluvier thinks that Servius is miftaken; and that if fuch a place exifted, it muft have been in the country fince called Cortona.

CORITIUM, a town of Afia, towards Syria; placed near the Euphrates by William of Tyre.

CORITUS, a mountain of Italy in Umbria; now Monte Corvo.

CORIUM, a place in the ifle of Crete, near the lake or marfh called Corefium.

CORIUNDI, a people of Hibernia, according to Ptolemy.

CORIUS, a river of Carmania.

CORIZENSIS, an epifcopal fee of Afia, in the patriarchate of Antioch.

CORIZIOLA, in the *Materia Medica*, is a name given by fome authors, particularly by Rhafis, to the fcammony.

CORK, the exterior bark of a tree belonging to the genus of oak (Quercus *Suber*), which grows wild in the fouthern parts of Europe, particularly France, Spain, Portugal, and Tufcany. When the tree is about 15 years old, it is fit to be barked, and this can be done fucceffively for eight years. The bark always grows up again; and its quality improves as the age of the tree increafes. If care is not taken to ftrip the bark, it fplits and peels off by itfelf, being pufhed up by a fecond growth forming under that of the preceding year.

Stripping and preparing the Bark.—The bark is taken off by the Portuguefe in fheets or tables, by cutting it with knives having two handles, fimilar to thofe which the tanners or fkinners ufe at their beam, or horfe, flitting it down after the circular incifion is made, from top to bottom; to effect this incifion they afcend the tree by a ladder to the part where the branches fpring from the top; they then make a flice or flip: the filaments connecting the bark with the trunk are next cut down, or through, by a knife formed like our hay-fpade, and which they ufe in nearly the fame manner: the bark is frequently, through hafte, broken off at

at the root, in which cafe the two ends are diftinguifhed by the appellations of "cut end" and "faft end;" the firft is that which had been at the top of the tree, where the circular cut was firft made, and the fecond is that which had been next the ground.

Another mode of accomplifhing the artificial ftripping of the tree, is thus performed: feveral incifions are made from the top of the trunk to the bottom, and at each extremity of thefe incifions a circular cut is effected; by this operation the bark is cut off from communication with either the lower or higher parts of the tree; confequently it is entirely deprived of fupport; in a little time it loofens, and its feparation is completely accomplifhed by the hand; thus the progrefs of nature is expedited by very fimple means. Before the operation of barking is again performed upon the fame tree, fhould it be a young one, it ought to ftand three years; it is not however unfrequently cut within the period; when it is cut too young, it is generally preferved by the Englifh cork-cutter in his cellar till it alters from green to the colour proper for his purpofe, which is effected merely from the time he keeps it in that ftate, though after all, it is ftill much inferior to that taken when the tree has arrived at maturity.

After being detached from the tree, the Portuguefe "burn it," laying the convex fide of the bark to the fire; in this operation they are careful to cover all the blemifhes they poffibly can, holes are filled up in an infufficient manner either by the fwelling and ftraightening of the wood upon the fire, or by the artful introduction of foot and dirt. When the judgment of the burner is fufficiently exercifed in flattening the bark, and artificially repairing its defects, it is laid into the farm yard for fale, in ftacks, and bought by the merchants from thence for exportation.

Another method ufed in ftraightening the bark, is to pile it up in pits, loaded with heavy ftones, by which method it becomes flat, this is afterwards more completely effected in a damp cellar, and is called "laying the cork;" when this operation is finifhed it is dryed over a ftrong fire in what is called "a burning yard;" from negligence in this procefs it receives too much of that black colour which is fo frequently difcovered in articles made of cork: when fufficiently dryed it is ready for ftacking.

The cork is not burnt, but only charred on each furface; previous to this operation the pores of the bark are open, and its confequent fponginefs of texture would make it not only give too much way to the knife; but particularly in the cafe of "taps" and "bungs" would render it a filter, rather than a preferver, of liquids. It fhrinks with the application of moderate heat, and thereby clofes the pores, by which any filtration might be effected. If "burning" ever be ufed as a cover for defects, it is not an original defign but an accidental advantage, which is taken of a neceffary procefs; "bungs" and "taps" are always charred on both furfaces; good bottle corks, though the bark of which they are made is likewife fubjected to the operation of fire, do not after they are cut exhibit any marks of that element, being cut in the length way of the wood, the pores lie in a contrary direction, and the charring confequently is taken off by the procefs of rounding them.

The cork tree as well as the ufes to which the bark is applied, &c.—This tree, as well as its ufe, was known to both the Greeks and Romans. By the former it was called *phellus*. Theophraftus reckons it among the oaks, and fays, that it has a thick flefhy bark, which muft be ftripped off every three years to prevent it from perifhing. He adds, that it was fo light as never to fink in water, and on that account might be ufed with great advantage for a variety of purpofes. That the *fuber* of the Romans was our cork-tree is generally and juftly admitted. Pliny relates of it every thing faid by Theophraftus of the *phellus*; and from his account we learn, that at the period when he wrote, cork was applied to as many purpofes as at prefent. At that time fifhermen made floats to their nets of cork; that is, they affixed pieces of cork to the rope which formed the upper edge of the net, in order to keep it at the furface of the water. Another ufe to which cork was applied, according to Pliny, was for anchor-buoys. "Ufus ejus ancoralibus maxime navium:" that is, as this paffage may be interpreted, it was ufed for making buoys, called "Ancoralia," which were fixed to the cable, and by floating on the furface of the water, over the anchor, pointed out the place where it lay. Our navigators ufe for that purpofe a large but light block of wood, which, in order that it may float better, is often made hollow. See Buoy.

Another ufe of cork among the Romans was for being made into foles, which were put into their fhoes, in order to fecure their feet from water, efpecially in winter; and, as high heels were not then introduced, they ferved the purpofe of elevating ladies and making them appear taller than they naturally feemed. The practice of employing cork for jackets to affift in fwimming is alfo very ancient; for we are informed, that the Roman whom Camillus fent to the capitol when befieged by the Gauls, put on a light drefs, and took cork with him under it, becaufe, to avoid being taken by the enemy, it was neceffary that he fhould fwim through the Tiber. When he arrived at the river, he bound his clothes upon his head, and placing the cork under him, was fo fortunate as to fucceed in his attempt. The moft extenfive and principal ufe of cork at prefent is for ftoppers to bottles. To this purpofe it is excellently adapted; becaufe it is very light, may be eafily compreffed, and expands again by its elafticity as foon as the preffure upon it is removed, and, therefore, it fills and ftops up very clofely the fpace into which it has been driven by force. Befides, it may be eafily cut into all forms; and though it abounds with pores, which are the caufe of its lightnefs, it fuffers neither water, beer, nor any common liquid to efcape through it, and it is but flowly and after a confiderable interval that it can be penetrated even by fpirits; its numerous pores feem to be too fmall to afford a paffage to the fineft particles of water and wine, which can with greater facility ooze through more compact wood that has larger or wider pores. This ufe of corks was not altogether unknown to the Romans; for Pliny exprefsly fays, that it ferved to ftop veffels of every kind, and inftances of its being employed for that purpofe may be feen in Cato (De Re ruftica, cap. 120.) and Horace (lib. iii. od. 8. 10.); its application to this ufe does not feem, however, to have been very common as other fubftances have been generally employed for this purpofe. Stoppers of cork feem to have been firft introduced after the invention of glafs bottles, of which no mention occurs before the 15th century. See Bottles.

This wood is ftill formed into foles for fhoes, into corks and bungs for ftopping bottles, &c. into a floatage for the nets of fifhermen; it is employed generally, though perhaps with a confiderable degree of error in teaching the art of fwimming; it is alfo ingenioufly ufed on account of its lightnefs, when an amputation of the human leg has been neceffary, to fupply the deficiency; the Spaniards line ftone walls with it, which not only renders their houfes very warm but corrects the moifture of the air; the Egyptians made coffins of it, which being covered in the infide with a refinous compofition

pofition preferved their dead bodies. It is burnt to make that light black fubftance called Spanifh black, from its having been firft made in Spain.

Cork bark has not only been applied as above, but alfo in the prefervation of life, when endangered by fhipwreck; the moft confpicuous exhibition of its advantages is in the application of it in the conftruction of the "life boat" or "cork boat," as it was originally called. We have under the article *boat*, "*life boat*," given our readers a fhort account of that ineftimable invention; fince which we have procured a very valuable account by the principal fecretary of the meeting who firft advertifed the reward; we have alfo obtained from the liberality of Mr. Greathead, and the intereft of the gentleman alluded to, a plan or fection of the boat, drawn by the original inventor, which will be given under the article LIFE *Boat*.

A cork jacket too has been revived from an old German difcovery, by Mr. Dubourg; to preferve the lives of perfons in danger of drowning, which is conftructed as follows. Pieces of cork about three inches long, by two wide, and the ufual thicknefs of the bark, are inclofed between two pieces of ftrong cloth or canvas and formed like a jacket without fleeves; the pieces of cloth are fewed together round each piece of cork, to keep them in their proper fituations; the lower part of the jacket about the hips is made like the fame part of women's ftays, to give freedom to the thighs in fwimming; it is made fufficiently large to fit a robuft man, and is fecured to the body by two or three ftrong tapes fewed far back on each fide, and tied before; the ftrings are thus placed to enable any wearer to tighten it to his own convenience.

Cork in its action has the elafticity of a fpring, and when preffed into any aperture, it exerts a force acting outwardly on all fides from the centre. It is this quality that makes it valuable in fhutting out the external air from liquors, and elaftic fluids; and it is fitted for this purpofe in a degree proportioned to the impermeability of its pores. The elafticity of cork has alfo been employed for many other purpofes in the arts; it forms the fpring of the lifter in ordinary candlefticks, and where the frame is not heavy, it can be made into a good fubftitute for the pulleys and weights of the fafhes of windows. See CANDLESTICK and WINDOW-SASH.

Other vegetable productions have likewife been occafionally employed poffeffing qualities fimilar to cork. The fpondias lutea, a native of South America, which flourifhes in moift fituations, and which is there called monbin or monbain, is fometimes brought to England, as a fubftitute for cork. The roots of liquorice are applied to the fame ufe, and on this account, as well as its medicinal properties, is much cultivated in Sclavonia, and exported to different countries. The tree called myffa, which is found in North America, has alfo been applied to fimilar purpofes.

CORK-*cutting*, or the *Manufacturing of Corks*. This bufinefs, though it is thought one of the moft dirty, is not one of the leaft profitable; it is likewife eafy in the acquirement. The cork, after being preffed into fquare pieces, as above noted in the treatment of the bark, is received by the cork-cutters, and if not fufficiently flat for their purpofe, they "lay" it again over a fire in their "burning yard," turning the convex part to the flame; the heat by twifting the edges of the bark, counteracts the natural bend, and compels it to receive a flat form. During this operation, a confiderable degree of attention is paid to fmoothing it, and particularly again to cover its defects. It is next cut into flips, narrow or wide, according to the intended cork, bung, or tap, for fuch are the names of the general divifions in this bufinefs. The ufe of the two former is well known, the latter is ufed for ftopping the tap-holes of barrels, as the name implies. Thefe flips are again cut into fquares, of a length proportioned to the ufe they are intended for. This operation is performed by one man, from whom they are handed forward to feveral others. A further divifion of corks takes place, of thefe different forts according to their lengths, and are denominated "fhort," "fhort long," and "full long."

The cork-maker places himfelf before the table or plank, on which is faftened a board about three inches thick, four broad, and twelve long: immediately on a line with his left hand is a piece of wood, rifing about four inches from the board, and fixed about the middle of it, on which the cork is laid, after being cut as above. This wood not only fupports the cork, and is as a guide to the workman, but by its elevation above the board, gives room for the knife to cut a part of the cork in a fmooth and circular manner, without ftriking on the table below. The piece is then turned to where the laft cut ceafed, and this is continued until the knife has gone completely round; the top and bottom are then pared level, and the cork thrown into a box or bafket, with the reft of the fame length. As the bark is not of the fame quality throughout each piece, the corks are forted by a boy into four kinds, "fuperfine," "fine," "common," and "coarfe," and are fold accordingly.

The only tool employed by the cork-cutter is a knife about three inches broad in the blade, and about fix inches long, very thin and fharp, and equal in breadth from the handle nearly to the end, which is finifhed by a gentle curve. This knife he fharpens upon the board where the guard is placed, by one whet or ftroke on each fide, after every cut, and now and then upon a common whet-ftone.

From the foregoing review it is evident, that the art of a cork-cutter is principally to obtain a regular, round, and quick turn of the wrift, in guiding the knife fo as to complete a pretty correct circle, and to make a fmooth furface; it is on this account that the knife muft be particularly fharp, to enable the workman to turn it with eafe.

The parings of the cork are carefully kept, and fold to the dry colour makers, to be burnt into Spanifh black.

It may be fuppofed that thofe who give the detail of any manufacture would be the beft able to point out improvements in it, though this is not always the cafe; yet one improvement in the "laying" of the cork wood, appears of great importance to the writer of this. In the prefent mode, a great deal of time is loft in placing and removing the ftones ufed to flatten the bark; and though the weight may be moderated or introduced by degrees, yet it cannot be done in that regular manner which appears the moft likely to effect the purpofe. In addition to which it may be obferved, that in proportion as the weight is carelefsly applied, will be the rifk of breaking thofe pieces which moft partake of the circular bend of the tree. To remedy this inconvenience, and to do away the old, grofs, and cumbrous method, a fcrew might be ufed, fuch as that employed by the printers in preffing their work; by its operation a gradual preffure would be given, the former objections done away, and a much neater and workman-like method adopted.

Cutting the cork into ftripes might alfo be accomplifhed with much greater facility; the whole breadth of the cork might be cut by one ftroke, by means of femi-circular knives, like fmall cheefe knives, fet at certain diftances, in a frame, which, by being affixed to a pole, with a crofs-bar as a handle, might be driven through the whole breadth, in the

the ſame time that a ſingle ſlip is cut by the preſent method.

Cork, *Acid of*, in *Chemiſtry*, a yellowiſh thick acid matter obtained by diſtilling four times its weight of nitrous acid from cork. This is ſoluble in water and has an auſtere bitteriſh taſte. It does not cryſtallize, but becomes conſiſtent like wax by evaporation; is ſoluble in ardent ſpirit; forms deliqueſcent ſalts with the earths and alkalis; and has as ſtrong an attraction for lime as the acid of ſugar.

Cork, *Mountain, Suber montanum*, or *Corium montanum*, in *Mineralogy*, a ſpecies of the muriatic genus of earths and ſtones, according to the arrangement of Kirwan (Mineral. vol. i.) Its colour is white, or reddiſh-white, or yellowiſh-grey, or iſabella, or ochre-yellow, or yellowiſh-brown. It is found either in thick compact pieces, and then called "mountain cork;" or in thin flat pieces, then called "mountain leather or paper;" or cellular, and then called "Caro montana, &c." The luſtre is 0, rarely 1, and transparency 0. Its fracture preſents fibres confuſedly interwoven with each other, ſometimes ſo ſubtile as to be diſtinguiſhed with difficulty, and thus they give the fracture a compact earthy appearance. Hardneſs 4; it takes an impreſſion, or yields like cork to the finger, and is ſomewhat elaſtic. Sp. gr. before it is penetrated by water, from 0.6806 to 0.9933; and after admiſſion of water, from 1.2492 to 1.3492. (Briſſon.) If perfectly dry, and ſufficiently thick, it gives a ſound when ſtruck. It feels meagre. Bergmann and Sauſſure found it fuſible, though with difficulty, by the blow-pipe. By Mr. Bergmann's analyſis it contains from 56 to 62 *per cent.* of ſilex, 22 to 26 of aërated magneſia, from 2.8 to 12.7 of argill, about 3 of calx of iron, and from 10 to 12.7 of aërated calx.

Cork-*ſcrew*, in *Mechanics*. *Fig. 1. Plate* XVII. *Mechanics*, is a ſimple cork-ſcrew, conſiſting of a ſcrew, A, turning in a female ſcrew attached by two ſmall rods to the collar B, which receives the neck of the bottle from which the cork is to be extracted; the two rods have a groove in them to receive the ends of a croſs piece, connected with the cork-ſcrew, and prevent its turning round with the ſcrew A.

Fig. 2. is nearly the ſame, except that the nut, B, is turned inſtead of the ſcrew.

Fig. 3. is called the *ne-plus-ultra* cork-ſcrew; it conſiſts of two cork-ſcrews A, B, one within the other; the ſcrew which enters the cork is fixed to the internal one. In uſing this inſtrument both ſcrews are ſcrewed up to their ſhoulders, and the whole is turned round together till the cork-ſcrew has penetrated the cork. The handle and the two ſcrews are then turned in the ſame direction, without permitting the frame to turn, till the cork is drawn. The handle is then turned the contrary way, and the ſcrew drawn out of the cork by means of the ſmall ſcrew B.

Fig. 4. is a ſcrew of nearly the ſame kind, a rack and pinion being ſubſtituted for the ſcrew B.

A corking-machine is repreſented in *fig.* 5; in which A is a treadle to be worked by the foot; it is connected by a rod *b*, with an iron-lever D; the bottle to be corked is placed in a leathern caſe E, faſtened to a board ſliding in a groove; the cork is inſerted, and the bottle ſlid under the lever D, the foot is then placed on the treadle, and the cork forced in; the corks are firſt pinched by placing them under the lever at *d*, to make them enter eaſily.

Cork-*tree*, in *Botany*. See Quercus *Suber*.

Cork, in *Geography*, a county of Ireland, in the province of Munſter, lying in the ſouth-weſtern extremity of the iſland, and by far the greateſt in extent and population. It has the Atlantic ocean on the ſouth and ſouth-weſt; the county of Kerry on the weſt; thoſe of Limerick and Tipperary on the north, and that of Waterford on the eaſt. Its greateſt length extending eaſtward from Kerry is 78 miles (99 Engliſh); and its greateſt breadth 56 miles ($71\frac{1}{2}$ Engliſh) containing 1,048,800 plantation acres (1,685,920 Eng.) and being about 1638 (or 2,653 Engliſh) ſquare miles. The number of houſes, according to an official return made to parliament in 1791, was 76,739, and they muſt have ſince conſiderably increaſed. From this the population has been eſtimated at 416,000, which is allowing 9.06 to a houſe in the city of Cork, and 5.6 to a houſe in other parts of the county, which thoſe who are acquainted with the many populous towns in this county, and with the manner in which the cottages are crowded, muſt admit to be a very moderate computation. According to this ſtatement, which is taken from Dr. Beaufort, the county of Cork contains very nearly a tenth-part of the number of acres in all Ireland, and above a tenth-part of the whole population. For not only its abſolute population is the greateſt, but its relative population is amongſt the moſt conſiderable, being nearly the ſame as that of Antrim and Londonderry, and exceeded only by the very populous diſtricts of Armagh, Monaghan, Down, Louth, and Dublin. It cannot therefore be wondered at, that it has three militia regiments to keep up. The number of pariſhes is 269, in which there are 105 churches. The biſhoprics of Cork, Roſs, and Cloyne lie entirely within the county, and all the above pariſhes belong to them except five. Cork returns eight members to the imperial parliament, *viz.* two knights of the ſhire, two for the city of Cork, and one each for the boroughs of Kinſale, Youghel, Bandon, and Mellow. In ſo large a diſtrict there muſt be a great variety of ſoil. It contains more good land than bad, and ſome parts of the county are highly cultivated, eſpecially the neighbourhood of the Blackwater, and the barony of Innſkilly in the eaſtern part. The barony of Ban and Bantry, which is covered with mountains, and the weſtern parts of Carbery and Muſkerry, in which are the Sheehy mountains, are the pooreſt and the leaſt improved. The whole county is hilly, and, a few places excepted, very deſtitute of trees, which is the conſequence of the vaſt number conſumed in the iron-works in the 17th century, without new ones being planted. There are however ſome ſpots which are richly wooded. The Galtees and the Waterford mountains bound it on the north-eaſt. The Nagle mountains and the Bogre which run weſtward through the heart of the county, though ſeparated from each other by a long valley, may be conſidered as part of a range, that is continued with few interruptions from Helwick Leed in Waterford, acroſs the counties of Cork and Kerry to the ocean. On the north of this range lies a narrow plain, which extends from the bounds of Tipperary to Dingle-bay. The rocks moſt common in this county are argillaceous. A coarſe red or grey ſandſtone, often varying to a coarſer and more ſlaty fracture, forms the greater part of the coaſt and the hills near it. There are in this many ſtrata of ſlate, ſome of good quality for roofing houſes. A large vein of limeſtone interſects the red argillite, commencing in the peninſula of Corhnbeg and the iſlands in Cork harbour, and extending on the ſouth ſide of the river Lee to its junction with the Bride, and thence through a valley adjoining this latter river to the diſtance of about 12 miles from the city of Cork. This limeſtone is evidently ſecondary as it contains a variety of petrified ſhells; and much of it on ſcraping has that diſagreeable ſmell which characteriſes *Stinkſtone*. This diſtrict contains ſome marbles which admit a good poliſh. In ſome of the limeſtone quarries near the city of Cork, there are not only very tranſparent quartz cryſtals, but alſo large amethyſts which are

are much efteemed by the jewellers. The bottom of Bantry bay is entirely compofed of broken pieces of coral, called coral fand, which is found to be an excellent manure. In Carbery there is a magnefian limeftone. On the Cork fide of the Galtees there is abundance of fine limeftone, and this ufeful article may be procured on moderate terms in every part of the county. The Galtee mountains themfelves confift of a very coarfe pudding ftone, in which is much iron fhot quartz. Near Galtymore, on the eftate of the countefs of Kingfton, is the remarkable cave of Skeheenrinky, which is deemed by Mr. A. Young fuperior to the peak. (See Mitchelstown.) The county of Cork abounds in fine rivers, and good harbours. The Blackwater rifes in the mountains between Limerick and Kerry, and flows eaftward through this county, receiving the Awbeg, the Funchem, the Bride, and many fmaller ftreams in a courfe of 80 miles. The Awbeg is the *Mulla* of Spenfer, who refided at Kilcolemen-caftle, not far from its banks, and the Blackwater is the *Awinduff* of the fame poet. On the banks of the Blackwater are many fine orchards remarkable for the cyder procured from them ; and feveral handfome feats. It is navigable from Cappoquin in the county of Waterford, where it turns to the fouthward, and difembogues itfelf in the harbour of Youghel. The Lee iffues from a lake called Gougane-Barra ; which is, according to Smith, a moft elegant and romantic fpot, and has by fome been preferred even to the lake of Killarney. This lake is weft of Inchigeelch, by which town the river paffes, and thence to the city of Cork, above which it divides into two branches which unite below the city ; and it contributes much to the wealth and profperity of that great commercial town. The paffage down the river from Cork to the outer harbour confifts of a fucceffion of varied and beautiful fcenery, which can fcarcely be furpaffed. The Bandon is another fine river, which, after watering the large and thriving town of Bandon-bridge, and the village of Inifhonan falls into the harbour of Kinfale : it is navigable for large floops as far as Inifhonan, between winding banks which ftill deferve the character given them by Spenfer ; " the pleafant Bandon crowned with many a wood." The whole coaft of Cork is broken into creeks and bays. The harbour of Crookhaven, near Mizen-head, the fouth-weft point of Ireland, is often reforted to, when the eafterly winds prevent veffels from gaining the harbour of Cork. Bantry-bay, a little to the north of this cape, is, at leaft, 20 miles long, and from three to five broad, every where deep, fheltered, and free from rocks. For particulars of thefe harbours, and of the many towns which this county contains, the reader muft be referred to their refpective articles. At Dromagh and Dromana, in the barony of Duhallow are coal-pits, which are worked, but not in a judicious manner, or to much advantage. There is much ironftone, and there were many furnaces ; but the dearnefs of fuel is a great check. Much linen is woven about Dunmanway, which is purchafed by merchants in Bandon, and fhipped from Cork. Near Bandon is a very extenfive cotton mill, which gives employment to great numbers. There are fome other manufactures, but none of much confequence, except thofe which belong more properly to the account of the city of Cork. The peafants in the county are very thickly differminated. In many parts they are very dependent on their landlords, working for them at a low price in payment of the rent of their cottages, and the fmall lot of ground adjoining them. This has been called the *Cottar* fyftem. The cottages in general, though bad, are not fo wretched in appearance as in fome other counties, and with fcarcely a fingle exception have a fmall garden for cabbages, as well as a field for potatoes, attached to them. The laft fupplies them with the principal article of their food. They all have a pig, and fome of them feveral, in which laft cafe they generally kill one for themfelves at Chriftmas. This animal, as well as fome poultry, often inhabits the fame dwelling with its owner, though, of late, pig-ftyes are becoming more common. There is a dunghill formed before the door of every cottage, which has a difagreeable appearance ; but it is often the only place the owners have for laying up manure for their potatoe gardens. Spinning is the general bufinefs of the women, and notwithftanding the fevere remarks that have been made on the lazinefs of the lower Irifh, they are feldom feen idle. They fpin more wool than flax. The middling and lower farmers have, of late years, improved much, both in their wealth and manner of living, and there is reafon to expect further improvement, if the encouragement to agriculture continues, and the peace of the country be undifturbed. The fyftem of agriculture, however, in ufe, is very bad, and much praife cannot be beftowed on the great landholders for their exertions to improve it. Cork partakes, with other counties of Ireland, the evils arifing from abfentees, fome of the greateft proprietors being of this clafs ; yet few counties have fo great a proportion of refpectable refidents. With refpect to the hiftory of this county, we may obferve that it was a kingdom of itfelf before the arrival of the Englifh, and was governed by the M'Cartys. A defcendant of that family, on refigning his Irifh title of *M'Cartymore*, was made by queen Elizabeth, earl of Clancarty, a title which was attainted foon after the revolution, in confequence of the attachment of the earl to the dethroned monarch. Henry II. granted the whole kingdom of Cork by charter to Robert Fitz Stephen and Milo de Cogan, about the year 1177; but they were able to get poffeffion only of a fmall part of it. It is unneceffary to trace the various changes of property which took place from forfeitures and intermarriages. It may be right however to mention that queen Elizabeth divided a great number of acres, which had been forfeited, amongft various undertakers, who agreed to introduce Englifh tenants. Sir Walter Raleigh had three feignories and a half given to him on this occafion, which he fold, in 1602, to fir R. Boyle, afterwards the firft earl of Cork, who was a great improver, and founded feveral towns. This property now chiefly belongs to the duke of Devonfhire, who is the reprefentative of the elder branch of the Boyle family. Many of Cromwell's officers afterwards obtained fettlements in this county. Beaufort's Memoir. Young, &c. &c.

Cork, the fecond city of Ireland, and capital of the county of the fame name, was originally built on a low marfhy ifland, formed by the branches of the river Lee, from which circumftance its name is faid to be derived, *corcach*, in Irifh, fignifying a moor or marfh. It appears, from the imperfect account we have of the early periods of Irifh hiftory, that in the 5th, or, as Ware fays, in the 7th century, there lived a pious hermit called Barroc, or Fin Barroc, and in after ages, St. Fin Barry, who founded a monaftery for regular canons of St. Auguftine, and a fchool on the fouth fide of the river Lee, near the place where the prefent cathedral ftands ; and that his fame drew fuch numbers to it, that to ufe the words of Colgan, " it changed a defert into a city." In the 9th and 10th centuries, this monaftery and town were often plundered by the Danes, who then infefted Ireland ; but, at the beginning of the 11th century, they founded the prefent town in an ifland of the river, of an oval fhape ; and called it either from the name of the town they had burned, or the marfhy fituation, *Corkan.*

kan. It was, however, very fmall, and probably did not contain above 1000 inhabitants; but the creeks which interfected it, were convenient for mooring the Danifh veffels, and thus their merchandize and plunder were fecured. On the arrival of the Englifh in 1172, Cork became an Englifh colony, and a royal garrifon. King John ordered the fortifications to be repaired; a ftone wall was built; caftles were erected at the north and fouth gates; and bridges were made with portcullifes for maintaining communication with the little towns adjoining the abbeys that had been founded on the north, as well as on the fouth fide of the river, and which are now the north and fouth fuburbs. Cork, however, was not fo early a place of the firft importance in the ifland. Stanihurft fpeaks of it as inferior to Limerick and Waterford; and Boate, who wrote near a century later, in the time of Cromwell, as inferior to the fame towns, and Galway. Camden, who wrote in the time of Queen Elizabeth, thus defcribes it: "It is of an oval form, inclofed with walls, and encompaffed with the channel of the river, which alfo croffes it, and is not acceffible but by bridges lying along, as it were, in one direct ftreet, with a bridge over it. It is a populous little trading town, and much reforted to; but fo befet with rebel enemies on all fides, that they are obliged to keep conftant watch, as if the town was continually befieged, and dare not marry out their daughters into the country, but contract one with another among themfelves, whereby all the citizens are related in fome degree or other." But though the town of Cork was confined to the fmall ifland now occupied by the main ftreet and the numerous lanes which interfect it; yet the fuburbs were confiderable, and were protected by feveral caftles.

The trade of Cork, in thefe periods, was not extenfive, and the principal fupport of the inhabitants was the confumption of the monafteries, of which there were feveral. As a haven, Kinfale was in greater eftimation. Since the commencement of the 18th century, the town has been gradually enlarged, by taking in and building upon the feveral marfhy iflands which lay near the principal one. The channels which were between thefe, ferved the purpofe of canals, and were convenient in fome refpects, by enabling the merchants to load and unload their veffels at their refpective warehoufes, which often joined their dwelling-houfes. In this, it refembled a Dutch town, and fuch is the defcription given of it in "the Traveller's Guide through Ireland," publifhed in 1806. It is now, however, more than twenty years fince the plan was adopted, of filling up thefe canals; and there is at prefent (1807) not a fingle one in the city, which appears as one ifland, lying between the north and fouth branches of the river. By this means, there are feveral wide pleafant ftreets, which want only regularity in the buildings, to enable them to vie with thofe even of the capital. The health of the city has alfo been promoted, for putrid exhalations arofe from thefe canals, which were a receptacle for filth of all kinds; and, when the tide was out, had both a difagreeable fmell and appearance. Many houfes have been rebuilt, and in confequence of a new bridge thrown over the north channel, the city is increafing rapidly on the northern bank of the river. So long ago as 1788, the houfes were 8093 in number; fince which time, there has been a confiderable increafe. The number of inhabitants in feveral of the old houfes is very great, in fome cafes above 50; and from the account Dr. Whitelaw has given of the population of Dublin, we may fafely reckon ten to a houfe. We fhall then be within bounds in ftating the population of Cork at 80,000. It may ferve to ftrengthen this opinion, that in the year 1801, when, in confequence of the fcarcity, committees were appointed to make returns of the perfons needing chariatable aid in each parifh, the number was very nearly 30,000. The appearance of the city has nothing ftriking to recommend it in the ftructure of the houfes. There are many comfortable, and even elegant manfions, but the want of uniformity, from their being built at different periods, and from the caprice or different views of the builders, prevents their appearing to as much advantage as they would otherwife. Cork has no public buildings of much confequence. The cathedral is a modern church, which is neat and convenient, but is furpaffed by many country parifh churches in England. The church of the Holy Trinity, or Chrift-church, is larger, but is only remarkable for an awkward leaning, in confequence of a fettlement at the time of building, which ftrikes every ftranger, and made it neceffary to take down the fteeple. There are five other parifh churches, and a French church. The Roman Catholic parifh chapels are three in number, which accommodate immenfe crowds of people. One of thefe has been lately rebuilt at a great expence. There are, befides, four chapels belonging to friaries and the chapel of the nunnery. There are fix meeting-houfes for Proteftant diffenters, *viz.* one for Prefbyterians, one for Baptifts, one for Quakers, one for Calvinifts, and two for Methodifts. The bifhop's palace, which is near the cathedral, is an elegant and convenient modern ftructure, containing fome fpacious apartments. The exchange is a light and elegant building, in the Italian ftyle, ornamented by columns of the Doric and Ionic orders. It was built by an Italian architect; as was alfo the corn-market houfe, of the Tufcan order, which has great merit as a building for that purpofe. Adjoining to the exchange is the city court-houfe, and a very extenfive coffee-houfe. The manfion-houfe, where the mayor refides, during his year of office, is a plain building, but contains two very fpacious rooms for public entertainments. In one of them is a ftatue of William III., of plafter, which is painted, and which Mr. Twifs having confounded with a ftatue of the earl of Chatham, of white marble, has made the fubject of ridiculing the corporation. The old cuftom-houfe is a large brick building, which having been deemed ineligible for bufinefs, has been promifed by government to *the* INSTITUTION *for applying Science to the common purpofes of Life;* and a new cuftom-houfe is to be erected in a better fituation. There are are two theatres; the Theatre Royal is tolerably large, but ftands in great need of extenfive repairs and embellifhments; the other, which was built by Mr. Aftley, is much fmaller. The affembly room is very large, and the profits derived from it increafe the funds of the North Infirmary, to the corporation of which it belongs. There are feveral bridges. St. Patrick's bridge over the north channel is one of the moft elegant ftructures in Europe. It is built, in fome refpects, on the plan of the beautiful bridge at Neuilly, near Paris, and confifts of a centre arch of 60 feet, and two of 50 feet; which arches are exact femi-ellipfes. Mr. Shanncbau was the architect. Parliament bridge, over the fouth channel, has been lately rebuilt, with a fingle arch, and makes a handfome appearance. The new barrack, at a fhort diftance from the city, on the north, is on a commanding eminence, fo as to be feen at a great diftance from the city, in various directions. It is very extenfive, containing accommodation for four regiments of foot, and 1000 horfe, with an hofpital and fuitable apartments for officers. The old barrack on the fouthfide is ftill retained, and there is a convenient general hofpital near it. The artillery have alfo a barrack and ftores; and there is a magazine about half a mile from the city. About three miles up the river are very extenfive powder-

mills,

mills, with large ftores, at a place called Ballincollig, belonging to government. The public-market, nearly in the centre of the town, is very neat and convenient. The meat-market confifts of three rows, on each fide of which the butchers have ftalls. The whole is well flagged, covered in, and lighted from above. Adjoining, are the fifh, poultry, and root markets. Thefe markets are open, and fupplied on every day, except Sunday; but on Wednefdays and Saturdays, which are reckoned market days, the fupply is abundant, and of the beft quality. There are fome inferior markets, but they do not deferve notice. The county jail is a handfome new ftructure, built at a fhort diftance from the city, which will enable the grand jury to take down the fouth gate at one end of the main ftreet; on, and adjoining which, was the old county jail. As a new city jail is fhortly to be erected, the north gate may alfo be taken down, which will be a material improvement to that part of the city. The bridewell is a plain building, fuitable to its purpofe. The county court-houfe has been lately new-modelled, and an elegant entrance to it built, fo as to be more worthy of the extenfive and opulent county, the bufinefs of which is tranfacted there.

There are a great number of charitable inftitutions, but the buildings are not remarkable. Where the funds, indeed, depend on voluntary contributions, it cannot be expected that there fhould be money to expend on ornaments. If, however, they cannot be fpoken of as contributing to the beauty of the city, they undoubtedly do honour to the feelings of the inhabitants. There are two infirmaries, containing upwards of 50 beds; a houfe of induftry, with commodious cells for lunatics adjoining it; a houfe of recovery, for the reception of fever patients; a lying-in hofpital; a foundling hofpital, which receives about 200 children, befides thofe at nurfe; a blue-coat hofpital for 24 boys; a fchool of induftry for 100 children of both fexes, with feveral alms-houfes and parifh fchool-houfes. There are, befides, a general difpenfary, which is provided with every thing neceffary for reftoring fufpended animation; a fociety for relieving perfons confined for fmall debts, and for lending fmall fums of money to poor tradefmen; a fociety for relieving the labouring poor, in time of ficknefs; and a fociety for affifting ftrangers, and enabling them to return to their refpective homes. Except the foundling hofpital, which is fupported by a tax on coal; and the houfe of induftry, which receives grants from the county and city grand juries; all of them chiefly depend on voluntary contributions, or on public amufements, which are made in a great degree conducive to charitable purpofes. The confequent difficulty of procuring funds for their fupport, obliges the conductors of thefe inftitutions to ufe rigid economy: yet it may be queftioned, whether the time now fpent in providing neceffaries might not be better employed in infpecting the internal regulations; and whether a permanent fupport for every ufeful inftitution would not, on that account, be defirable. Cork has alfo a fociety *for bettering the condition and increafing the comforts of the poor,* which maintains a correfpondence with the fimilar focieties in London and Dublin, and has fuggefted many ufeful plans, fome of which are perfevered in with fuccefs. Though the citizens of Cork have been ftigmatifed, by fome illiberal travellers, as neglectful of the fciences and fine arts; yet there feems to be no juft ground for this cenfure. The public library, fupported by annual fubfcriptions, contains a large and well chofen collection of books, which is rapidly increafing. The inftitution already referred to, which alfo originated in private fubfcriptions, has a fcientific library, a large collection of minerals, and the neceffary apparatus for giving lectures in natural philofophy and chemiftry. The managers of it, having received the countenance and fupport of government, are now adding a botanical garden, and extending their plan in many refpects. The proprietors of the inftitution, with fome other gentlemen, form a literary and philofophical fociety, which meets on two evenings in every month. With refpect to the fine arts, mufic is a favourite amufement; and there are many excellent performers, both profeffors and amateurs. The juftly celebrated Barry, who was a native of Cork, was firft brought into notice by an ingenious townfman, Dr. Keigh; and there are not wanting, at the prefent time, men who have tafte to difcern, and liberality to encourage, rifing merit: though a place fo remote from the capital cannot be expected to afford fcope for eminent talents. The environs of Cork, towards Paffage and Glanmire, are extremely beautiful: the lands rife in gentle hills, ornamented with many country houfes, gardens, and plantations, and with woods and fields of variegated verdure. On an ifland between the two branches of the Lee, above the city, is a walk of an Englifh mile in length, planted with trees; from which there is a pleafant view of part of the city, and of the fuburb of Sunday's Well. It is called the Mardyke, and is a fafhionable walk. But whatever advantages its environs may poffefs, or whatever improvements may take place in this city, the fource of all muft be fought in its fafe and capacious harbour, which has now become a regular ftation for an admiral, and which is the place of rendezvous for fleets failing to the Weft Indies. The principal export from Cork has long been provifions, including beef, pork, and butter, made up either for the Weft Indies, or for the fupply of the Britifh fleet. The average exportation of beef, in the years 1743-4-5, was 92,950 barrels; the average of butter, in the fame years, was 84,105 *cwt.*; and Smith fays, it was afcertained that the average number of bullocks and cows flaughtered in Cork, from Auguft to Chriftmas in each year, was near 100,000. The export of butter began about the year 1633; and about the fame time the merchants began to barrel up their beef and butter with hoops bound about with twigs, after the Englifh manner; and at prefent they are alfo iron-hooped. The average of beef for 19 years, ending in 1773, had increafed to 291,970 barrels; and that of butter to 120,000 *cwt.* The export of pork was at that time inconfiderable. The average value of the whole exports was 1,100,190*l.* fterling. The other articles of export were hides, bay and woollen yarn, camblets, ferges, candles, foap, tallow, herrings, glue, wool, and fome fmall articles. Of late years, the export of beef, and of all the articles connected with it, has decreafed; and that of yarn, camblets, and ferges, has almoft entirely ceafed: but the export of pickled pork and bacon, of corn, of porter, fpirits, &c. has become confiderable. The quantity of butter exported in 1806 was 160,000 *cwt.*; the number of black cattle, on the average of the three laft years, was only 18,000; the number of calf-fkins, on an average of the fame years, about 50,000. The imports are chiefly for the fupply of the city, and the adjoining diftrict. The breweries and diftilleries of Cork are a great fource of wealth. There are five porter breweries, befides many of ale and fmall beer. That diftinguifhed by the name of the Cork porter brewery is the moft extenfive, not only in Cork, but in Ireland, and is probably furpaffed only in London. There are four large diftilleries, each of which pays 2100*l.* duty *per* week. At one of thefe is a fteam-engine, of Boulton and Watt's lateft conftruction: it is of 40 horfe power, and no expence has been fpared in the erection of it. The manufacture of clothing for the army is alfo very extenfively carried on; and there are many leffer factories for coarfe cloth, ferge, &c.

The

The manufactories of sail-cloth, sheeting, paper, leather, glue, glass, &c. are also considerable. The corporation consists of a mayor, two sheriffs, a recorder, and several aldermen. The charter was given by Charles I. The sheriffs are chosen by the freemen at large; and, after having served the office, are called burgesses. On the day of election, the names of all these burgesses are put into a box or hat, and five names are drawn out: of these five the freemen are to chuse one to be mayor for the ensuing year. By an agreement, however, which has been entered into by a great number of freemen, who form a club, the senior burgess, if willing to serve, is always elected. The same club has also assumed to itself the choice of sheriffs, so as to render the public election a mere farce, or rather a ratification, according to form, of what has been previously determined at a meeting of the club. Cork, as well as Dublin, retains the privilege of sending two members to the imperial parliament. The electors consist of about 1500 freemen, and a number of freeholders in the county of the city, which is very extensive. The eldest sons of freemen are entitled to their freedom, as well as those who serve a regular apprenticeship to freemen. Many also obtain this privilege by favour every year; for as the number of voters is too great to admit of any attempt to dictate to them at elections, so there is little inducement to throw difficulties in the way of obtaining freedom. The income of the corporation, which arises chiefly from duties paid by those not free on articles of trade brought into the city, is so small as to be scarcely sufficient for the current expences. In history Cork has not been remarkable. Like most other parts of Ireland, it engaged in the interest of the impostor, Perkins Warbeck, which brought the citizens into some difficulty. In 1690 it was besieged by king William's forces, under the earl (afterwards duke) of Marlborough, and taken after a short resistance. The duke of Grafton, a natural son of Charles II., was killed at this siege.

Cork is 126 Irish miles S.W. from Dublin. The latitude of the observatory of the Cork Institution is 51° 53′ 54″ N. Longitude W. from Greenwich, in time, 33′ 56″; in degrees, 8° 29′. Smith, Young, &c. &c.

CORK, *Bishoprick of*, is supposed to have been founded in the seventh century. It was united with Ross by queen Elizabeth, in 1586; and they are both contained in the county of Cork, as is also the adjoining one of Cloyne. The Union is, in Irish miles, about 65 by 17; and in English, 83 by 23. The number of acres is 480,300, which are divided into 127 parishes, of which only 54 have churches. Beaufort.

CORK-*bay*, a bay on the east side of Newfoundland island.

CORK, or CORKING *of a saddle*, are pieces of wood upon which the bolsters are made fast.

This part of the saddle was formerly made of cork, whence it still retains the name.

CORLAY, in *Geography*, a small town of France, in the department of the Côtes du Nord; is the chief place of a canton, in the district of Loudéac. The town contains 1483, and the canton 6481, inhabitants, dispersed in five communes, upon a territorial extent of 117½ kiliometres.

CORLIEU, in *Ornithology*, the name given by Albinus to the SCOLOPAX *totanus*, the spotted red-shank of Pennant, and spotted snipe of Latham.

CORLIN, in *Geography*, a small town of Prussian Pomerania, on the river Persante; 12 miles S.E. of Colberg. It has a few woollen manufactures.

CORLIS, in *Ornithology*, the common curlew, or SCOLOPAX *arquata*.

CORMA, in *Ancient Geography*, a river of Asia, in the territory of Chalonitis, which discharged itself into the river Delæs or Silla.

CORMALOS, a river of Asia Minor, in the Troade.

CORMANTIN, LITTLE, in *Geography*, a village of Africa, situated on the Gold Coast, three miles from Mawri, and a little below Aga; so called in contradistinction to Great Cormantin, from which it is distant 4 miles W.S.W. The French and Portuguese formerly carried on a great trade with this place, in which the Dutch also shared, till it was discovered that the negroes adulterated the gold. About the year 1682, the Dutch resumed the trade, when they enlarged and strengthened Fort Amsterdam, the chief residence of the English, till they were forced to abandon it by De Ruyter, in 1665. The fort is a square stone building, fortified with four bastions, mounting 20 pieces of cannon; having convenient apartments for the officers and soldiers, and commanding fine views of the country and sea. Large cisterns, receiving the rain-water, supply the fort with water.

CORMANTIN, *Great*, a large and populous town, on the Gold Coast, in the territory of Fantin, standing about cannon-shot from the fort of Little Cormantin, on a high hill behind, and under the cannon of the fort. The town is occupied by a considerable number of merchants and fishermen, together with other inhabitants of different employments. Cormantin and Anamaboa were formerly the great marts of the English and Dutch commerce, as they were much frequented by the Akhauese, who came hither with their goods in large caravans. N. lat. 5° 5′. E. long. 0° 8′.

CORMASA, or, as Polybius calls it, CURMASA, in *Ancient Geography*, a town of Asia, in Pamphylia.

COR-MASS, the name of a grand procession, said to have been established at Dunkirk during the dominion of Charles V., and renewed on St. John's day, the 24th of June. After the celebration of high mass, the procession, consisting of the several tradesmen of the town, begins. Each person has a burning taper of wax in his hand; and after each company comes a pageant, followed by the patron-saint, usually of solid silver, richly wrought and adorned. The companies are followed by music; and after the musicians, the friars, in the habits of their order, the secular priests, and then the abbot magnificently adorned, and preceded by the host. Machines likewise of various fantastical forms and devices, and as variously accoutred, form a part of the shew on this occasion; which is described as one of the most superb and magnificent in the world, by an eyewitness, in 1755. Gent. Mag. vol. xxix. p. 263.

CORMEILLES, in *Geography*, a small town of France, in the department of Eure, and district of Pontaudemer, with 1230 inhabitants. It is the chief place of a canton, which has 15 communes, and 10,063 inhabitants, on a territorial extent of 127 kiliometres.—Also, a town of France, in the department of the Oise, and district of Clermont; 4 miles W.N.W. of Breteuil.

CORMERY, a town of France, in the department of the Indre and Loire, and district of Tours; 7 miles S.E. of Tours.

CORMICY, a town of France, in the department of the Marne, and district of Reims; 10 miles N.W. of Reims.

CORMION, or LICONIUM, in *Ancient Geography*, a town of Asia Minor, situated on the Bosphorus of Thrace, and near the western bank of the river Aneretus. This small town lay to the east of the Hermæan promontory.

CORMION *Sinus*, a gulf of Asia Minor, in the Bosphorus of Thrace, over against the Hermæan promontory.

CORMOLAIN, in *Geography*, a town of France, in the department of the Calvados; 10 miles S.S.W. of Bayeux.

CORMONS, a town of Germany, in the county of Goritz; 7 miles S W. of Goritz.

CORMORANT, in *Ornithology*. See PELECANUS *carbo*, and CORVUS *aquaticus*.

CORMOS, or CORMON, in *Ancient Geography*, a town of Arcadia, on the frontiers of Laconia, near the fource of the river Carrion, S.E. of Megalopolis. In the time of Paufanias, its ruins only were to be feen.

CORN, in *Agriculture*, a term applied to all forts of grain fit for food; particularly wheat, rye, &c.

The farmers, indeed, rank under the denomination of corn feveral other grains; as barley, oats, and even pulfe; as peas, vetches, &c. which, however, they fometimes diftinguifh by the denomination, *fmaller corn*.

Europe, in every part of it; Egypt, and fome other cantons of Africa, particularly the coafts of Barbary; and fome parts of America, cultivated by the Europeans; and the Armenians themfelves, produce corn. Other countries have maize and rice, in lieu of it; and fome parts of America, both in the iflands and continents, fimple roots, fuch as potatoes, and manioc.

Egypt was anciently the moft fertile of all countries in corn; as appears both from facred and profane hiftory. It furnifhed a good part of the people fubject to the Roman empire, and was called the dry nurfe of Rome and Italy. England, France, and Poland, feem now to have fupplied the place of Egypt, and with their fuperfluities fupport a good part of Europe.

For the firft difcovery and culture of corn, authors are much divided: the common opinion is, that in the firft ages men lived on the fpontaneous fruits of the earth; as acorns, and the nut, or maft, produced by the beech; which, they fay, took its name, *fagus*, from the Greek φαγω, *I eat*. It is added, that they had not either the ufe of corn, nor the art of preparing, or making it eatable. See BAKING.

Ceres has the credit of being the firft that fhewed the ufe of corn, on which account fhe was placed among the gods; others give the honour to Triptolemus; others fhare it between the two, making Ceres the firft difcoverer, and Triptolemus the firft planter and cultivator of corn.

Diodorus Siculus afcribes the whole to Ifis; in which Polydore Virgil obferves, he does not differ from the reft; Ifis and Ceres being, in reality, the fame. The Athenians pretend, it was among them the art began; and the Cretans, or Candiots, Sicilians, and Egyptians, lay claim to the fame. Some think the title of the Sicilians beft fupported, that being the country of Ceres; and authors add, fhe did not teach the fecret to the Athenians, till fhe had firft inftructed her own countrymen. Others fay, Ceres paffed firft into Attica, thence into Crete, and, laft of all, into Sicily: many of the learned, however, maintain, it was in Egypt the art of cultivating corn firft began; and it is certain, there was corn in Egypt and the Eaft, long before the time of Ceres. For the various modes of producing corn, and preparing it for ufe; fee HUSBANDRY, and other articles appropriate to each kind of grain in this dictionary. For the beft method of preferving corn, fee GRANARY.

CORN *Laws*, in *Rural* and *Commercial Economy*, are thofe laws and regulations which relate to the importation and exportation, as well as general trade in grain. They are a fet of rules and regulations which have undergone much change and alteration at different periods, but which ftill feem far from having attained that degree of perfection which is effential in fo important an article of commerce. It has been remarked by an able writer, that "almoft every other manufacture may be admitted to a free trade; but as the trade of corn muft at all times be limited by, and fubfervient to, the neceffities of the ftate, it requires the attention of a careful and foftering parent." It is therefore contended, that the agriculture of the nation "ought to be guarded by the wifeft laws and the ftricteft execution of them, as the only certain means of employing the greateft number of people, and confequently of encreafing the population; and that it is the better entitled to this attention, that the farmer and the landholder pay a full proportion of all taxes impofed for promoting and protecting the fale of our other manufactures, both at home and abroad, as well as for the growth of corn at home."

Though very different principles have been laid down as the bafis of thefe laws at different times, it feems evident that, as the ftrength and power of a nation muft be proportioned to the extent and induftry of its population, the chief attention of the framers of them fhould be directed to fuch meafures as have an immediate tendency to encourage and promote the improvement of agriculture. It has indeed been contended, on the ground of long experience, that the foundation of fuch regulations fhould always be fuch as is calculated to induce the inhabitants to improve their grounds in fuch a manner as to raife the largeft proportion of grain, the particular foil and climate is capable of permitting. And that this is "an object which can only be attained by fecuring a certain and fteady market to the farmer for his produce; not only by preventing importation, but alfo, whenever it fhall appear, from the moderate price of grain at home, that a greater quantity has been raifed than is required for the annual fupply of the inhabitants, by giving fuch a bounty on exportation, as fhall enfure a ready vent for the excrefcent ftock in foreign countries. It is not enough, fays the able writer, that a nation raifes, in general, a fufficiency of corn for the confumption of its inhabitants: it muft be accuftomed to raife confiderably more, in order to afford plenty in bad feafons; and its annals ought to be diftinguifhed by a greater or leffer *exportation*; but on no occafion ought it be reduced to the neceffity of *importation*, and having recourfe to foreign countries for an expenfive and precarious relief."

Mr. Young in his "Political Arithmetic" likewife remarks, in fpeaking of the obftacles which bad corn laws throw in the way of good hufbandry, and of the want of permiffion to export grain in Spain, Portugal, and fome parts of Italy, that he does not conceive it poffible, "under fuch a fyftem, to have a flourifhing corn hufbandry—prices will be too fluctuating—fome years will be fo cheap that the farmers will be ruined, and others fo dear that the people will be ftarved. Long experience muft convince us, continues he, that this is not only reafoning but fact. Famines never appear in countries that admit a free exportation; but in all above named, where a contrary policy has been purfued, they have appeared frequently and feverely." And he farther obferves that "the variations in the earth's products, owing to feafons, though not fo great as fome have imagined, where the hufbandry is good, yet where it is indifferent, muft neceffarily be confiderable." He thinks that one maxim may be laid down on this fubject which can hardly be contradicted, which is, that "the good of hufbandry requires that the price of corn fhould be proportioned to the product. Let us then, adds he, fuppofe the common confumption of a nation to be 5,000,000 of quarters of bread corn: the proportion between the common product and the common confumption muft vibrate according to various circumftances.—Suppofe a crop of 6,000,000 of quarters, and no exportation, what

what, he aſks, muſt be the conſequence? There is the ſurplus of a ſixth in the markets, conſequently the price is brought down much lower than that proportion. Here, ſays he, lies the misfortune. If corn in ſuch a year yielded a price proportioned only to the plenty, the misfortune would not be great; but the addition in the markets of a ſixth ſinks the price probably a third, and perhaps more." And further, ſuppoſing "another good crop, with a new ſurplus of a ſixth or ſeventh; this coming upon granaries full of a part of the former ſurplus, ſinks the price yet lower; and then the farmers are not only diſcouraged, as, he ſays, ſeveral writers have obſerved, from ſowing another crop, but what is as bad, they are impoveriſhed ſo much that they cannot plough, harrow, dung, drain, ditch, fence, or do any thing with proper ſpirit. Theſe two circumſtances, inability in future to act well, and diſcouragement from ſowing again, can hardly fail, he thinks, of occaſioning in future years a ſcarcity, or probably a famine. Then the farmers reap of courſe a thin crop, from their former inability, and that too over only part of the land uſually ſown; in ſuch a caſe, corn, he contends, muſt be very high to recompenſe the farmer; probably ſo high, that the government of the country is alarmed, and imports corn from wherever they can get it; then the price falls, when he again ſuffers. Thus a great crop or a bad one operates equally againſt him, and nothing can ſupport him at all but ſuch a product as pretty exactly anſwers the annual conſumption. There is no balance preſerved in the meaſures, exportation is prohibited, yet importation is allowed; ſo that it is impoſſible the price ſhould with any regularity be ſuch as can encourage good huſbandry."

"On the contrary, if the policy of the ſtate admits exportation, the ſurplus of a large crop being ſent away, keeps the price at home, he maintains, from falling too low: this is an encouragement to the farmer acting two ways; firſt, by enriching him, he is able the better to improve all his culture; ſecondly, he is induced to ſow as much corn as poſſible, for every man, whatever be his trade, is deſirous of increaſing that commodity which ſells beſt at market."

The bounty on exportation, which was formerly given in this country, is conſidered as a refinement on this policy, and which, though given originally with the view of raiſing the price of grain, as an encouragement to the country gentlemen, yet it had the contrary effect, having rendered corn much more cheap, by becoming ſo great an inducement to the cultivation of it.

It is, in ſhort, ſtrongly contended, that "in ſuch countries as will adhere to ſo deſtructive a ſyſtem as that of reſtraining the export of corn, it is not of much conſequence whatever advantages are given to huſbandry, ſince all others united, that can be named, or thought of, will not make amends to the farmer for the want of a market: it is of no conſequence to enable him to raiſe noble crops, if when he has got them, he cannot ſell at a proper price; his plentiful harveſts tend only to his ruin."

From the fulleſt conſideration of the ſubject in various points of view, an able writer conceives it obvious, "that agriculture and manufactures are eſtabliſhed on very different principles, and that whilſt wealth and population raiſe conſiderably the money price of corn, and other rude produce of the ſoil, they have not an equal effect in advancing the price of manufactures." Hence, contrary to the opinion of the celebrated author of the Wealth of Nations, it is ſuppoſed the following political maxim may be fairly deduced: "that agriculture in rich and populous countries, ſtands more in need of a monopoly for its ſupport than manufactures; and that the farther a nation advances in proſperity, it becomes the more neceſſary to ſecure its agriculture, not only by reſtraining the importation of foreign corn, but alſo by removing every impediment which may prevent, and by giving every encouragement which may promote, the extenſion of cultivation and improvement over the whole face of the country."

Conſequently, that, if this country wiſh "to preſerve her preſent ſuperiority in wealth and reſources over the ſurrounding nations, agriculture muſt be protected by allowing to the huſbandmen prices for their produce proportioned to the internal wealth and proſperity of the country; and that, if at any time, the bringing in of foreign corn tends to ſink the money price of Britiſh grain below the correſponding value of labour and other commodities, the importation muſt be checked by judicious laws, altered from time to time, at different periods, to correſpond with the proſperous or declining ſtate of the country."

The principles on which the corn laws have been conſtructed at different times, ſo far as they can be traced and recognized, appear to have been theſe.

1ſt. That of cutting off the importation of corn from foreign countries, except when the price at home was very high.

2d. That of granting a bounty on the exportation of it, when it does not exceed certain prices.

3d. That of having recourſe to both theſe meaſures according to circumſtances; or what may be termed a ſort of mixed or ſhifting policy, without any thing being permanent, without any regular law, or due arrangements of prices at which export ſhould be allowed, or import be prohibited.

4th. That of lowering the import rates and duties, as well as that of the bounty, on exportation in a conſiderable degree, in order to reduce the prices of corn in the home market, to the ſtate of former periods, and thus to introduce a permanent law in reſpect to corn by which the inconveniences of a varying policy may be remedied. And,

Laſtly, That of regulating the import and export of corn, and the bounties and duties upon them, by the particular circumſtances of the period, ſo that the farmer may obtain a fair and reaſonable profit in the home market.

Having now conſidered the different objects which ſhould be particularly attended to in conſtructing laws for the regulation of the commerce in grain, and ſhewn the principles on which they ſeem to have been in general founded, it may not be improper to trace the cauſes from which they proceeded, and the effects which they have produced at different times.

In regard to the corn laws of this country, as they exiſted previous to the revolution in 1688, it may be obſerved, that in order to preſerve the laws of the kingdom in force, it was conſidered neceſſary, for ſeveral centuries after the conqueſt, to renew or confirm them upon the acceſſions of new ſovereigns, a practice which explains the reaſon of the various confirmations of the great charter, and the frequent re-enactions of the ſame laws, on this ſubject, as well as others, without any new meaning appearing on the ſtatute-book.

At this period, the rents of lands, held by farmers or tenants, were for the moſt part payable in produce, as in corn, cattle, or ſome other product afforded by the ſoil. And the rules by which the rents were received were extremely indefinite and irregular; the meaſures of grain being various, and taken heaped, nine buſhels generally conſtituting the quarter. For though by the great charters of king John and Henry III., which had been often confirmed by ſucceeding kings and their parliaments, one weight

and meafure had been directed to be made ufe of over all England, yet it was far from being the cafe, as is fhewn by an act of 1360, the 25th of Edward III., in which the weights and meafures are again attempted to be regulated; and in which it is directed, that eight bufhels ftricken and no more, fhall be received as the quarter of grain, "but faving the rents and farms, and all manner of franchifes of the lords." On which Mr. Dirom remarks, that, "with fuch refervations, it is not to be expected that the law could have any effect." And he adds, that, "under fuch impofitions with the oppreffion of purveyance, and the depreffed fituation in life wherein the farmers were placed, it is not to be wondered that agriculture languifhed, and that a numerous community depended upon foreign provifions for their fubfiftence."

In tracing the progreffive advances of agriculture from this depreffed fituation, it may be neceffary to obferve, that, at thefe periods, moft of the bufinefs of the dealer or trader was carried on in the different markets and fairs of the kingdom, and that a large proportion of the revenue of the crown was drawn from the duties payable to the king, on the goods brought to them in order to be fold. And the barons had likewife, within their refpective jurifdictions, tolls at the fairs. Hence it not unfrequently happened, that as the farmers and other dealers were conveying their corn and other neceffaries to the markets and fairs to be difpofed of, they were met by perfons on the road, in order to purchafe them for the purpofe of retailing them at a higher price, in confequence of which, the king and the lords of the manors were deprived of the different duties payable upon them, and at the fame time the price was inhanced on the people, in confequence of the diminifhed quantity brought to market. It of courfe became neceffary, both on the fcore of public and private intereft, to prevent the practice as much as poffible, by the infliction of fevere penalties; and various laws were enacted for the purpofe at different times, the offenders being termed foreftallers, regrators, and ingroffers.

Hitherto, as various laws had been formed with the view of inviting the importation of foreign articles of neceffity, while the exportation of the fuperabundant ftock of Britifh grain had been prohibited, it cannot be fuppofed that agriculture had been encouraged as an object of national importance. About this period, 1393, however, a law was made, the 17th Richard II. c. 7, which authorized all the king's fubjects to carry corn out of the kingdom, upon the payment of the cuftoms and fubfidies. And which was confirmed in 1425, referving to the king and council, power to reftrain the exportation when they fhould judge it neceffary.

However, from this refervation being conftrued into a prohibition to export grain without a licence, or from the difficulty of procuring the licence, the beneficial confequences to be derived from it were prevented; and from the check which was thus given to the art of cultivation, much inconvenience and diftrefs experienced in the country, as is fully fhewn by the preamble to the law of 1436, the 15th Henry VI. c. 2, by which it was followed, and in which liberty was given to perfons to tranfport grain, without a licence to wherever they chofe, except to the enemies of the king, when wheat was at 6*s.* and 8*d.* and barley at 3*s.* the quarter; which were fums rather above the medium prices, being in the proportion of the prefent money of 2*l.* 4*s.* for the quarter of the former, and 19*s.* 10*d.* for that of the latter.

The advantage of this law had been found fo beneficial to the country in reftoring abundance of grain, that it was in 1442 and 1444, confirmed and continued for ten year as well as foon afterwards made perpetual, by the acts of 20 Henry VI. c. 6. and 23 Henry VI. c. 5: and the effects of which, fo far as they can now be difcerned, were thofe of a very moderate and more fteady, or lefs fluctuating, price of corn for forty years.

However, notwithftanding this, the laws favouring the importation of foreign grain ftill continued in force; and the trade was in the hands of foreign merchants or dealers, who conveyed their corn or other articles from one port to another, fo as to anticipate the Englifh farmers in the fale and difpofal of their grain or other produce. And it is fuggefted by Mr. Dirom in his "Inquiry into the Corn Laws and Corn Trade," that, "although thofe merchants may have loft upon the grain which they imported into England at this time, they gained upon the general courfe of the trade; becaufe they received in return, wool, unfinifhed woollen cloth, and ready money, upon which they made great profit in their own countries, and thus were enabled to underfell the produce of our fields at home."

Further, "this appears to have been the cafe, even after this period, from two reftrictive and regulating laws of Richard III. 1, c. 8, 13, by the laft of which it appears, that the foreign merchants who imported wines into England, had not only taken their payment two-thirds in woollen cloth, and one-third in ready money, but had confiderably leffened the contents of their wine cafks, although fold under the former titles and contents."

The inconvenience and confequent diftrefs to which the bufinefs of cultivation was expofed, by the conftant importation of foreign grain, at length awakened the attention of the legiflature, and in 1463, a preventive law was made, 3 Edward IV. c. 2; fome of the caufes of which feem to have been, that the labourers or cultivators and occupiers of land, had been grievoufly injured by the importation of foreign grain, when corn at home was at a low price; by which the importation of foreign grain was prohibited, until the prices at home fhould exceed 6*s.* 8*d.* the quarter for wheat, 4*s.* for rye, and 3*s.* for barley; which is in the proportion of 1*l.* 15*s.* 2*d.* 1*l.* 1*s.* and 15*s.* 10*d.* of the prefent money.

The able author quoted above, confiders thefe as the laws to which the agriculture of this country owes its origin; and that notwithftanding their objects have frequently been defeated by others, they are the bafis or foundation which ftill remains; and on which a great fabric, now out of repair, has been erected; but which, by "moderate attention, may long continue to be the chief ornament and fupport" of the kingdom. It was on thefe laws, he adds, that the agriculture of the country refted for nearly a century; though the want of their being duly executed, rendered them in a confiderable degree nugatory. For as the prohibition of the importation of foreign grain, was never fufficiently regarded; the occupiers of land had ftill to contend with the competition of grain from abroad as well as other oppreffions and grievances at home; as is fully fhewn by an act made in the year 1552 againft regrators, foreftallers, and ingroffers, the 5 and 6 of Edw. VI. c. 14; "by which the crime of foreftalling is extended to perfons buying victuals coming in fhips from beyond the feas, to be fold in any market or fair, city, port, haven, creek, or road, as if no laws had fubfifted by which fuch importation had been prohibited." And after obferving that although the "repreffion of the practices of foreftalling and regrating might have been neceffary," it is not eafy to difcover any caufe "for the enactment of ingroffing" at a period fo late as this when commerce had made fuch confiderable advances: and further that, "by the fame law, no

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perſon at home could tranſport corn from one port to another without a licence; neither could they purchaſe corn to be laid up in their granaries for home ſale, until the quarter of wheat was at, or under, 6*s*. 8. *d*. (equal to 16*s*. 6*d*. of preſent money): malt and barley at 3*s*. 4*d*. (8*s*. 3*d*); oats at 2*s*. (4*s*. 11½*d*.); peaſe and beans at 4*s*. (9*s*. 11*d*.): and rye at 5*s*. (12*s*. 5*d*.) per quarter."

By theſe means it is contended that the former ſyſtem of corn laws was wholly ſubverted, for that, "although theſe were the prices to which exportation was limited by the act of Edward IV. in 1463, the value of money was materially changed; for, at the former period, there were only 37*s*. 6*d*. in the pound of ſilver, and now there were 60*s*. and at the former period, money bore a very high and unlimited intereſt, and now, it yielded only about 12 *per cent. per annum*; ſo that 6*s*. 8*d*. for a quarter of wheat, in 1463, was equal to 1*l*. 15*s*. 2*d*. and in the year 1552, it was only equal to 16*s*. 6*d*." as has been noticed above. And further that the prohibition to the purchaſing of grain for ſtoring up or conveying coaſt-ways, till the price ſhould ſink beneath the expence of raiſing it, muſt have neceſſarily put a total ſtop to all dealings in grain and of courſe ruin the farmers; all of which was done at a period when the price of corn had been invariably at a low ſtate. It is ſuppoſed not to have occurred to the legiſlature at this period, that by keeping the grain at home in ſeaſons of great plenty the price muſt be inhanced, as the farmers would not be capable of continuing their trade of raiſing grain under ſuch diſadvantageous circumſtances; of courſe, that as ſoon as the ſtock on hand was conſumed, ſcarcity if not famine muſt be the conſequence; nor that by permitting an exportation of the excreſcent ſtock, plenty would be enſured, by preſerving an open market to the farmers, and in that way enabling them to carry on their buſineſs, and raiſe more grain than was in general neceſſary for the home conſumption: nor was the benefit that would ariſe to the nation, from the increaſed number of perſons who might be engaged in raiſing and exporting the quantity of corn that could be ſpared, or the ſums of money which would be brought into the country as the price of it, in the leaſt attended to.

It ſeemed to have proceeded on the idea that the only mode of preſerving plenty, was that of keeping the whole of the corn and other proviſions at home, and importing as much as poſſible from abroad, which appears from experience to be far from having any foundation in truth.

However, the ſame ſyſtem was farther enforced and followed out by the enacting of another law this year 1554, 1 & 2 Phil. & Mary, c. 5. under the ſuppoſition of injury from the exportation of corn and other victuals; by which it was provided that "no manner of perſon or perſons ſhould export any wheat, rye, barley, or other ſort of grain, growing within England; or any malt made within the ſame; or any butter, cheeſe, herring, or wood, without having licence ſo to do, under ſevere penalties; except when the common price of corn, within England, ſhould not exceed for wheat 6*s*. 8*d*. (equal to 16*s*. 6*d*. of preſent money): rye 4*s* (9*s*. 11*d*.) and barley 3*s*. (7*s*. 5*d*.) per quarter.

Such was the policy of Edward IV. as well as of Philip and Mary, notwithſtanding the price of wheat this and ſeveral years before, had been only 8*s*. the quarter (equal to 19*s*. 10*d*. of preſent money); and the export prices below the medium ones in times of ordinary plenty; and in Scotland it was ſoon afterwards followed by laws expreſsly prohibitory under very ſevere penalties of the exportation of all ſorts of victuals, tallow, and fleſh. Mary par. 6. c. 40. Jas. par. 11. c. 55.

After the enacting of this law, from the ſeaſons being favourable and the importation of foreign grain being continued, though the price of wheat remained about 8*s*. the quarter; the farmers became ruined, and the buſineſs of cultivation much relinquiſhed; which ſtrongly marks the abſurdity of directing perſons to labour in occupations in which they cannot procure a reaſonable ſubſiſtence. The excellent laws of Henry VI. and Edw. IV. had continued without repeal throughout the reigns of Henry VII. and VIII. without, however, being countenanced or having any execution, yet theſe ſovereigns, as well as Edw. VI. and Philip and Mary, made repeated laws to enforce the people to cultivate and ſow their grounds, 4 Hen. VII. c. 19. 7 Hen. VIII. c. 1. 27 Hen. VIII. c. 22; 5 and 6 Edw. VI. c. 15. 2 and 3 Phil. and Mary c. 2. thoſe of the latter being particularly prejudicial in repreſſing the ſpirit of huſbandry.

Theſe inconſiſtencies did not however eſcape the attention of Elizabeth, as almoſt immediately upon her acceſſion ſhe not only renewed the laws which formerly exiſted for rebuilding farm houſes, and tilling the land formerly in cultivation with greater vigour, 5 Eliz. c. 2. but by another law 5 Eliz. c. 5. § 26. permitted farmers to export their corn as merchandize, when the price was not high at home, as when wheat did not exceed 10*s*. the quarter, equal to 1*l*. 8*s*. of preſent money, rye, peas or beans, 8*s*. (16*s*. 7*d*.) barley and malt 6*s*. 8*d*. (13*s*. 10*d*.) And as in the former of theſe laws, the penalties had been given to the king, they were now given to the next heir, &c. of the perſon offending. By this means a conſiderable extenſion of the exportation prices took place, which is remarked by the beſt writers of that period to have had a direct and immediate effect in the increaſe of tillage and the reduction of importation, though it had been obſerved by one of them that for ſeveral years preceding that time, "the importation of grain had exceeded forty-five millions of livres." Theſe are probably the firſt traces of the navigation laws.

Not long after this, in 1570, a ſtill more vigorous effort was made to reſtore the agriculture of the country, in a law enacted for the better increaſe of tillage, &c. 13 Eliz. c. 13. by which exportation was permitted, without limitation of prices, from ſuch ports and creeks, in which a cuſtomer or collector of the ſubſidy of tonnage and poundage, had been placed, to any part beyond the ſeas in amity with England, when not reſtrained by proclamation, provided ſuch exportations were made in ſhips belonging to Engliſh born ſubjects reſiding within the dominions; at ſuch times as the ſeveral prices of grain ſhould be ſo reaſonable and moderate, when ſuch exportations were intended, as that no prohibition ſhould be made by the queen's proclamation, or by the preſidents of the North, or of Wales, within their ſeveral juriſdictions; or of the juſtices of aſſize at their ſeſſions, in other ſhires out of the juriſdiction of the ſaid two preſidents and councils; or by the major part of the juſtices of peace of the county at their quarter ſeſſions. Thus, theſe different magiſtrates were to annually confer and deliberate with the inhabitants of the county concerning the prices of the different ſorts of corn within their juriſdictions, in regard to its cheapneſs or dearneſs, and by their diſcretion decide whether it would be meet, at any time, to prevent any grain from being carried out of the realm, by any port within their juriſdictions or limits, and by a writing under their hands and ſeals, make a determination, either for permiſſion or prohibition, and cauſe the ſame to be publiſhed by the ſheriffs of the ſeveral counties; which was to continue in force until the ſame ſhould be altered, by the ſaid preſidents and councils, or other powers reſpectively, except the ſame ſhould, in the mean time, be countermanded by the queen, her heirs or ſucceſſors; or by ſome order of the juſtices

justices of peace, in the counties situated out of the jurisdiction of the said two councils, in their quarter sessions to be holden in the mean time, or the greatest part of them, should find the determination of the justices of assize to be hurtful to the country, in consequence of the dearth, or a great hindrance to tillage, in consequence of the great cheapness; which determination was in like manner to be published, and continue in force until a new regulation should be made; except the same should in the mean time be altered by the queen, her heirs or successors: provided always, that these presidents &c. should not publish their determinations, until the same was first notified to, and approved by, the queen, or her privy council; and that the custom or poundage be paid upon exportation: provided likewise, that the queen, her heirs and successors, might at all times by proclamation, prohibit exportation, either generally from all the ports of the realm, or particular ports only.

Mr. Dirom supposes the corn trade, in this case, to have been considered in a scientific manner; and that if the plan marked out had been properly digested and modified, as well as the duties upon exportation removed, there could have been no doubt of the act producing the most beneficial consequences to the kingdom; but the judges, to whom this important business was intrusted, had no certain rule by which to direct their proceedings, not being permitted to determine, by the price of grain at the time of their annual inquiry, the only certain index of plenty or deficiency, but simply upon a conference with the people of the country, to decide whether it would be hurtful to the kingdom, from the dearth, or a great hindrance to tillage, from the too great cheapness, to admit the exportation of corn, than which, he thinks, nothing could be more vague and uncertain. But further that, "whatever consideration might have been given to the framing of this act, the laying a duty of twenty *per cent. ad valorem* upon grain to be exported by licence, and ten *per cent.* upon grain to be exported by the statute, was equal to prohibition, and gave full scope to the importation of foreign grain, which was still (he says) received without the payment of any duty."

However, "in Scotland, the prohibition to export grain to foreign parts was continued under severe penalties;" as by Jas. 6. par. 11. c. 55.

Judging concerning the effects of the preceding law of England, from the prices of grain immediately subsequent to it; they do not seem to have been favourable, as the price of the quarter of wheat in 1574 was 2*l.* 16*s.* equal to 5*l.* 15*s.* 8*d.* of present money; and in 1587 not lower than 3*l.* 4*s.* equal to 6*l.* 12*s.* 8*d.*

In 1593, the corn laws seem to have again undergone a sort of revision, though the reason is not by any means explained; but they are taken notice of in an act, the 35 Eliz. c. 7. made for the adjusting of other acts, and which is entitled, "An Act for revising, continuance, explanation, and perfecting of divers Statutes:" by which it would seem, that the absurd and impracticable scheme of forcing the people to labour or cultivate their land, whether they could live by such means or not, had been given up; as the act passed in the 5th of the present reign was now repealed, and the plan laid down by that of the 13th appears likewise, from other circumstances, to have been relinquished, though the act itself is neither mentioned nor repealed, as the resolutions of the legislature are found to be changed by the 23d section of the present act: by which exportation was permitted, when wheat was at 20*s.* the quarter (equal to 2*l.* 1*s.* 4*d.* of present money); rye, pease, and beans, at 13*s.* 4*d.* (1*l.* 7*s.* 8*d.*); and barley and malt at 12*s.* (1*l.* 4*s.* 10*d.*); which are exactly double the prices at which exportation was permitted by the former law of the 5th. However, at the same time, the duties payable upon corn, exported by force of the statute, were doubled; which, together with an unlimited importation, without the payment of any duty whatever, amounted to a prohibition, and consequently rendered the act nugatory, keeping the price of grain at an extravagant height; as, in 1594, the quarter of wheat sold at 2*l.* 16*s.*, equal to 5*l.* 15*s.* 8*d.*; in 1595, at 2*l.* 13*s.* 4*d.*, equal to 5*l.* 10*s.* 2*d.*; in 1596, at 4*l.*, equal to 8*l.* 5*s.* 4*d.*; and in 1597, at 4*l.* 12*s.*, equal to 9*l.* 10*s.* of present money.

The laws concerning grain continued, however, in this situation till 1604, when, on the accession of James I. to the crown, various statutes were revised; some continued, and others repealed, without any specific reason being given; and one was enacted in respect to grain, the 2 Ja. I. c. 25. § 26, 27. by which the exportation prices were considerably increased; namely, when the quarter of wheat was at 26*s.* 8*d.* (equal to 2*l.* 13*s.* 4*d.* of present money); the quarter of rye, pease, and beans, 15*s.* (1*l.* 10*s.*); the quarter of barley and malt, 14*s* (1*l.* 8*s.*); provided the grain was carried abroad in ships belonging to English born subjects; reserving to the king, his heirs, and successors, the power to restrain, by proclamation, the exportation from the realm in general, or from particular places. But from exportation being still, under this act, encumbered with duties, it is obvious that the complete operation of it must have been greatly retarded or prevented.

And in another revising act of the same reign, 21 Ja. I. c. 28. § 3, 4. in the sections relating to grain, the exportation prices were still farther extended, under similar terms with the former act; namely, the quarter of wheat at 32*s.*, the quarter of rye at 20*s.*, the quarter of pease and beans at 16*s.*, and the quarter of barley and malt at 16*s.*, of current English money. This extent of 32*s.* for wheat was equal to 3*l.* 4*s.* of present money; 20*s.* for rye, to 2*l.*; and 16*s.* for barley and malt, pease and beans, to 1*l.* 12*s.*: which different sums are nearly double the medium prices of the present time, consequently very great, having obviously the extension of revenue in view. Besides this, the penalties for ingrossing were obviated by this act, while the prices of grain did not exceed those stated in it, which was become essentially necessary, in order to restore the internal as well as external trade in corn, which they had nearly put a stop to.

But the duties upon exportation having still been kept up, the proper effects of the law could not be produced.

In 1627, not long after the accession of Charles I., it was again renewed in exactly the same terms, 3 Cha. I. c. 5. § 24, 25. It is, however, remarked by Mr. Dirom, that "although the export prices were literally the same, they were very different in fact; for, in the year 1624, the yearly interest of money having been reduced from 10 to 8 *per cent.*, 32*s.* for a quarter of wheat, which, in 1623, was equal to 3*l.* 4*s.*, was, in 1627, equal to only 2*l.* 11*s.* 2*d.* of present money;" and so in proportion, in respect to the prices of other grain. It is conceived that the long interval of parliament, after the session in which this act passed, and the confusion which quickly succeeded the meeting of the following parliament, in 1640, were probably the causes of no farther attention having been had to the business during the remainder of the reign.

Though, from the unfortunate circumstance of connecting the corn laws with the revenue, the excellent institutions of the reign of Elizabeth, and those of her two immediate successors, had in a great degree been frustrated, agriculture had, in other respects, been treated by the laws as an object of much importance; not merely in the view of the numbers employed

employed in it, or the intrinsic value of the produce which it afforded, but likewise in consequence of the support which would be given to the navy, from the export trade, arising from it. On the restoration of Charles II., however, it was inconsiderately abandoned, being treated merely as an object of revenue.

In the year 1660, without the least reason being stated for any alteration in the corn laws, in a section of the act of tonnage and poundage, 12 Cha. II. c. 4. § 11. corn is considered in the same list or roll with other articles, on which duties are made payable. The exportation prices of grain were still more extended; but the duties were raised so high, as to be equal to a prohibition. Importation was also permitted; but the duties here likewise operated as a prohibition. The prices set for the exportation of wheat being 40*s.*, equal to 2*l.* 8*s.* of present money; 24*s.* for the quarter of rye, pease, and beans, equal to 1*l.* 8*s.* 10*d.*; 20*s.* for the quarter of barley and malt, equal to 1*l.* 4*s.*; and 16*s.* for the quarter of oats, equal to 19*s.* 2*d:* And further by this act, the duties payable on exportation were 20*s.* for the quarter of wheat, equal to 1*l.* 4*s.*; 10*s.* for the quarter of rye, pease, beans, barley, malt, and buck wheat, equal to 12*s.*; and 6*s.* 8*d.* for the quarter of oats, equal to 8*s.* And by the same act, the rates inward, or duties on importation, were thus regulated: for the quarter of wheat, when the price, at the place of importation, did not exceed 44*s.*, equal to 2*l.* 12*s.* 10*d.*, the sum of 2*l.*, equal to 2*l.* 8*s.*; and when it exceeded that price, 6*s.* 8*d.*, equal to 8*s.* of present money. For the quarter of rye, when not exceeding in price as above, 36*s.*, equal to 2*l.* 3*s.* 2*d.*, the sum of 1*l.* 6*s.* 8*d.*, equal to 1*l.* 12*s.*; and when it exceeded that price, 5*s.*, equal to 6*s.* of present money. For the quarter of pease, beans, barley, and malt, not exceeding in price as above, 1*l.* 6*s.* 8*d.*, equal to 1*l.* 12*s.*, the sum of 1*l.* 6*s.* 8*d.*, equal to 1*l.* 12*s.*; and when it exceeded that price, 5*s.*, equal to 6*s.* of present money. Consequently, Mr. Dirom observes, that until the price of wheat *per* quarter was higher than 2*l.* 12*s.* 10*d.* of present money, and that of other grain in proportion, from the importation high duties acting as a prohibition, and exportation being in fact prohibited, prices would quickly rise, and bring the country to import at the low duties; a circumstance which, he says, accordingly happened: "for, in 1660, the quarter of wheat sold at 2*l.* 16*s.* 6*d.*, equal to 3*l.* 7*s.* 9*d.* of present money;" "in 1661, it rose to 3*l.* 10*s.*, equal to 4*l.* 4*s.*; and in 1662, to 3*l.* 14*s.*, equal to 4*l.* 8*s.* 10*d.* of present money." He adds, that these laws, in addition to their having raised the price of grain to an "extravagant height, had ruined many of the farmers;" and that agriculture declined, a great part of the lands lying without tillage or cultivation.

In consequence of this, the corn laws were again taken into consideration in 1663, the preamble to the act concerning which, 15 Cha. II. c. 7. § 1, 2, 3, 4, sufficiently shews the deplorable state into which husbandry had fallen; and it would seem that the legislature was now seriously anxious to afford it encouragement. By this law, the exportation prices were extended beyond their former limits: that of the quarter of wheat being fixed at 48*s.*, equal to 2*l.* 17*s.* 7*d.* of present money; the quarter of buck wheat, barley, or malt, 28*s.*, equal to 1*l.* 13*s.* 7*d.*; the quarter of oats, 13*s.* 4*d.*, equal to 16*s.*; the quarter of rye, pease, and beans, 32*s.*, equal to 1*l.* 18*s.* 5*d.* current English money: but the exported grain being still suffered to continue loaded with nearly 50 *per cent.* of duties, it operated as a prohibition.

While, on the contrary, the high duties on importation were removed, and when the prices of grain did *not* exceed the same rates limited for exportation, or when grain was at the lowest price, importation was allowed, on the payment of about 9 *per cent.* of duties *ad valorem*, which were much lower than the low duties fixed by the act of tonnage and poundage. These duties were, for every quarter of wheat, 5*s.* 4*d.*, equal to 6*s.* 5*d.* of present money; for every quarter of rye, 4*s.*, equal to 4*s.* 10*d*; for every quarter of barley or malt, 2*s.* 8*d.*, equal to 3*s.* 2*d.*; for every quarter of buck wheat, 2*s.*, equal to 2*s.* 5*d.*; for every quarter of oats, 1*s.* 4*d.*, equal to 1*s.* 6*d.*; and for every quarter of pease and beans, 4*s.*, equal to 4*s.* 10*d.*

By the introduction of the monosyllable *not*, in the clause of the act which relates to importation, it is observed, the meaning of the whole was perverted; as it never could have been the design of the framers of the act to allow importation at low duties, till grain had risen above the prices fixed for exportation; as, until that rise, the prohibition to ingross was taken off, and similar reasons influenced both cases.

This is rendered still more probable by a law of Scotland, Cha. II. par. 1. sess. 3. c. 12. 14. of the same year; in which the powers of exportation were extended, reserving to the king and privy council to restrain or prohibit it as they should judge necessary; while a duty of about 40 *per cent.* *ad valorem* was laid upon grain imported, when the prices did not exceed those of exportation, namely, for ilk boll of wheat, under 12*l.*, equal to 1*l.* 4*s.* of present money; bear and barley, under 8*l.*, equal to 16*s.* the boll; and oats and pease, under 8 *merks*, equal to 10*s.* 8*d.* the boll; with power to the king and council to remit the duties, if the prices should rise.

In this case Mr. Dirom contends, that "the Scotch parliament clearly took the lead in the liberal and wise exercise of their powers, for the encouraging of agriculture, and thereby procuring plenty and cheapness of provisions." He adds, that "they permitted the exportation of all sorts of grain, when the prices at home were moderate, upon payment of a small duty; and as long as the prices remained in that situation, the duties payable upon importation were equal to a prohibition: and they gave unlimited powers to export cattle, and barrelled fleshes of all kinds, without the payment of any duties: while, in England, importation was permitted, when the price of corn at home was at the cheapest rate, upon payment of a low duty; and the duties upon exportation, when the price of corn was in the same situation, amounted to a prohibition."

And in 1669, the parliament of Scotland, from reconsidering the subject, and finding that the exportation of corn had been impeded by the duty payable upon the same, now removed all duties, except a merk the chalder, equal to 1*s.* 4*d.* of present money, payable upon corn exported, when the prices at home did not exceed those stated in the act of 1663. Cha. II. par. 2. sess. 1. c. 14. And in order to prevent any debates that might arise concerning the respective prices of victual, when the same were under or above the rates expressed in the said act, they recommended to, and authorized, the lords of the privy council to determine the same; declaring that it should be lawful for his majesty's subjects to export corns of all sorts, unless prohibited and discharged from doing the same, by a proclamation or public intimation from the said lords of council.

In 1670, a revision of the corn laws again took place, probably in consequence, as Mr. Dirom suggests, of the continual drain upon England for the payment of the price of the large quantities of grain imported; and by a law now passed,

paffed, entitled, "An Act for Improvement of Tillage, and the Breed of Cattle, for the common Good and Welfare of the Kingdom," it was enacted as lawful for every perfon, native or foreigner, to tranfport, at any time, as merchandize, all forts of corn, although the prices exceeded the rates in the act of the 15th of the prefent reign; paying for the fame the rates expreffed in the act of tonnage and poundage. And that in cafes where the prices of grain, at the places of importation, fhould not exceed the rates, as follows; there fhould be paid for cuftom thefe rates, namely, for every quarter of wheat, when the fame fhould not exceed 53*s.* 4*d.*, equal to 3*l.* 4*s.* of prefent money, the fum of 16*s.*, equal to 19*s.* 2*d.*; when the fame fhould exceed 53*s.* 4*d.*, and not exceed 4*l.*, equal to 4*l.* 16*s.*, there fhould be paid 8*s.*, equal to 9*s.* 7*d.*; for every quarter of rye, when the fame did not exceed 40*s.*, equal to 2*l.* 8*s.*, the fum of 16*s.*, equal to 19*s.* 2*d.*; for every quarter of barley, malt, or buck wheat, when the fame did not exceed 32*s.*, equal to 1*l.* 8*s.* 5*d.*, the fum of 16*s.*, equal to 19*s.* 2*d.*; for every quarter of oats, when the fame did not exceed 16*s.*, equal to 19*s.* 2*d.*, the fum of 5*s.* 4*d.*, equal to 6*s.* 5*d.*; and for every quarter of peafe and beans, when the fame did not exceed 40*s.*, equal to 2*l.* 8*s.*, the fum of 16*s.*, equal to 19*s.* 2*d.* And that when the prices of corn fhould exceed the aforefaid rates, there fhould be paid the former cuftom and poundage: imagined to have been intended to be, by the act of 1663, 5*s.* 4*d.*, equal to 6*s.* 5*d.*, for wheat; 4*s.*, equal to 4*s.* 10*d.*, for rye, peafe, and beans; 2*s.* 8*d.*, equal to 3*s.* 2*d.*, for barley and malt; and 1*s.* 4*d.*, equal to 1*s.* 6*d.*, for oats. 22 Charles II. c. 13. § 1, 2.

The above mentioned writer fuppofes that this law was without doubt defigned to promote the exportation of Englifh corn, and to reftrain, if not prohibit, the importation of grain from abroad; but that the former was completely prevented, from the high duties continued upon it; and that the latter was rendered nugatory, in confequence of no rule being laid down for afcertaining the price of grain, at the time or place of importation: of courfe the trade continued to be carried on, on the payment of the low duties; agriculture languifhed; the dealers finding their account in feeding the populace with foreign grain, the prices of courfe keeping high: the average price of the quarter of wheat, for the ten years preceding this period, having been 2*l.* 8*s.* 10*d.*, equal to 2*l.* 18*s.* 8*d.* of prefent money. It is fuggefted that by thefe laws the poorer fort of farmers became ruined, and the richer were weakened, being neceffitated to turn their attention from corn to live ftock, or any other objects by which they could fupport their families: the price of corn confequently rofe on the manufacturer and labourer; and the importer of foreign grain became an important man, upon the ruins of the landholders, farmers, and others.

Notwithftanding this, the reft of this thoughtlefs and inattentive reign paffed away without any alteration being made, though it continued for a period of fifteen years afterwards. Grain, of courfe, kept high in price: the average of the quarter of wheat, for the twenty years, from 1660 to 1680, having been 2*l.* 9*s.* 9*d.*, equal to 2*l.* 19*s.* 9*d.* of the prefent money.

In 1685, on the acceffion of James II., the evafion of the duties payable on imported corn, and the diftrefs caufed by the vaft importation of grain from abroad, were brought under the confideration of the legiflature; and another act for the improvement of tillage paffed, 1 Ja. II. c. 19, by which the defect of the above law was endeavoured to be obviated; it being there referred to the juftices of the peace, in the feveral counties of England, where foreign grain might be imported, at their quarter feffions, after Michaelmas and Eafter, on the oaths of two or more fubftantial perfons, neither being merchants nor factors for the importation of corn, nor anywife concerned or interefted in the corn to be imported, and each having a free eftate of 20*l.* *per annum*, or a leafehold of 50*l.* *per annum*, to determine the prices of the feveral kinds of grain, which they were to certify to the principal officer of the cuftoms in the feveral counties, for his rule and regulation.

The importation of victual from Ireland had been prohibited in Scotland, under very fevere penalties, Char. II. par. 2. feff. 3. c. 3, only referving to the lords of the privy council power to admit of it, for fuch times as they fhould think proper, when the price within the kingdom fhould be at or above 8*l.* Scots, equal to 16*s.* of prefent money, for bear and meal; and 10*l.*, equal to 20*s.*, for wheat *per* boll. But in this year, 1686, by the act of Ja. VII. par. 1. feff. 3. c. 14, a total prohibition was enforced; all victual which fhould then be imported, being directed to be funk or deftroyed.

It is remarked by the writer we have quoted above, that for the ten years from 1650 to 1660, the average price of the quarter of wheat in this country had been 2*l.* 9*s.* 6*d.*, equal to 2*l.* 19*s.* 5*d.* of prefent money; that from the latter period to 1670, it had been 2*l.* 8*s.* 10*d.*, equal to 2*l.* 18*s.* 8*d.*; from this laft period to 1680, it had been 2*l.* 10*s.* 8*d.*, equal to 3*l.* 0*s.* 10*d.*; and that from 1681 to 1685 inclufive, it had been 2*l.* 4*s.* 3*d.*, equal to 2*l.* 13*s.* 1*d.*

But the unfavourable tendency of the above fyftem of corn laws is more fully fhewn by the fcale of prices, fixed by them for the exportation and importation of wheat, in the following tables, from 1360 to 1688, as taken from the above excellent work.

TABLE

TABLE of Exportation Prices and Duties for Wheat.

ENGLAND.

	Exportation Prices *per* Quarter.				Exportation Duties *per* Quarter.		
	Prefent Money.	Money of the Time	Anno Domini	Anno Regis.	Money of the Time.	Prefent Money.	
	£. s. d.	£. s. d.			£. s. d.	£. s. d.	
Permitted - -	0 0 0	0 0 0	1360	34 Edward III.	0 0 0	0 0 0	
	0 0 0	0 0 0	1393	17 Richard II.	0 0 0	0 0 0	
	0 0 0	0 0 0	1425	4 Henry VI.	0 0 0	0 0 0	
	2 4 0	0 6 8	1436	15 Henry VI.	0 0 0	0 0 0	
	0 16 6	0 6 8	1554	12 Phil. & Mary.	0 0 0	0 0 0	
	1 0 8	0 10 0	1562	5 Elizabeth.	0 0 0	0 0 0	
	0 0 0	0 0 0	1570	13 Elizabeth.	0 1 0	0 2 1	by ftatute.
	0 0 0	0 0 0			0 2 0	0 4 2	by licence.
	2 1 4	1 0 0	1593	35 Elizabeth.	0 2 0	0 4 2	
	2 13 4	1 6 8	1604	2 James I.	0 2 0	0 4 0	
	3 4 0	1 12 0	1623	21 James I.	0 2 0	0 4 0	
	2 11 2	1 12 0	1627	3 Charles I.	0 2 0	0 3 2	
	2 8 0	2 0 0	1660	12 Charles II.	1 0 0	1 4 0	
	2 17 7	2 8 0	1663	15 Charles II.	1 0 0	1 4 0	
Without limitation of prices	0 0 0	0 0 0	1670	22 Charles II.	1 0 0	1 4 0	

SCOTLAND.

	Prices *per* Boll.				Duties *per* Boll.	
	Prefent Money.	Money of the Time.	Anno Domini	Anno Regis.	Money of the Time.	Prefent Money.
	£. s. d.	£. s. d.			£. s. d.	£. s. d.
Prohibited - -	0 0 0	0 0 0	1587	20 James VI.	0 0 0	0 0 0
Permitted when under	1 4 0	12 0 0	1663	15 Charles II.	0 5 0	0 0 6
	1 4 0	12 0 0	1669	21 Charles II.	0 0 10	0 0 1

TABLE of Importation Prices and Duties for Wheat.

ENGLAND.

	Importation Prices *per* Quarter.				Importation Duties *per* Quarter.	
	Present Money.	Money of the Time.	Anno Dom.	Anno Regis.	Money of the Time.	Present Money.
	£. s. d.	£. s. d.			£. s. d.	£. s. d.
Invited - - -	0 0 0	0 0 0	1202	3 John.	0 0 0	0 0 0
Invited - - -	0 0 0	0 0 0	1215	16 John.	0 0 0	0 0 0
Invited - - -	0 0 0	0 0 0	1266	9 Henry III.	0 0 0	0 0 0
Invited - - -	0 0 0	0 0 0	1297	25 Edward I.	0 0 0	0 0 0
Invited - - -	0 0 0	0 0 0	1328	2 Edward III.	0 0 0	0 0 0
Invited - - -	0 0 0	0 0 0	1358	25 Edward III.	0 0 0	0 0 0
Permitted - -	1 15 2	0 6 8	1463	3 Edward IV.	0 0 0	0 0 0
When not above	2 12 10	2 4 0	1660	12 Charles II.	2 0 0	2 8 0
When above that price	0 0 0	0 0 0			0 6 8	0 8 0
When not above - -	2 17 7	2 8 0	1663	15 Charles II.	0 5 4	0 6 5
When not above - -	3 4 0	2 13 4	1670	22 Charles II.	0 16 0	0 19 2
From that price to -	4 16 0	4 0 0			0 8 0	0 9 7
And when above that price -	0 0 0	0 0 0			0 5 4	0 8 0

SCOTLAND.

	Prices *per* Boll.				Duties *per* Boll.	
	Present Money.	Money of the Time.	Anno Dom.	Anno Regis.	Money of the Time.	Present Money.
	£. s. d.	£. s. d.			£. s. d.	£. s. d.
Permitted - -	0 0 0	0 0 0	1663	15 Charles II.	3 0 0	0 6 0
Prohibited - -	0 0 0	0 0 0	1672	25 Charles II.	0 0 0	0 0 0
Prohibited - -	0 0 0	0 0 0	1686	2 James VII.	0 0 0	0 0 0

It is confidered by Mr. Dirom as extraordinary, that the advantage which muft neceffarily accrue to a nation from raifing the utmoft poffible quantity of corn, and exporting fuch portions of it as the confumption at home does not demand, fhould, for fuch a great length of time, have been mifunderftood in this country; efpecially fince the example of the neighbouring ftates, conftantly bartering their excrefcent ftock of this article for the raw materials and money of the kingdom, could fcarcely have efcaped notice for fuch a number of centuries. The importation trade is confidered as operating, in various ways, in direct oppofition to the benefit of the country: in confequence of which, agriculture became in a declining ftate; much of the ground was without cultivation; there was a decreafe in the population, a proportionate reduction in the public revenue neceffarily took place; and the number of remaining manufacturers were of courfe fed at an exorbitant price, by the products of foreign lands, the inhabitants of which were not unfrequently at enmity with us, but who drew vaft fums from the country, and thus robbed it of its riches.

But we now approach a period in which a different fyftem was acted upon, and in which a very material change took place in the laws refpecting corn; but which was not accomplifhed by fimply revifing or amending the old acts, or by merely reducing the duties upon exported grain, but by at once giving up every idea of revenue from grain raifed at home; and thus holding out a new fyftem which fhould invigorate and encourage the cultivation of the foil, while it afforded a new ftimulus to the trade and navigation of the country.

In 1688, not long after the acceffion of William and Mary to the crown, the fubfequent important act for encouraging the exportation of corn was paffed, 1 Will. & Mary, c. 12. and ibid. c. 24. § 18, by which exportation was permitted from

from England, when the prices at home did not exceed the following rates: malt or barley, 24*s.* the quarter, Winchester measure, equal to 28*s.* 10*d.* of present money; rye, 32*s.*, equal to 38*s.* 5*d. per* quarter; and wheat, 48*s.*, equal to 2*l.* 17*s.* 7*d.* the quarter; provided it was made in English shipping, the master and two-thirds of the mariners, at least, being subjects of that state, and the exporter producing a certificate under his hand, of the quantity of grain shipped, to the collector of the customs at the port where the grain had been shipped, and proving the said certificate by the oaths of one or more credible persons; and upon bond, of at least 200*l.* for every 100 tons of corn, that the said grain should be exported to parts beyond the seas, and not again re-landed, the exporter should receive the following bounties: for every quarter of barley or malt, ground or unground, 2*s.* 6*d.*, equal to 3*s.* of present money; for every quarter of rye, ground or unground, 3*s.* 6*d.*, equal to 4*s.* 2*d.*; for every quarter of wheat, ground or unground, 5*s.*, equal to 6*s.*: and on producing a certificate, under the common seal of the chief magistrate in any places beyond the seas, or under the hands and seals of two known English merchants, that such corn had been actually landed; or upon proof, by credible persons, that such corn had been taken by enemies, or perished on the seas, the exporter's bond was to be given up; and the money, paid by the collector or commissioner of the customs, to pass in his account.

And the same system of policy was adopted soon afterwards in Scotland in 1695, by an act Will. par. 1. c. 32, in which all export duties were taken off, and a bounty of eight merks granted upon ilk chalder of corn exported, when the prices did not exceed the following: wheat twelve pounds the boll equal to 1*l.* 4*s*; bear, barley, or malt, eight pounds, equal to 16*s.* the boll; pease, oats, and meal, six pounds, equal to 12*s.* the boll; the whole being of Linlithgow measure, provided that the exportation was made in Scotch ships and by Scotsmen, the master and three-fourths of the seamen being Scotsmen, power however being reserved to the lords of the secret council, when the prices exceeded the fixed rates, to discharge and discontinue exportation.

The duties and subsidies payable upon exported corn from England, not having been given up by the former act, they were now, 1700, finally removed and taken away by another act, 11 and 12 Will. III. c. 20. § 4, whether upon ground or unground grain.

By this means what has been termed a new system of corn laws, was finally established in both this country and Scotland, and the act of Union taking place soon afterwards, 1706, their laws concerning grain were made alike. That when oats shall be sold at 15*s.* sterling, equal to 18*s.* of present money, the quarter or under, there shall be paid 2*s.* 6*d.* sterling, equal to 3*s.* bounty, for every quarter of the oatmeal, so long as rewards are granted for exportation of other grains; and that the bear of Scotland have the same reward as barley.

It has been already seen that the prices and duties of corn imported, had been determined by the act of 1670, but that for want of a rule for ascertaining the prices at the times and places of importation, the duties were evaded. The act of 1685 was to supply this defect; it enjoined and required the justices of peace of the several counties, at their respective quarter sessions, to inquire into and determine the prices of grain at fixed periods, and to send certificates thereof to the several custom houses within their jurisdiction, to be there hung up in a public place for the rule and direction of the parties concerned. But in consequence of neither the trouble of its execution being compensated, nor the neglect of it punished, it was in many places unattended to; and from no mode or rule having been substituted, in such an event, the defect was laid hold of by the importer, and much foreign grain was imported without payment of the duties during 1728 and 1729. And difficulties had likewise been met with from the modes employed in ascertaining the prices and quantities of grain exported.

There being, therefore, in different places a great neglect in the justices of peace, to determine the prices of grain, by which the duties on imported corn were to be regulated, the matter was now, 1729, taken up, and they were directed to do it in future, in their respective counties, at their next quarter sessions, or any adjournment, according to the act of 1670, and that on their omitting or neglecting to do it, and to certify the same, the collectors of the customs at the respective places of importation, were empowered to demand and receive the duties according to the lowest price of the several sorts of corn mentioned in the last named act.

And to ascertain the quantity of grain shipped, for which a bounty was to be paid, in a better manner, the proper officers of the customs were directed to admeasure the same, by a tub, or measure, containing four Winchester bushels; and when such corn to be exported was brought to be shipped off in sacks, they were empowered to make choice of any two of them out of twenty, and in that way compute the quantity to be shipped, on which the bounty was to be paid. And that the same powers should be employed in ascertaining the prices and quantity of bear, bigg, oatmeal, and malt, made from wheat or wheat malt, for being exported, 2 Geo. II. c. 18. § 1, 2, 3, 4, 5. That in all such cases, as where any corn or grain had been imported since the first day of the Michaelmas quarter session, then last past, where the importers or proprietors had omitted to pay the respective duties on the same on demand, they should forfeit and lose all such grain, or the value of it.

Notwithstanding this, neglects still frequently occurred in determining the prices of grain, according to which the duties payable on importation were to be levied, and of course the means were afforded of much foreign grain being brought in, though the prices at home were very low; consequently another act was now, 1732, passed, for the *better ascertaining the same, and preventing fraudulent importation*, in which it was again recommended to the justices of peace, at their quarter sessions, in the several counties where foreign grain should or might be imported, to give in charge, to the grand jury, in the open court, to make inquiry and presentment, upon their oaths, of the common corn market prices, of middling English corn and grain, of the respective sorts and quantities mentioned in the act, made in the 22d year of the reign of king Charles II. as the same should be commonly bought and sold, in every such county, which presentment should be certified by the said parties, in writing, to his majesty's chief officer and collector of the customs for the time being, at every such port, place, or haven, where importation should be made, and which should be hung up in some public place in the custom house, for general information and instruction: and that the custom duty upon foreign grain imported, as directed by the above act of Charles II., should be collected and paid, according to the prices contained in such certificate. But that after importation, no foreign corn or grain was to be exported, or in any manner or shape laden on ship board, or put to sea, for carrying, conveying, or transporting it from one part or port of the kingdom to another, either by itself or in mixture with English corn, under the very severe penalties and forfeitures therein mentioned. 5 Geo. II. c. 12.

It

It is ftated byMr. Dirom, in his very able "Inquiry into the Corn Laws and Corn Trade," that at this period agriculture had confiderably recovered its ftrength, and that the exertions of the farmers had become vigorous and conftant. That the prices of corn for feveral years preceding it had been very reafonable, and that a great export trade in corn had been carried on from this country; proper attention having been paid to the execution of thofe laws which were made to guard againft fraudulent importations: the average price of the quarter of wheat, for the five years from 1731 to 1735 inclufive, being only 34*s.*; in 1736, 40*s.*; in 1737, 38*s.*; and in this year 1738, only 35*s.* 6*d.* yet under thefe plentiful circumftances, the lower orders of the populace were excited to commit various outrages, by which the corn was deftroyed. Therefore, in order to reprefs fuch diforders, an act was paffed, 11 Geo. c. 22, by which fuch offenders were feverely punifhed, and the inhabitants of the hundreds, in which fuch outrages fhould be committed, fubjected to the payment of the damages.

The power of fufpending the laws, in Scotland, which were made to prohibit the importation of foreign grain, or to buy, fell, or retail the fame, which had refted on the act of 1703, and the two preceding ones therein referred to, having been formerly vefted in the privy council of that kingdom; in confequence of the prices of grain having rifen in 1740, from the feverity of the winter, and fome importation of foreign grain made contrary to law, from there exifting no power of fufpending the prohibitory acts there, on account of the act of the fixth Anne, c. 6. having done away the privy council, a temporary expedient without any new plan was now, 1741, had recourfe to, and a law made, which transferred fuch power to the courts of feffion, jufticiary, and exchequer; the judges in thefe courts being required to determine on the neceffity of exportation or importation, from the prices of grain in the county of Edinburgh. The duties payable in England by the act of the 22 Charles II. being required by the fame law to be paid on the importation of grain into Scotland; the whole of the claufes and provifions of that act, as well as of that of the 2 George II., termed "An act to afcertain the cuftom payable on Corn imported, being extended to Scotland."

Difficulties having arifen concerning the computation and meafurement of wheat, meal, and other ground corn, on which a bounty was payable upon exportation, in order to adjuft all differences arifing thereon, by a law now (1751) made, the officers of the cuftoms were empowered to allow the fame bounty on the exportation of 224 pounds weight of wheat meal, or other ground corn or grain, as was allowed upon the exportation of four bufhels of wheat, or other corn or grain, unground; and for the more effectually expediting the bufinefs, they were permitted to make choice of any two facks out of twenty, from which to compute the weight. 24 Geo. II. c. 56. § 1.

Thefe laws had greatly contributed to the extenfion of the export trade in grain, while plenty continued at home, with moderate prices. It is ftated, that the average exportation of four years, from 1748 to 1751 inclufive, was 1,212,686 quarters annually; and that the average price of wheat, for the fame four years, was 36*s.* 3*d.* the quarter.

From the money, applicable to the payment of the bounty, becoming inadequate to the difcharge of the fums due on fuch extenfive exportations, an act was now (1753) paffed, 26 Geo. II. c. 15, by which the debentures, for the bounties on exported corn, were to carry an intereft, when not paid within fix months, at the rate of 3 *per cent. per annum*, according to the regulations of the act of the 12 and 13 of king William.

The crop of 1756 being defective and the prices of courfe rifing, the populace from being long in the habits of plenty, miftaking the caufe, committed various outrages in different places. And a law was brought forward in 1757, 30 Geo. II. c. 1, by which all forts of corn, meal, malt, flour, bread, bifcuit, or ftarch, were prohibited exportation, before the 25th December 1757, except malt made to be exported, and declared to be fo before the 4th December 1756, fhips cleared out with it before the 25th being fuffered to proceed on their voyages: power was however referved to the king to remove the prohibition by proclamation, and to admit all perfons, natives as well as foreigners, but no particular perfon or perfons, to export grain. All duties, cuftoms, rates, and impofitions of every kind, on corn or flour, imported, or taken from the enemy and brought into the kingdom, were difcontinued until the 24th of Auguft 1757; and the fame might be carried coaftways free of duty, 30 Geo. II. c. 7, and importation without duty was permitted alfo in fhips of other friendly nations from any port or place whatever, 30 Geo. II. c. 9. § 14. After 11th March 1757, the diftillation of low wines and fpirits from any wheat, barley, malt, or any other fort of grain, or from any meal or flour, was prohibited during the fpace of two months, 30 Geo. II. c. 10. and it was afterwards continued to the 11th December in the fame year; but with power to his majefty to fufpend the act and permit it, by proclamation or an order of council. 30 Geo. II. c. 15.

By thefe laws and regulations, the exportation of corn is ftated to have been completely checked, the quantity of about 80,000 quarters having been exported, previoufly to the prohibition, and about 150,000 quarters of foreign grain brought in.

There was however a reftoration of the exportation trade in 1759 it proceeding as ufual, with but little importation of foreign corn, but in confequence of the crop of 1762, being a little deficient, importation took place from the rife of prices, which at the low duties was capable of being done, and of courfe was confiderable, during that and the three years which followed it. During the laft, from fome caufe of fear, an embargo was laid upon all fhips loaden with corn for exportation, the 26th of September, but which having been done contrary to law, it was neceffary to pafs an act of indemnity for it in the following year 1766, the 7 Geo. III. c. 7. On this it is remarked by the writer quoted above that there does not now feem to have been any fufficient ground for thofe meafures; as in the year ftated there were more than 300,000 quarters of grain exported, and under 250,000 imported.

In 1767, prohibitory laws were paffed for a limited period, for the prevention of the exportation of corn, grain, meal, flour, bread, bifcuit, and ftarch, as well as the extraction of low wines, and fpirits from wheat and wheat flour. Alfo a law for permitting, for a limited time, the importation of wheat and wheat flour, oats, and oatmeal, rye, and ryemeal without duty. 7 Geo. III. c. 3, 4, 5, 8. And in 1768 the fame laws were renewed, having fome additions made to them; it being now enacted that they fhould continue in force until twenty days after the beginning of the next feffions of parliament, or the exportation of the above different articles, as well as their diftillation and preparation from wheat or wheat flour, was prohibited, except to particular Britifh dependencies. And the importation both of wheat, wheat flour, barley, barleymeal, pulfe, oats, oatmeal, rye, ryemeal, from any part of Europe, and maize or Indian corn and rice from North America, as well as wheat and wheat flour from Africa, were allowed without any duty. 8 Geo. III. c. 1, 2, 3. And in 1769, the prohibition was

was continued until twenty days after the meeting of the next feffions of parliament, but the importation of rice from North America permitted duty free.

But in 1770 the former law of the preceding year, prohibiting the exportation of corn, grain, meal, malt, flour, bread, bifcuit, and ftarch, and alfo the extraction of low wines and fpirits from wheat or wheat flour, was continued in force until twenty days after the commencement of the enfuing feffion of parliament, provided that the faid continuation might be abridged, and this act, or any part of it, altered and varied by any other act or acts to be enacted in the prefent feffion. 10 Geo. III. c. 1. Confequently by another law of this feffion, thofe parts of the former acts, which prohibited the exportation of malt, were repealed. 10 Geo. III. c. 10. And an act was likewife paffed for regiftering the prices at which corn was fold in the feveral counties of Great Britain, as well as the quantity exported and imported. 10 Geo. III. c. 39. And in 1771 prohibitory laws againft the exportation and extraction of the above different articles were again paffed, 11 Geo. III. c. 1. (with the exception of victualling fhips, on their being fent to Britifh dependencies) to be in force till the twentieth day after the meeting of the next feffion of parliament. On the meeting of the feffion of parliament in the following year (1772), a prohibitory law was again paffed, againft the exportation and extraction of the fame articles, to be in force till the twentieth day after the meeting of the next feffion of parliament. Afterwards an act was likewife paffed, permitting the importation of wheat, wheat flour, rye, ryemeal, and Indian corn, without duty, until the firft day of December in the fame year.

It is confidered by the able inquirer into the corn laws and corn trade mentioned above, that all this would feem to have been had recourfe to without any fufficient grounds, as the price of grain was not by any means very high, and the quantity exported from the year 1760 to 1770 greatly exceeded that which was imported.

On the meeting of parliament in 1773, an act was, however, paffed, by which a free importation was permitted before the firft day of January in the following year, for any wheat, wheat flour, rye, ryemeal, barley, barleymeal, oats, oatmeal, peafe, beans, tares, calivancies, and all other forts of pulfe, from any part of Europe or Africa; and permiffion to carry the fame coaftways, under fimilar regulations to thofe of wheat or wheat flour the growth of this country, provided due entries were made according to the previous practice of the kingdom; and likewife for the free importation of wheat, wheat flour, Indian corn and meal, bifcuit, peafe, beans, tares, calivancies and all other forts of pulfe, from North America, under the fame regulations. And another prohibitory law was enacted, 13 Geo. III. c. 1, 2, 3, preventing the exportation and extraction of all the above named articles, wines and fpirits, except for victualling fhips, or to Britifh dependencies, until the firft day of January 1774.

Thefe laws, though radically injurious to the agriculture of the country, are conceived by Mr. Dirom, from their not trenching on the general fyftem, as only productive of a temporary effect which might have been overcome.

By another law of the fame year 1773, the 13 Geo. III. c. 40. fuch alterations and changes were however made, by the reduction of the export and import prices, and the rendering the duties on importation a mere trifl , that a *new fyftem* feems to have been introduced and eftablifhed in the corn laws, deftructive of the *old code* by which fuch benefits had accrued to the agriculture and commercial induftry of the country; and by which, befides producing plenty and reafonable prices at home, by the difpofal of the excrefcent ftock in foreign markets, vaft fums of money had been brought into the kingdom. The manner in which that ufeful code had been gradually raifed, formed, and matured by experience, through a vaft length of time, and finally eftablifhed by the laws of 1670, 1688, and 1706, has been amply fhewn in the preceding part. But in order to place the *different fyftems* in a better point of contraft, and thereby afford a more diftinct notion of their nature and principles, the excellent comparative tables introduced below, have been drawn from Mr. Dirom's "Inquiry into the Corn Laws, &c."

TABLE.—Old Syftem of Laws for Importation of Grain.

	Importation Prices and Duties.	Money of the Time. Prices.	Money of the Time. Duties.	Prefent Money. Prices.	Prefent Money. Duties.
		£. s. d.	£. s. d.	£. s. d.	£. s. d.
	For every quarter of wheat, when the prices did not exceed - -	2 13 4	0 16 0	3 4 0	0 19 2
	when above that price, and not exceeding -	4 0 0	0 8 0	4 16 0	0 9 7
	when above that price - - -	0 0 0	0 5 4	0 0 0	0 6 5
1670	For every quarter of rye, peas, and beans, when the price did not exceed -	2 0 0	0 16 0	2 8 0	0 19 2
	when above that price - -	0 0 0	0 4 0	0 0 0	0 4 10
	For every quarter of barley, when the price did not exceed - -	1 12 0	0 16 0	1 18 5	0 19 2
	when above that price - -	0 0 0	0 2 8	0 0 0	0 3 2
	For every quarter of oats, when the price did not exceed - -	0 16 0	0 5 4	0 19 2	0 6 5
	when above that price - -	0 0 0	0 1 4	0 0 0	0 1 6

TABLE

TABLE.—New Syftem of Laws for Importation of Grain.

	Importation Prices and Duties.	Prices.			Duties.		
		£.	s.	d.	£.	s.	d.
1773	For every quarter of wheat, when the price was at or above	2	8	0	0	0	6
	100 weight of wheat flour	0	0	0	0	0	2
	quarter of rye, peas, or beans, when the price was at or above	1	12	0	0	0	3
	barley, bear, or bigg, when the price was at or above	1	4	0	0	0	2
	oats, when the price was at or above	0	16	0	0	0	2

It is remarked by the able writer, in refpect to thefe tables, that, according to the *old laws*, but efpecially that of 1670, importation was not allowed till the prices at home were very high, and then even the duties were great, in confequence of which, foreign corn could be only introduced for the fupply of times of fcarcity, never being able to come in competition with the home produce. That, the law of 1688 did not even notice importation; it being folely enacted for the purpofe of promoting and encouraging the agriculture of the country, by affording a new market for the fuperabundant grain, and in that way giving a new ftimulus to the exertion of the people, to bring the wafte and barren lands into a ftate of profitable cultivation: The bufinefs of importation being left to the laws which previoufly exifted, by which it was fuppofed to be fufficiently reftricted, if not wholly prohibited.

It is obferved further, that at the time thofe laws were paffed, and till 1714, the intereft, borne by money, was 6 *per centum per annum*, being of courfe proportionally of greater value than at prefent, when the intereft is only 5 *per cent. per annum*. Befides, the old acts did not, in fact, admit the importation of flour or ground corn at any period; only the grain at certain places, where the prices fhould happen to be very high. Neither did they allow the carrying of imported grain by fea, coaftways, nor the tranfporting of it to any other place, except that to which neceffity had brought it; reftrictions which feemed fo effential as to require being enforced, under very fevere penalties, by the act of the 5th of George II.

But that the *new law*, or that of 1773, commences with importation, and directs that, at any time when the price of the middling fort of Britifh grain fhall be at the prices ftated in the above tables, at the feveral ports and places where the fame fhould be imported; then all cuftoms and duties, formerly payable on wheat, wheat flour, rye, peafe, beans, barley, bear, bigg, and oats, imported into the kingdom, fhould ceafe and be no longer payable, while thefe prices continued. That, inftead of the former duties, thofe ftated in the above table, fhould only be paid. It was likewife enacted, that the importation of oatmeal from Ireland, or any other part beyond the feas, into any port or place in Scotland, fhould be lawful, where the price of oatmeal exceeds 16*s*. the boll of 8 ftone, troy weight.

Further, that by the new law importation is admitted, when the prices of grain at home are at fuch a reduced rate, as that foreign corn may always come in competition with the home produce in the markets, an evil that has conftantly exifted fince the paffing of the act; befides, by this law, wheat and other grain imported, may be conveyed coaftways, and entered and landed in any other parts of the kingdom, at which the prices of middling Britifh corn, grain, or flour, are at or above the refpective rates ftated in the table given above, under fuch regulations as wheat, wheat flour, rye, peafe, beans, barley, bear, bigg, or oats, the growth of this kingdom, are permitted to be conveyed coaftwife. Alfo, that on importing corn, grain, or flour, and paying the duties, where the fame fhall be again exported within fix months, the duties were to be drawn back and repaid.

TABLE.—Old Laws for the Exportation of Grain.

	Exportation Prices and Bounties.	Money of the Time.						Prefent Money.					
		Prices.			Bounties.			Prices.			Bounties.		
		£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1688	Upon every quarter of wheat, ground or unground, when the prices were at or under	2	8	0	0	5	0	2	17	7	0	6	0
	of rye, when the price was at or under	1	12	0	0	3	6	1	18	5	0	4	2
	of barley or malt, when the price was at or under	1	4	0	0	2	6	1	8	10	0	3	0
1706	of oatmeal, when the quarter of oats is at or under	0	15	0	0	2	6	0	18	0	0	3	0

TABLE.

TABLE.—New Laws for the Exportation of Grain.

	Exportation Prices and Bounties.	Prices.			Bounties.		
		£.	s.	d.	£.	s.	d
1773	Upon every quarter of wheat, or malt of wheat, when the price is under -	2	4	0	0	5	0
	of rye, when the price is under - - - -	1	8	0	0	3	0
	of barley, bigg, or malt made thereof, when the price is under -		2	0	0	2	6
	of oats, when the price is under - - -	1014		0	0	2	0
	And for every quarter of oatmeal, confifting of 276 *lbs.* avoirdupois - -	0	0	0	0	2	6

The provifions of the *old laws* of 1688 and 1706, have been already fo fully ftated and confidered, that nothing further than what is contained in the above table feems requifite here.

Under the *new law* it was enacted, that, when the price of the quarter of wheat was at, or above, 44*s.*; rye, peafe, and beans, 28*s.*; barley, bear, and bigg, 22*s.*; and oats, 14*s.* no fuch corn or grain fhould be tranfported or conveyed out of the kingdom, under fevere penalties. That after the 1ft day of January 1774, the bounties formerly allowed by law upon grain exported, fhould ceafe and determine; and that, in the place thereof, when the prices of it fhould be under the rates ftated below, at the ports and places, whence the fame fhould be fhipped, there fhould be allowed, on the exportation of fuch grain, either ground or unground, being the growth of this kingdom, and fhipped in Britifh fhips, the mafter, and at leaft two-thirds of the mariners of fuch fhips being fubjects of his majefty, thefe bounties; that is to fay, when the price of middling Britifh wheat is *per* quarter under 44*s.* a bounty for every quarter of wheat, or malt made from it, 5*s.*; when the quarter of rye was under 28*s.* a bounty of 3*s.*; when the quarter of barley, bear, or bigg, was under 22*s.* a bounty of 2*s.* 6*d.* for every quarter of them, or of malt made from them, and when the quarter of oats was under 14*s.*, a bounty of 2*s.* on every quarter, and 2*s.* 6*d.* upon every quarter of oatmeal, confifting of 276 pounds avoirdupois weight.

Further, that, by the old laws, the juftices of peaee were to afcertain the prices at their quarter feffions, which, by the new law, was continued the fame for England; but for Scotland it was transferred to the fheriffs of the different counties to be afcertained four times in every year, certificates of which were to be fent to the cuftom-houfes within their jurifdiction refpectively, fo as to regulate the payment of the export and import bounties and duties.

However, fo far as exportation was concerned, thofe rules were, in 1774, wholly altered, it being enacted, that the prices of exported corn, grain, and oatmeal fhould be regulated and directed according to the average prices, at which they fhould be refpectively fold in the public market at or neareft to the port or place whence they fhould be intended to be exported, on the market day preceding that of their being fhipped, and the bounties to be payable accordingly.

From the comparative ftatements given in the above tables, the difference in the principles and operations of thefe different fyftems of laws, will be eafily underftood, the former being calculated for the promotion of cultivation at home, and preventing the importation of foreign corn, unlefs called for by neceffity; while the latter is formed for the purpofe of promoting the importation of grain from abroad, whether there may be any neceffity for it or not. Thus the foreign cultivator is allowed the liberty of importing his flour into the country almoft free from duty, while the bounty upon flour or meal produced from wheat is taken off.

But in order to expedite and render the conception of the various laws, which have been detailed above, more eafy and familiar, we fhall here introduce the tabular view of them given by the author of the "Inquiry into the Corn Laws and Corn Trade," as brought down to the year 1773.

T A B L E.

Anno Dom.	Anno Regis.	Abbreviation of Englifh Exportation Laws.
1360	34 Ewd. III.	Exportation prohibited.
1393	17 Rich. II.	Allowed, upon payment of the ordinary fubfidies and duties.
1425	4 Hen. VI.	The laft law confirmed, but referving power to the king and council to reftrain it.
1436	15 Hen. VI.	Allowed, when wheat did not exceed 6*s.* 8*d.* and barley 3*s.* *per* quarter.
1442	20 Hen. VI.	The laft act confirmed for 10 years.
1444	23 Hen. VI.	And that act now made perpetual.
1552	5 & 6 Ed. VI.	Prohibited, until the prices were at or under 6*s.* 8*d.* for wheat, 3*s.* 4*d.* for barley and malt, 2*s.* for oats, 4*s.* for peafe and beans, and 5*s.* for rye *per* quarter.
1554	1 & 2 P. & M.	Prohibited, when the prices did not exceed 6*s.* 8*d.* for wheat, 4*s.* for rye, and 3*s.* for barley *per* qr.
1562	5 Eliz.	Allowed, when the prices did not exceed 10*s.* for wheat; 8*s.* for rye, peafe, and beans; 6*s.* 8*d.* for barley and malt, *per* quarter.
1570	13 Eliz.	Allowed, under the direction of prefidents, &c. upon payment of duties.
1593	35 Eliz.	Allowed, when the prices did not exceed 20*s.* for wheat, 13*s.* 4*d.* for rye, peafe, and beans, 12*s.* for barley and malt, upon payment of a duty of 2*s.* for every quarter of wheat, and 16*d.* for every quarter of other grain.
1604	2 James I.	Allowed, when the prices did not exceed 26*s.* 8*d.* for wheat, 15*s.* for rye, peafe, and beans, and 14*s.* for barley and malt *per* quarter; and upon payment of the fame duties.

Allowed,

Anno Dom.	Anno Regis.	Abbreviation of Englifh Exportation Laws.
1623	21 James I.	Allowed, when the prices did not exceed 32*s.* for wheat; 20*s.* for rye, peafe, and beans, barley and malt *per* quarter, and upon payment of the fame duties.
1627	3 Charles I.	Allowed upon the fame terms with the laft act.
1660	12 Charles II.	Allowed, when the prices did not exceed 40*s.* for wheat; 24*s.* for rye, peafe, and beans; 20*s.* for barley and malt, and 16*s.* for oats, upon payment of the fame high duties.
1663	15 Charles II.	Allowed, when the prices did not exceed 48*s.* for wheat, 32*s.* for rye, peafe, and beans, 28*s.* for barley and malt, and 13*s.* 4*d.* for oats *per* quarter, upon payment of the fame high duties.
1670	22 Charles II.	Allowed, without limitation of prices, upon payment of the fame high duties.
1688	1 W. & M.	Not only allowed, when wheat was not above 48*s.* rye 32*s.* and barley and malt 24*s.* *per* quarter; but bounties granted.
1699	10 Will. III.	Prohibited for one year, from the 10th February 1699.
	11 Will. III.	Bounty fufpended from 9th Feb. 1699, to 29th September 1700.
1700	11 & 12 W. III.	The fubfidy and all the duties payable upon corn and grain, ground and unground, bread, bifcuit, and meal given up and totally removed.

TABLE.

Anno Dom.	Anno Regis.	Abbreviation of Britifh Exportation Laws.
1706	5 Anne.	Union fettled-Englifh bounties adopted over all the kingdom, and extended to oatmeal, bigg, and malt of wheat.
1709	8 Anne.	Exportation prohibited, until the 29th Sept. 1710.
1729	2 Geo. II.	Rules laid down for meafuring corn to be exported, and for afcertaining the prices, &c.
1732	5 Geo. II.	Grand juries at feffions, to prevent the price of corn, and corn imported, not to be again exported, nor carried coaftways.
1741	14 Geo. II.	Prohibited until the 25th Dec. 1741.
1751	24 Geo. II.	Bounties upon corn exported in meal, to be paid according to the weight, at the rate of 448 pounds for the quarter
1753	26 Geo. II.	Money due upon debentures for corn exported, to bear intereft at 3 *per cent. per annum*, if not paid in fix months after prefenting the certificate.

Anno Dom.	Anno Regis.	Abbreviation of Britifh Exportation Laws.
1757	30 Geo. II.	Prohibited until the 25th Dec. 1757, but with power to the king and council to take off the prohibition.
1757	31 Geo. II.	Corn-market eftablifhed at Weftminfter; and, the fame year, an affize made for bread.
1766	6 Geo. III.	Exportation prohibited for a limited time; and, fame year, an embargo laid upon fhips loaded with corn for exportation; and fame year, the mayor and aldermen of London empowered to determine the prices of corn in January and July, as well as in April and October.
1767	7 Geo. III.	Exportation of grain, and diftilling from wheat or wheat-flour, prohibited from the 26th Sept. to the 14th Nov. 1767.
1768	8 Geo. III.	Exportation of corn, and diftilling from wheat or wheat-flour, prohibited until 20 days after the commencement of the next feffions of parliament.
1769	9 Geo. III.	Five thoufand quarters of bigg allowed to be exported from the iflands of Orkney, yearly; and, fame year, exportation of grain and diftilling from wheat or wheat-flour prohibited for a limited time.
1770	10 Geo. III.	Corn regifter eftablifhed; and weekly returns, from market-towns in the feveral countries, to be made of the prices of wheat, rye, barley, oats, and beans, in England; and of bear or bigg in Scotland. Same year the exportation of corn, and the diftilling from wheat or wheat-flour, prohibited till 20 days after the commencement of the next feffion of parliament.
1771	11 Geo. III.	Exportation of corn prohibited, and alfo the diftilling from wheat or wheat-flour, until 20 days after the commencement of the next feffion of parliament.
1772	12 Geo. III.	Exportation of corn, and diftilling from wheat and wheat-flour, prohibited until 20 days after the commencement of next feffion of parliament.
1773	13 Geo. III.	Exportation of grain, and diftilling from wheat and wheat-flour, prohibited until the 1ft day of Jan. 1774. Same year, the former bounties and duties repealed, and a total alteration made in the corn laws.
1774	14 Geo. III.	Alteration of the method of afcertaining the prices of corn to be fhipped for exportation.

TABLE.

Anno Domini.	Anno Regis.	Abbreviation of English Exportation Prices.	Money of the Time	Prefent Money.
1436	15 Hen. VI.	Exportation permitted, when the price of grain, at home, did not exceed *per* quarter, for	£. s. d.	£. s. d.
		Wheat - - - - -	0 6 8	2 4 0
		Barley - - - - -	0 3 0	0 19 10
1554	1 P. & M.	Permitted, when the price did not exceed, for		
		Wheat - - - - -	0 6 8	0 16 6
		Rye - - - - - -	0 4 0	0 9 11
		Barley - - - - -	0 3 0	0 7 5½
1562	5 Eliz.	Permitted, when the price did not exceed, for		
		Wheat - - - - -	0 10 0	1 0 8
		Rye, peafe, and beans - -	0 8 0	0 16 6
		Barley and malt - - -	0 6 8	0 13 10
1593	35 Eliz.	Permitted, when the price did not exceed, for		
		Wheat - - - - -	1 0 0	2 1 4
		Rye, peafe, and beans - -	0 13 4	1 7 7
		Barley and malt - - -	0 12 0	1 4 10
1604	2 James I.	Permitted, when the price did not exceed, for - -		
		Wheat - - - - -	1 6 8	2 13 4
		Rye, peafe, and beans - -	0 15 0	1 10 0
		Barley and malt - - -	0 14 0	1 8 0
1623	21 James I.	Permitted, when the price did not exceed, for		
		Wheat - - - - -	1 12 0	3 4 0
		Rye - - - - - -	1 0 0	2 0 0
		Barley, malt, peafe, and beans -	0 16 0	1 12 0
1627	3 Char. I.	Permitted, when the price did not exceed, for		
		Wheat - - - - -	1 12 0	2 11 2
		Rye - - - - - -	1 0 0	1 12 0
		Barley, malt, peafe, and beans -	0 16 0	1 5 7
1660	21 Char. II.	Permitted, when the price did not exceed, for		
		Wheat - - - - -	2 0 0	2 8 0
		Rye, peafe, and beans - - -	1 4 0	1 8 9
		Barley and malt - - -	1 0 0	1 4 6
		Oats - - - - - -	0 16 4	0 19 2
1663	15 Char. II.	Permitted, when the price did not exceed, for		
		Wheat - - - - -	2 8 0	2 17 7
		Rye, peafe, and beans - - -	1 12 0	1 18 4
		Barley and malt - - -	1 8 0	1 13 7
		Oats - - - - - -	0 13 4	0 16 0
1688	1 W. & M.	Permitted, when the price did not exceed, for		
		Wheat - - - - -	2 8 0	2 17 7
		Rye - - - - - -	1 12 0	1 18 4
		Barley and malt * - - -	1 4 0	1 8 9

* Prior to the year 1346, the exportation of all kinds of grain from England was totally prohibited.

TABLE.

Anno Domini.	Anno Regis.	Abbreviation of Britifh Exportation Prices.	Money of the Time.	Prefent Money.
1706	5 Anne.	Exportation of grain permitted, when the price of the quarter did not exceed, for	£. s. d.	£. s. d.
		Wheat, ground or unground, or malt of wheat - -	2 8 0	2 17 7
		Rye, ground or unground - - - -	1 12 0	1 18 5
		Barley, bear, or bigg, or malt, ground or unground -	1 4 0	1 8 9
		Oats - - - - - - - - - -	0 15 0	0 18 0
1773	13 Geo. III.	Exportation permitted, when the prices were under, for		
		Wheat - - - - - - - - -	0 0 0	2 4 0
		Rye - - - - - - - - -	0 0 0	1 8 0
		Barley, bear, or bigg, or malt thereof - - -	0 0 0	1 2 0
		Oats - - - - - - - - -	0 0 0	0 14 0

TABLE.

Anno Dom.	Anno Regis.	Abbreviation of Engliſh Exportation Duties.	Price of the Quarter of Grain.						Duties *per* Quarter.					
			Money of the Time.			Preſent Money.			Money of the Time.			Preſent Money.		
			£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1570	13 Elizabeth.	For wheat, when not prohibited - -	0	0	0	0	0	0	0	1	0	0	2	0
		other grain - - - -	0	0	0	0	0	0	0	0	8	0	1	4
		wheat exported by licence - -	0	0	0	0	0	0	0	2	0	0	4	0
		other grain by ditto - - -	0	0	0	0	0	0	0	1	4	0	2	8
1593	35 Elizabeth.	For wheat, when the price did not exceed -	1	0	0	2	1	5	0	2	0	0	4	0
		other grain as *per* exportation prices -	0	0	0	0	0	0	0	1	4	0	2	8
1604	2 James I.	For wheat, when the price did not exceed -	1	6	8	2	13	4	0	2	0	0	4	0
		other grain as *per* exportation prices -	0	0	0	0	0	0	0	1	4	0	2	8
1623	21 James I.	For wheat, when the price did not exceed -	1	12	0	3	4	0	0	2	0	0	4	0
		other grain as *per* exportation prices -	0	0	0	0	0	0	0	1	4	0	2	8
1627	3 Charles I.	For wheat, when the price did not exceed -	1	12	0	2	11	2	0	2	0	0	3	2½
		other grain *per* exportation prices -	0	0	0	0	0	0	0	1	4	0	2	1½
1660	12 Charles II.	For wheat, when the price did not exceed -	2	0	0	2	8	0	1	0	0	1	4	0
		Rye, peas, beans, barley, malt, buck wheat -	0	0	0	0	0	0	0	10	0	0	12	0
		Oats when not above - - -	0	16	0	0	19	2	0	6	8	0	8	0
1663	15 Charles II.	For wheat when the price did not exceed -	2	8	0	2	17	7	1	0	0	1	4	0
		Rye, peas, beans, barley, malt, buck wheat -	0	0	0	0	0	0	0	10	0	0	12	0
		Oats - - - - - -	0	13	4	0	16	0	0	0	0	0	0	0
1670	22 Charles II.	For wheat, without limitation of price -	0	0	0	0	0	0	1	0	0	1	4	0
		Rye, peas, beans, barley, malt, buck wheat -	0	0	0	0	0	0	0	10	0	0	12	0
		Oats - - - - -	0	0	0	0	0	0	0	6	8	0	8	0

TABLE.

Anno Dom.	Anno Regis.	Engliſh and Britiſh Bounties on Exportation.	Price of the Quarter of Grain.						Bounties *per* Quarter.					
			Money of the Time.			Preſent Money.			Money of the Time.			Preſent Money.		
			£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1688	1 Will. & Mary.	For wheat, when the price did not exceed -	2	8	0	2	17	7	0	5	0	0	6	0
		Rye, ground or unground, when not above -	1	12	0	1	18	5	0	3	6	0	4	2½
		Barley and malt, ground or unground, when not above - - - -	1	4	0	1	8	9	0	2	6	0	3	0
1706	5 Anne.	For wheat or malt made of wheat, ground or unground, when not above - -	2	8	0	2	17	7	0	5	0	0	6	0
		Rye, ground or unground, when not above -	1	12	0	1	18	5	0	3	6	0	4	2½
		Barley, bear, or bigg, malt, ground or unground, when not above - - -	1	4	0	1	8	9	0	2	6	0	3	0
		Quarter of oatmeal when oats not above -	0	15	0	0	18	0	0	2	6	0	3	0
1773	13 George III.	For wheat and malt of wheat, when the price is under - - - -	0	0	0	2	4	0	0	0	0	0	5	0
		Rye, when under - - - -	0	0	0	1	8	0	0	0	0	0	3	0
		Barley, bear, or bigg, when under - -	0	0	0	1	2	0	0	0	0	0	2	6
		Oats, when under - - - -	0	0	0	0	14	0	0	0	0	0	2	0
		And for every quarter of oatmeal conſiſting of 276 pounds avoirdupois. - -	0	0	0	0	0	0	0	0	0	0	2	6

TABLE.

TABLE.

Anno Domini.	Anno Regis.	Abbreviation of Englifh Importation Prices.	Money of the Time.	Prefent Money.
1463	3 Edw. IV.	Importation of foreign grain permitted, when the prices at home *per* quarter did exceed, for	£. s. d.	£. s. d.
		Wheat - - - - - -	0 6 8	1 15 2
		Rye - - - - - - -	0 4 0	1 1 1
		Barley - - - - - -	0 3 0	0 15 10
1660	12 Char. II.	Importation permitted, when the prices did exceed, for		
		Wheat - - - - - -	2 4 0	2 12 9
		Rye - - - - - - -	1 16 0	2 3 2
		Beans, barley, and malt - - -	1 6 8	1 12 0
1663	15 Char. II. *	Importation permitted, when the prices did not exceed, for		
		Wheat - - - - - -	2 8 0	2 17 7
		Rye, peas, or beans - - -	1 12 0	1 18 5
		Barley, malt, or buck wheat - -	1 8 0	1 13 7
		Oats - - - - - - -	0 13 4	0 16 0
1670	22 Char. II.	Importation permitted, when the prices did not exceed, for		
		Wheat - - - - - -	2 13 4	3 4 0
		Rye, peas, or beans - - - -	2 0 0	2 8 0
		Barley, malt, and buck wheat - -	1 12 0	1 18 5
		Oats - - - - - - -	0 16 0	0 19 2
1773	13 Geo. III.	Importation permitted, when the prices were at or above, for		
		Wheat - - - - - -	0 0 0	2 8 0
		Rye, peas, or beans - - - -	0 0 0	1 12 0
		Barley or malt - - - -	0 0 0	1 4 0
		Oats - - - - - -	0 0 0	0 16 0

* This is the act, in which the infertion of the word *not* in the important claufe, entirely altered the intention of the law.

TABLE.

A. D.	Anno Regis.	Abbreviation of Englifh Importation Laws.
1202	3 John.	Importation of foreign grain invited.
1215	16 John.	Invited.
1266	9 Hen. III.	Invited.
1297	25 Edw. I.	Invited.
1328	2 Edw. III.	Invited.
1350	25 Edw. III.	Invited.
1360	34 Edw. III.	Invited.
1463	3 Edw. III.	Prohibited, until the price exceeded 6*s*. 8*d*. for wheat, 4*s*. rye, and 3*s*. for barley *per* quarter.
1660	12 Char. II.	Allowed, upon payment of different duties according to the prices.
1663	15 Char. II.	Allowed, upon payments of lower duties.
1670	22 Char. II.	Allowed, upon payment of different duties according to the prices.
1685	1 James II.	Regulations to prevent fraudulent importation.
1729	2 Geo. II.	Regulations for afcertaining the price of corn at the time of importation, and for receiving the duties, according to the prices.
1732	5 Geo. II.	Further regulations anent the prices, and prohibiting corn imported to be again exported, or carried coaftways.
1757	30 Geo. II.	Duties upon the importation of corn fufpended until the 24th Auguft 1757, and importation allowed, duty free, in fhips of foreign nations in amity with Great Britain.
1766	6 Geo. III.	Importation of foreign grain permitted, for a limited time, duty free.
1767	7 Geo. III.	Importation permitted, for a limited time, duty free.
1768	8 Geo. III.	Ditto. Ditto. Ditto.
1769	9 Geo. III.	Importation of rice permitted, for a limited time, duty free.
1772	12 Geo. III.	Importation permitted duty free to 1ft December.
1773	13 Geo. III.	Permitted, duty free to 1ft of January 1774. Same year the old corn laws totally altered, and importation of foreign grain and flour permitted, at all times and places, when the price of the quarter was at or above 48*s*. for wheat; 32*s*. for rye, peas, and beans; 24*s*. for barley; and 16*s*. for oats. Importation of oatmeal into Scotland permitted duty free, when the price there fhall exceed 16*s*. per boll weighing 8 ftone Troy.

TABLE.

A. D.	Anno Regis.	Abbreviation of English Importation Duties.	Price of grain *per* qr.						Duties *per* quarter.					
			Money of the Time.			Present Money.			Money of the Time.			Present Money.		
			£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1660	12 Charles II.	For wheat, when the price did not exceed - -	2	4	0	2	12	9	2	0	0	2	8	0
		when it exceeded that price - -	0	0	0	0	0	0	0	6	8	0	8	0
		Rye, when the price did not exceed - -	1	16	0	2	3	2	1	6	8	1	12	0
		when it exceeded that price - - -	0	0	0	0	0	0	0	5	0	0	6	0
		Beans, barley, and malt, when not above - -	1	6	8	1	12	0	1	6	8	1	12	0
		when above that price - - -	0	0	0	0	0	0	0	5	0	0	6	0
1663	15 Charles II.	For wheat, when the price did not exceed - -	2	8	0	2	17	7	0	5	4	0	6	5
		Rye, peas, and beans, when not above - -	1	12	0	1	18	5	0	4	0	0	4	9
		Barley and malt, when not above - - -	1	8	0	1	13	7	0	2	8	0	3	2
		Buck wheat, when not above - - -	1	8	0	1	13	7	0	2	0	0	2	5
		Oats, when not above - - - -	0	13	4	0	16	0	0	1	4	0	1	7
1670	22 Charles II.	For wheat, when the price did not exceed - -	2	13	4	3	4	0	0	16	0	0	19	2
		when above that price, and not exceeding	4	0	0	4	16	0	0	8	0	0	9	7
		when above that price - - -	0	0	0	0	0	0	0	5	4	0	6	5
		Rye, peas, and beans, when not above - -	2	0	0	2	8	0	0	16	0	0	19	2
		when above that price -	0	0	0	0	0	0	0	4	0	0	4	9
		Barley, malt, buck-wheat, not above - -	1	12	0	1	18	5	0	16	0	0	19	2
		when above that price - - -	0	0	0	0	0	0	0	2	8	0	3	2½
		Oats, when not above - - - -	0	16	0	0	19	2	0	5	4	0	6	5
		when above that price - - -	0	0	0	0	0	0	0	1	4	0	1	7
		British Importation Duties.												
1773	13 Geo. III.	When the price of wheat is at or above - -	0	0	0	2	8	0	0	0	0	0	0	6
		Rye, peas, or beans, at or above - -	0	0	0	1	12	0	0	0	0	0	0	3
		Barley, bear, or bigg, at or above - -	0	0	0	1	4	0	0	0	0	0	0	2
		Oats, at or bove - - - -	0	0	0	0	16	0	0	0	0	0	0	2
		And for every hundred weight of wheat flour - -	0	0	0	0	0	0	0	0	0	0	0	2

TABLE.

Anno Domini.	Anno Regis.	Abbreviation of Scotch Importation Laws.
1454	17 James II.	Importation of foreign grain invited to be made, either by foreigners or denizens.
1493	5 James IV.	Invited.
1663	15 Charles II.	Allowed from Ireland upon payment of a duty of 3 *l.* *per* boll, when meal and barley did not exceed the price of 8*l.* *per* boll at home.
1672	24 Charles II.	Importation of victual from Ireland prohibited under severe penalties.
1687	3 James VII.	Prohibition to import victual from Ireland renewed, and victual so imported ordered to be destroyed.
1703	2 Anne.	Importation of victual prohibited from foreign parts, until the price of the boll of grain exceeds 12*l.* for wheat, 8*l.* for bear, meal, and malt, and 6*l.* for oats and pease; but with power to the lords of the privy council to suspend this prohibition when necessary.
1741	14 Geo. II.	Importation permitted, when the prices of grain, in the county of Edinburgh, exceeded 40*s.* for wheat; 20*s.* for pease and beans; 18*s.* for bear and barley; and 13*s.* 4*d.* for oats, *per* quarter, and 8*l.* Scots, *per* boll, for oatmeal, upon payment of the duties fixed by the English acts of the 22d Charles II.

TABLE.

TABLE.

Anno Domini.	Anno Regis.	Abbreviation of Scotch Exportation Laws.
1555	13 Mary.	Exportation of grain prohibited under fevere penalties.
1587	20 James VI.	Prohibited.
1663	15 Charles II.	Exportation of grain permitted when the price of victual at home was under 12 *l.* for wheat, 8*l.* for bear and barley, and 8 merks for peas and oats, *per* boll; upon payment of the ufual duty.
1669	21 Chas II.	All duties payable upon grain exported removed, except one merk *per* chalder upon every kind of victual.

TABLE.

Anno Dom.	Anno Regis.	Scotch Importation Duties.	Price of Grain per Boll. Money of the Time.	Price of Grain per Boll. Prefent Money.	Duties per Boll. Money of the Time.	Duties per Boll. Prefent Money.
			£. s. d	£. s. d.	£. s. d.	£. s. d.
1663	15 Chas II.	Duties payable upon the boll of all kinds of grain imported, when the boll of barley and meal did not exceed at home - - -	8 0 0	0 16 0	3 0 0	0 6 0
1703	2 Anne.	A duty of 40*s.* per boll, befides the former duties upon each boll of grain from England for feed - -			2 0 0	0 4 0
1741	14 Geo. II.	The fame duties to be paid in Scotland, as are payable in England upon grain imported by the Englifh act of 22 of Charles II.				
		Scotch Exportation Duties.				
1663	15 Chas II.	For wheat, when the price of the boll is under -	12 0 0	1 4 0	0 0 5	0 0 6
		bear or barley, when the boll is under -	8 0 0	0 16 0	0 0 5	0 0 6
		Oats and peas, when the boll is under 8 merks -	5 6 8	0 10 8	0 0 5	0 0 6
1669	21 Chas II.	Duty upon each chalder of grain exported, when under the above prices at home - - - -			0 13 4	0 1 1¾
1695	7 William.	Duties upon exportation ceafed, and bounties commenced.				
		Scotch Exportation Bounties.				
1695	7 William.	For every chalder of grain, when the price of the boll of wheat is at, or under - - -	12 0 0	1 4 0	5 6 8	0 10 8
		For bear, barley, and malt, at or under - -	8 0 0	0 16 0		
		Peas, oats, and meal, at or under - -	6 0 0	0 12 0		
1706	5 Anne.	The fame bounties with England. -				

As it would appear from what has been advanced in the preceding pages, that on the experience of a great length of time, it would feem that the laws and regulations in refpect to grain, which were brought forward under the acts of 1670, 1688, 1706, and 1732, had confiderable influence and effect in promoting the improvement of agriculture, increafing the quantity of corn, and thereby preventing the neceffity of having recourfe to *importation* for a precarious and uncertain fupply; it may not only be proper to afford the following tabular view from the valuable work quoted above, of the prices, bounties, and duties, as laid down by them, by which their principles and objects may be more clearly comprehended, but alfo to contraft them with the regulations concerning thofe which have been enacted by the law of 1791.

TABLE.—Prices, Bounties, and Duties, on Exportation and Importation of Grain by the former Acts.

Bounties *per* Quarter.		Exportation.	Price of Grain *per* Quarter.		Importation.	Duties *per* Quarter.	
Money of the Time.	Prefent Money.		Money of the Time.	Prefent Money.		Money of the Time.	Prefent Money.
£. s. d.	£. s. d.		£. s. d.	£. s. d.		£. s. d.	£. s. d.
		1. WHEAT, WHEAT-FLOUR.			OR MALT made of WHEAT.		
0 5 0	0 6 0	Bounty, when the price did not exceed - -	2 8 0	2 17 7	there was payable upon importation - -	0 16 0	0 19 2
		when the price was not above -	2 13 4	3 4 0	there was payable - -	0 8 0	0 9 7
		when above that price and not above -	4 0 0	4 16 0	there was payable - -	0 5 4	0 6 5
		and when above that price - -					
		2. RYE, PEASE.			BEANS, BUCK WHEAT.		
0 3 6	0 4 2½	Bounty, when the price did not exceed - -	1 12 0	1 18 5	there was payable upon importation - -	0 16 0	0 19 2
		when the price was not above - -	2 0 0	2 8 0	there was payable - -	0 4 0	0 4 9½
		and when above that price - -					
		3. BARLEY, BEAR.			BIGG, MALT.		
0 2 6	0 3 0	Bounty, when the price did not exceed - -	1 4 0	1 8 9	there was payable upon importation - -	0 16 0	0 19 2
		when the price was not above - -	1 12 0	1 18 5			
		and when above that price - -			there was payable - -	0 2 8	0 3 2½
		4. OATS.			OATMEAL.		
0 2 6	0 3 0	For the quarter of oatmeal, when the price of oats did not exceed - -	0 15 0	0 18 0	there was payable upon the importation of oats -	0 5 4	0 6 5
		when the price was not above - - -	0 16 0	0 19 2	there was payable - -	0 1 4	0 1 7
		and when above that price					

TABLE.—Prices, Bounties, and Duties on Exportation and Importation of Grain, by the latter Aƈ.

Bounties *per* Quarter.		Prices of Grain *per* Quarter.		Duties *per* Quarter.
	1. WHEAT.		WHEAT.	
£. s. d.		£. s. d.		£. s. d.
0 5 0	Bounty when under - - -	2 4 0		
	Exportation prohibited when at, or above	2 6 0		
	when under	2 10 0	there is payable upon importation	1 4 3
	when at, or above	2 10 0	} ditto ditto	0 2 6
	but under	2 14 0		
	when at, or above	2 14 0	ditto ditto	0 0 6
	2. RYE.		PEASE and BEANS.	
0 3 0	Bounty when under * - - -	1 8 0		
	Exportation prohibited when at, or above	1 10 0		
	when under	1 14 0	there is payable upon importation	1 2 0
	when at, or above	1 14 0	} ditto ditto	0 1 6
	but under	1 17 0		
	when at, or above	1 17 0	ditto ditto	0 0 3
	3. BARLEY.		BEAR or BIGG.	
0 2 6	Bounty when under - - -	1 2 0		
	Exportation prohibited when at, or above	1 3 0		
	when under	1 5 0	there is payable upon importation	1 2 0
	when at, or above	1 5 0	} ditto ditto	0 1 3
	but under	1 7 0		
	when at, or above	1 7 0	ditto ditto	0 0 3
	4. OATS.		OATS.	
0 2 0	Bounty when under - - -	0 14 0		
	Exportation prohibited when at, or above	0 15 0		
	when under	0 17 0	there is payable upon importation	0 6 7
	when at, or above	0 17 0	} ditto ditto	0 1 0
	but under	0 18 0		
	when at, or above	0 18 0	ditto ditto	0 0 2

N. B.—Flour, meal, and malt, are regulated in proportion to the ſeveral ſorts of grain. The importation of malt is at all times prohibited.

* The bounty, by the tables in the aƈ of parliament, appears to be given only upon rye, and not alſo upon the exportation of peas and beans.

It has been obferved on thefe tables, by Mr. Mackie, that though the import prices and duties are higher in a fmall degree in the latter, than was the cafe in the act of 1773, which is fo far returning to the old fyftem, yet that the encouragement held out to the hufbandman is confiderably lefs, than was the cafe under the ancient regulations. Without confidering the difference in the value of money between the periods, it may be noticed, he fays, that the bounty of 5*s*. on wheat, is now withdrawn when it reaches 44*s*., and exportation ftopped when it advances to 46*s*. the quarter; while, by the old laws, exportation, with the bounty, was continued till the price reached 48*s*.

And importation, by this act, is permitted on low duties, when the price of wheat advances to 2*l*. 10*s*.; while, by the old acts, the duties were equal to a prohibition, until the price reached 4*l*., and even then, the duty was high, inftead of being reduced to almoft nothing, as is now the cafe, before wheat reaches a price capable of repaying the farmer in an unfavourable feafon. In fact, it is contended, that agriculture has derived little protection or fupport from the late laws, its continued profperity depending rather on the impoffibility of procuring adequate fupplies of grain from abroad, by which the farmers in this country have, in a great degree, retained the monopoly of the markets, than the countenance it has received from the legiflature.

Since the period already noticed, however, the above plan has been relinquifhed, and different changes and alterations have been made in the corn laws, by which it would feem that fome parts of the old fyftem have been again in fome meafure reverted to.

The act of 1773, by fo greatly lowering the rates and duties on the importation of foreign grain, had contributed to fix and eftablifh the import fyftem, and fpeculation in corn, under the direction of the merchants, by which, from the prices of grain in the markets abroad, being commonly fo much below thofe of this country, they were conftantly ready, by fome contrivance or other, to open the ports, before the price of the home grain in the markets, came to the rate at which foreign grain was permitted to be imported. It confequently became neceffary, from time to time, to pafs acts, in order to counteract fuch defigns, and render the general law more efficient.

Accordingly, in 1781, an act was made, 21 Geo. III. c. 50, by which fo much of the acts of the 1 Ja^s. II.; 5 Geo. II.; 6 Geo. III.; and 14 Geo. III., as related to the afcertaining of the prices of medium Englifh wheat, and other grain, in the port of London, and counties of Kent and Effex, was repealed; and, in the place of which, an infpector was appointed, to fix the weekly average prices, from the actual fales in the faid port; by which exportation, and the bounties paid thereon, were to be regulated. But befides this, an average price is directed to be made up from the weekly returns of each three months, on the firft day of the feffions held in London, in January, April, July, and September, for the purpofe of regulating importation for three months, and the duty payable thereon, in the port of London, and the above-mentioned counties. And, in 1783, the law refpecting corn was fufpended, importation being permitted at low duties, and exportation prohibited, till the 25th Auguft of the fame year, in England, and the 25th of September in Scotland. 23 Geo. III. c. 1, 53, 81.

In 1789, an act was paffed, 29 Geo. III. c. 38., for improving and extending the act of the 21 Geo. III. c. 50, by which every corn-factor in London, and the fuburbs, was neceffitated to give in weekly returns of his fales to the infpectors; and importation was permitted into London, Kent, and Effex, when the prices of middling Britifh grain reached the rates fixed in the act of 1773, as formed from the fix laft weekly returns in the port of London, immediately preceding the quarterly feffions, with the exception of oats, which as formerly was directed to be regulated by twelve weekly returns: the act being extended to the maritime counties of England, which were divided into eleven diftricts. The infpectors of corn returns, were to be appointed by the juftices of peace in each county, and directed to make weekly returns of the prices of grain, from not more than twelve, or lefs than eight market towns in each county, the average prices, made from the weekly returns, being directed to be fent to the collectors of the ports in the diftrict, for regulating exportation; and the average prices for the whole diftrict, formed from the fix weekly returns, immediately preceding the firft day of February, of May, of Auguft, and of November, were to regulate the importation of foreign grain and the duties paid thereon.

In 1790, an act of indemnity, 30 Geo. III. c. 1, was paffed, for abrogating the corn laws, in purfuance of orders from the privy council of the 11th and 18th of November, 23d of December 1786, 2d and 8th of January 1790, by which the above orders are confirmed, and the laws refpecting corn fufpended; no fort of Britifh grain being permitted to be exported, except the particular fpecified quantities for the ufe of the fugar colonies; but all kinds of foreign grain permitted to be brought freely into every port in the kingdom at the low duties; the act being to continue in full force, until the 29th of September in this year.

And, by the 30 Geo. III. c. 43, the execution of thefe laws was further fufpended, until the 28th February 1791, full powers however being given to the privy council, to admit the exportation of all kinds of Britifh grain, whenever it judged it neceffary. Further, by the 31 Geo. III. c. 4. the two preceding acts were amended; and, by the introduction of a claufe in the general corn law, paffed this feffion, they were continued in full force until its commencement on the 15th of November 1791.

It is remarked by Mr. Mackie, in his "Letters on the Corn Laws," that none of thefe acts for rendering the law of 1773 more efficient, were extended to Scotland, the confequence of which was, that from the average prices not being fixed and determined by the actual fales, whenever the ports were opened for the importation of grain from abroad into it, it conftantly took place, when the current price of produce there was greatly under the reduced rates at which that act even admitted the importation of foreign corn; namely, wheat at 48*s*. the quarter, Winchefter meafure, &c. And that, on the contrary, when the overplus quantity of corn was in fuch abundance, as to permit exportation, the ports there were conftantly fhut, before the price of the home produce reached the limit at which exportation ceafes; both of which cafes operate unfavourably for the agriculture of the country.

In 1791, an act for a new general corn law was paffed, 31 Geo. III. c. 30., commencing on the 15th of November of the fame year, by which the 1 Ja^s. II. c. 19.; 1 Gul. & M. c. 12.; 5 Geo. II. c. 12.; 10 Geo. III. c. 39.; 13 Geo. III. c. 43.; 21 Geo. III. c. 50.; 29 Geo. III. c. 58.; and fo much of the 15 Cha. II. c. 7., as prohibits the buying of corn to fell again, and laying it up in granaries, when above certain prices, were repealed.

By this act, the maritime counties of England are divided into twelve districts, and Scotland into four districts, making sixteen in the whole. The prices of grain at the corn exchange in London, being made to regulate the exports and imports of the first district, which comprehends the ports of that city, together with the counties of Kent, Essex, and Sussex. And, in the other districts, the particular market towns, at which the prices and quantities of grain actually sold are collected, are stated in the act. The dealers in grain are directed to give in, on oath, weekly accounts of their actual sales for that time, to the officer termed the inspector of returns, who, from such returns, is to make out an account of the general weekly average price of the whole district, which is to be transmitted to the collectors of the customs at the different ports within the said district, by which the bounties payable on exportation are to be regulated.

And, at four different times in the year, as within the space of seven days after the 15th of February, 15th of May, 15th of August, and the 15th of November, the receivers of corn returns, in each district, are to make up the average prices of corn within the same, from the last six weekly returns thereof, with the exception of oats, which is to be made up from twelve weekly returns, this quarterly average being sent to the collectors of the customs at the different ports within the said district, at such periods as mentioned above, by which importation, and the duties payable thereon, are to be regulated for the following quarter.

But, in Scotland, the average prices of grain are not ascertained from the actual sales. The sheriffs of the different counties, once in the month, convene juries for fixing the average price at which it is usually selling, but the witnesses brought forward produce no account of their actual purchases or sales, only deposing to what they believe from their own experience, and the opinion of others, to be the current prices. Monthly accounts of the average prices of grain within each county, are made from these, by the sheriffs of the different counties, which are sent up to the receiver of corn returns in the port of London, from which the receiver is to make up an average account for each district, and transmit it to the collectors of the ports within the same, which is to regulate the bounties upon exportation; and, at the above-named quarterly periods, he is to make up the average prices from the two last monthly returns, which are to regulate the duties payable upon importation for the following quarter.

But corn from abroad may be imported and landed at any time without payment of duties, provided it be warehoused under certain regulations, but cannot be taken out of the warehouse for home consumption, until the low duties are paid, and such other duties as are payable at the time, in the district where intended to be used; nor can corn of either foreign or home produce be conveyed coastways from the port of any district, where exportation is not permitted, at the time of shipping, to the ports of any district in which exportation is permitted.

And when the general average of the whole country exceeds the rates of import at the low duties, his majesty, in such case, the parliament not being sitting, can, with the consent of the privy council, suspend the execution of the act so far as to prohibit exportation wholly, and permit importation at the low duties, such permission continuing in force three months; but this power does not extend to prohibiting the exportation of foreign grain warehoused before.

Since the above act, other laws have been made for the further regulation of the trade in grain. In 1793, an act of indemnity was passed, the 33 Geo. III. c. 3. for putting a stop to the execution of the general corn law, by an order of council of the 9th of November 1792, prohibiting the exportation of home produce, and granting liberty to import corn from abroad, until the 1st of March 1793; and for further suspending the said law, by granting power to his majesty and council at any time during the sitting of the parliament, to permit importation and prohibit exportation.

And by the 33 Geo. III. c. 63., the general corn law of 1791 was altered, by the repeal of the clauses for ascertaining the average prices of corn in England, and substituting others of a similar tendency in their stead. And further, by granting liberty to his majesty and council, when parliament is not sitting, to permit the importation of grain, and prohibit the exportation of home produce, when the general average of the whole kingdom exceeds the prices at which grain can be imported at the low duties from Ireland and the colonies of North America; namely, wheat, 48*s.* rye, 32*s.* barley, 24*s.* oats, 16*s.* Likewise, by allowing exportation with a bounty of 1*s.* 6*d.* when oatmeal is under 13*s.* *per* boll; prohibiting exportation to foreign countries, when above 14*s.* the boll.

The law of 1795, the 35 Geo. III. c. 4. passed the 13th February, suspends the general corn law of 1791, by giving power to his majesty, with the consent of the privy council, to prohibit the exportation and permit the importation of all sorts of grain from abroad, without the payment of any duties whatsoever. The act to be in force until six weeks after the next parliament has met.

In consequence of a report of a committee of the house of commons, made in 1804, on which it appeared, that the price of corn from 1791 to the harvest of 1803, though very irregular, and increased on the average greatly by the years of scarcity, has in common afforded a fair profit to the grower; but that, from the stimulus of the usual high prices having increased industry, by which large tracts of waste land have been brought into cultivation, which, joined to the two last productive seasons, and other causes, have occasioned such a depression in the value of corn, as may tend to the discouragement of agriculture, unless supported by the aid of the legislature. Accordingly an act was this year passed the 44th Geo. III. c. 109, for the purpose of regulating the importation and exportation of corn, and the bounties and duties payable on the same; and by which it was enacted, that from and after the 15th of November, 1804, so much of the act of the 31 Geo. III. c. 30. as regulates the prices at which British corn, grain, malt, meal, flour, and biscuit, may be exported, except to Ireland, and at which corn from abroad, grain, meal, and flour may be imported, except from Ireland, and as fixes the duties and bounties payable thereon, be repealed. Further, that, by this act, the importation and exportation of grain, into and from England and Wales, be regulated by the average price of the twelve maritime districts, and into or from Scotland, by the average price of the four districts of it; and that the bounties and duties be regulated by schedules annexed to the act; that whenever the average shall be under the prices, at which corn may be importable into Great Britain and Ireland, from abroad, on the low duties, exportation shall be permitted from Great Britain to Ireland, &c.; and that the importation and exportation of corn into and from Ireland shall be regulated by schedules annexed to the act. The first schedule shews the prices, to which the scale of bounty is to attach on the export of corn, &c. and the prices at which the exportation is prohibited. According to which wheat may be exported

when

when at or under 48*s.* the quarter, with a bounty of 5*s.*; rye at or under 32*s.* with a bounty of 3*s.*; peafe and beans are exportable without a bounty, until at or under 35*s.*; barley, bear, or bigg, or malt made of barley, bear, or bigg, may be exported at or under 28*s.* with a bounty of 2*s.* 6*d.*; oats at or under 16*s.* with a bounty of 2*s.*; wheat, flour, bifcuit, &c. with a bounty of 1*s.* 6*d. per* cwt.; wheat meal, with a bounty of 1*s.* 3*d. per* cwt.; barley, bear, or biggmeal, with a bounty of 10*d. per* cwt.; and oatmeal, with a bounty of 1*s. per* cwt. But that when the price of wheat exceeds 54*s.* that of rye 35*s.* that of peafe and beans 35*s.* that of barley, bear, or bigg, or malt made of them, 31*s.* and that of oats 19*s.* no export is to be allowed.

The fecond fchedule fhews the prices, according to which high or low duties are to take place on importation. When imported from the province of Quebec, or the other colonies or plantations in North America, wheat under 53*s.* the quarter, is fubject to the high duty of 24*s.* 3*d.* the quarter; at or above 53*s.* but under 56*s*, to the firft low duty of 2*s.* 6*d.*; and at or above 56*s.* to the fecond low duty of 6*d.*; rye, peafe, and beans, under 35*s.* the quarter are fubject to the high duty of 22*s.*; at or above 35*s.* but under 37*s.* to the firft low duty of 1*s.* 6*d.*; and at or above 37*s.* to the fecond low duty of 3*d.*; barley, bear, or bigg, under 26*s.* are fubject to the high duty of 22*s.*; at or above 26*s.* but under 28*s.* to the firft low duty of 1*s.* 3*d.*; and at or above 28*s.* to the fecond low duty of 3*d.*; oats under 17*s.* are fubject to pay the duty of 6*s.* 7*d.*; at or above 17*s.* but under 18*s.* the firft low duty of 1*s.*; and at or above 18*s.* the fecond low duty of 2*d.*; oatmeal, if under 16*s.* 6*d.* the boll of 140 lbs. avoirdupois, or 128 lbs. Scotch troy, is fubject for every boll to the high duty of 8*s.*; at or above 16*s.* 6*d.* the boll, but under 17*s.* 4*d.* to the firft low duty of 1*s.*; and at or above 17*s.* 4*d.* the boll, to the fecond low duty of 2*d.* When imported from any other country abroad, wheat under 63*s.* the quarter is fubject to pay the high duty of 24*s.* 3*d.*; at or above 63*s.* but under 66*s.* the firft low duty of 2*s.* 6*d.*; and at or above 66*s.* the fecond low duty of 6*d.*; rye, peafe, and beans, under 42*s.* pay the high duty of 22*s.*; at or above 42*s.* but under 44*s.* the firft low duty of 1*s.* 6*d.*; and at or above 44*s.* the fecond low duty of 3*d*; barley, bear, or bigg, under 31*s.* 6*d.* pays the high duty of 22*s.*; at or above 31*s.* 6*d.* but under 33*s.* the firft low duty of 1*s.* 3*d.*; and at or above 33*s.*, the fecond low duty of 3*d.*; oats, under 21*s.*, pay the high duty of 6*s.* 7*d.*; at or above 21*s.*, but under 22*s.*, the firft low duty of 1*s.*; and at or above 22*s.*, the fecond low duty of 2*d.*; oatmeal under 20*s.* the boll, pays the high duty of 8*s.*; at or above 20*s.* but under 21*s.*, the firft low duty of 1*s.*; and at or above 21*s.*, the fecond low duty of 6*d.*

The third fchedule fhews the prices to which the fcale of bounty attaches on the export of corn, ground corn, flour, or meal, malt, &c. from Ireland, and the prices at which the exportation is prohibited. When exported to any country abroad, wheat at or under 29*s.* 5*d.* the barrel Britifh, is allowed a bounty of 3*s.*; rye, and likewife peas and beans, at or under 20*s.* 4*d.*, a bounty of 1*s.* 10*d.*; barley, bear, or bigg, or malt made from them, at or under 16*s.*, a bounty of 1*s.* 5*d.*; oats, at or under 10*s.* 2*d.*, a bounty of 1*s.* 3*d.*; wheat flour, bifcuit, &c. a bounty of 1*s.* 6*d.* the cwt.; wheat, meal, 1*s.* 3*d.* the cwt.; rye meal, or flour, 9*d.* the cwt.; barley, bear, or bigg flour, 10*d.* the cwt.; and oatmeal 1*s.* the cwt. When the price of wheat exceeds 33*s.* 1*d.* the barrel, Britifh; of rye, peas, and beans, 22*s.* 3*d.*; of barley, bear, or bigg, or malt made from them, 17*s.* 8*d.*; and of oats 12*s.* 3*d.*, no exportation is permitted.

The fourth fchedule fhews the prices according to which the high or low duties are to take place on importation into Ireland.

By the act of the 45 Geo. III. c. 26. fec. 3, paffed in 1805, fo much of the act of the 41 Geo. III. c. 36, as may enable the lord lieutenant of Ireland to prohibit the exportation from it for a limited time, fo as not to endure longer than the expiration of fix weeks, after the commencement of the next feffion of parliament, corn, potatoes, and all other provifions whatever, and to permit the importation of corn, &c. for fuch limited time, without the payment of duty, and the faid act to be further continued in force until the 25th day of March 1806.

The act of the 16th July 1806, 46 Geo. III. c. 97. which is intitled, "An Act to permit the free Interchange of every fpecies of Corn between Great Britain and Ireland," enacts that the bounty and duties payable on exportation and importation of all corn and grain, meal, flour, bread, or bifcuit, from Great Britain into any port or place of Ireland, or from Ireland, into any port or place of Great Britain, fhall ceafe and determine. Provided always that the perfon exporting fuch articles declare before the chief officer of the cuftoms that the corn, &c. is really intended to be exported to Great Britain or Ireland, as the cafe may be, on which certificates, &c. are to be given to the exporter as in other cafes of tranfmitting goods coaftways, without any fee or perquifite.

And by an act of the 19th February, 1807, the 47 Geo. III. c. 7. the above recited act is amended, it being enacted that the faid act, and the feveral claufes and provifions therein mentioned, concerning the exportation and importation of any fort of grain or corn, meal, flour, bread, or bifcuit, from Great Britain to Ireland, or from Ireland to Great Britain was intended to extend, and is hereby declared to extend only to fuch corn or grain, meal, flour, bread, or bifcuit, as is the growth, produce, or manufacture of Great Britain or Ireland refpectively, and not to fuch being the growth, produce, or manufacture of any other country or place.

It is obferved by Mr. Mackie, in his excellent "Letters on the Corn Laws," after fuggefting many judicious amendments in the act of 1791, that the power of the crown in fufpending thefe laws without the confent of parliament is a highly dangerous power, which renders them in fome meafure of no effect. He conceives that in all free countries agriculture, which is an object of the greateft national importance, fhould conftantly be under the facred protection of ftanding laws, left the cultivators of the foil fhould not have their induftry fufficiently encouraged. And that at prefent, however deficient the cafe might formerly have been, when capitalifts are always ready and on the watch to open the ports, and fpeculate in the introduction of grain from abroad, importation fhould never be permitted but with the greateft precaution, nor exportation put a ftop to contrary to the eftablifhed laws, except in cafes of abfolute neceffity, when indemnity would be readily granted. Some method of counteracting this and other inconveniencies of a fimilar kind he conceives to be effential. From the barriers which had been formerly fet up, as a preventative of the importation of corn from abroad, being deftroyed, by the repeal of the old laws and reducing the import duties, a change made by the law of the year 1773, has arifen, he conceives, the inability of Great Britain to fupply herfelf with corn the produce of her own foil.

"In proportion," fays he, "as the country advanced in

 profperity,

profperity, the furplus quantity, after fupplying the inhabitants, which ufed formerly to be exported, was gradually abforbed by the increafing population and luxury of the nation; and the law in queftion, among other caufes, giving a check to the further extenfion of agriculture, neceffary to counterbalance the additional confumption, the tide at laft turned againft the country, and a regular influx of foreign grain became expedient to fupply the growing wants of the inhabitants."

The differences which took place in this way, are ftrikingly fhewn in the ftatement given below from Mr. Dirom, who remarks that no accounts have been preferved concerning the exports and imports of corn, previoufly to 1697, or that, from the high duties, little trade of this nature was carried on; but that in the years from that period to 1700 inclufive, the amount of the exportation of the different forts of grain was 331,223 quarters; while the importation was only 8,948 quarters: that, in the courfe of the ten years from the laft of the above periods to 1710, the amount of the annual exportation was 248,945 quarters; while the average of the importation only came to 442 quarters. That in one of thefe years (1709) more than half a million of quarters, and in the courfe of the whole, not lefs than 2,849,446 quarters were exported, while only 4.442 quarters were imported.

In the next ten years, from 1711 to 1720 inclufive, the average yearly exportation increafed to 449,193 quarters; the average annual importation being only 71 quarters. The amount of the exportation of thefe ten years being nearly in a double proportion to that of the preceding ten, arifing to 4.491,933 quarters; while the import was only 714 quarters.

In the fubfequent ten years, from 1721 to 1730 inclufive, though from different circumftances, much foreign grain was introduced in fome of the years, the exports kept nearly up to the preceding equal period; the amount of the whole of them for thefe ten years being 4,479,683 quarters; the imports of the different kinds of grain being 732,692 quarters.

For the ten years, from 1731 to 1740 inclufive, the act of 1729 having given a check to foreign importation and promoted cultivation, the average annual exportation was 549,447 quarters; while the amount of the average importation was only 4,690: the whole export of the ten years being 5,494,471 quarters; and the whole import only 46,909 quarters.

For the ten years from 1741 to 1750 inclufive, on account of the great induftry and exertion of the farmers, in confequence of being releafed from prohibitory and injudicious laws, the annual average amount of exportation rofe to the extraordinary height of 848,660 quarters; while the imports amounted only to 15,193 quarters. The exports in 1748 were 1,123,953 quarters, in 1749, 1,250,306 quarters, and in the following year the amazing amount of 1,667,778 quarters; the whole for the ten years being 8 486,602 quarters; while the imports of the feveral forts of grain were only 159,437 quarters.

But for the ten years from 1751 to 1760 inclufive, the exports declined, on the average, to 582,837 quarters; the imports, on the average, being 37,397 quarters. This reduction in the exports is fuppofed to have depended on the deficient crops of 1756 and that of the following year.

From about this period the commencement of the import fyftem feems to have taken its rife, which has fince been carried to fuch an amazing extent.

The imports of the years 1763 and 1764 chiefly confifted of oats; but in 1765 they were different forts of foreign grain, chiefly wheat, amounting to 218,031 quarters; while the exports of the feveral forts of corn amounted to the extent of 457,730 quarters. In 1767 the vaft amount of 907,420 quarters was imported, 500,000 of which were wheat; and on the average of the twelve years, from 1761 to 1772 inclufive, the annual exportation had funk to 370,703, the yearly importation having increafed to 251,279 quarters.

Under the fanction of the act of 1773, in 1774 the large amount of 926,174 quarters of grain were imported from abroad, one-third being wheat or wheat flour; while the quantity exported was not more than 51,099. In 1775 the immenfe quantity of 1,163,407 quarters of foreign corn was imported, half of which being wheat and wheat flour, while the exportation only rofe to 191,007 quarters. On the whole, for the twelve years from 1773 to 1784 inclufive, the annual average importation came up to 578,358 quarters; while the exportation decreafed to 267,182 quarters. The whole importation of this period being not lefs than 6,940,293 quarters of foreign grain; while only 3,206,184 quarters of grain of home growth were exported.

This reverfe in our corn trade, with the vaft difadvantages which are fuftained by it to the nation, are ftill further fhown by Mr. Mackie in the table of the exports and imports of all forts of grain, fent from or brought into Great Britain, from the conclufion of the above period to the year 1793.

ACCOUNT

ACCOUNT of Exports and Imports of Corn into Great Britain, from 5th January 1785, to 5th January 1793.

GREAT BRITAIN, *Dr.*

		Quarters.	Price. s.	Price. d.	£.	s.	d.
1785	To foreign wheat imported.	110,863	41	10			
1786		51,463	38	10			
1787		59,339	41	2			
1788		148,710	45	0			
1789		107,324	51	2			
1790		216,374	53	2			
1791		459,490	47	0			
1792		22,131	42	2			
1793		459,611	48	4			
	Average price of the above 9 years 45*s.* 9*d.*	1,635,305	45	9	3,740,760	3	9
		1,635,305			3,740,760	3	9

Cr.

		Quarters.	Price. s.	Price. d.	£.	s.	d.
1785	By wheat exported.	132,685	41	10			
1786		205,466	38	10			
1787		120,536	41	2			
1788		82,971	45	0			
1789		67,868	51	2			
1790		229,754	53	2			
1791		71,546	47	0			
1792		310,684	42	2			
1793		81,755	48	4			
		1,303,265	45	9	2,980,831	1	3
	Balance paid in 9 years by Great Britain for foreign wheat, or *per. annum* 36,893⅓ qrs. 84,436 *l.* 11 *s.* 5 *d.*	332,040			759,929	2	6
		1,635,305			3,740,760	3	9

GREAT BRITAIN, *Dr.*

		Quarters.	Prices. s.	Prices. d.	£.	s.	d.
1785	To foreign barley imported.	67,212	24	0			
1786		62,374	24	4			
1787		43,244	22	8			
1788		11,479	22	0			
1789		12,295	22	10			
1790		30,117	25	6			
1791		61,135	25	10			
1792		118,527	26	8			
1793		147,169	31	8	691,940	0	0
	Average price of the above 9 years 25*s.*	553,552	25	0	702,245	0	0
	Balance received by Great Britain in the above 9 years for barley exported or *per annum* 80,199⅗ qrs. 78,027 *l.* 4 *s.* 5¾ *d.*	561,796					
		1,115,348			1,394,185	0	0

Cr.

		Quarters.	Price. s.	Price. d.	£.	s.	d.
1785	By barley exported.	166,408	24	0			
1786		111,598	24	4			
1787		135,089	22	8			
1788		212,811	22	0			
1789		344,631	22	10			
1790		51,163	25	6			
1791		41,590	25	10			
1792		47,555	26	8			
1793		44,463	31	8	1,394,185	0	0
		1,115,348	25	0			
		1,115,348			1,394,185	0	0

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ACCOUNT of Exports and Imports of Corn into Great Britain, from 5th January 1785, to 5th January 1793.

Great Britain, *Dr.*

		Quarters.	Price. *s.*	*d.*	£.	*s.*	*d.*
1785	To foreign rye imported - -	28,761	28	0			
1786		3,643	27	2			
1787		7,054	27	8			
1788			27	8			
1789		14,844	29	10			
1790		21,683	34	0			
1791		56,378	31	4			
1792		13,027	30	10			
1793	Average price of the above 9 years, 30*s.* 1¼*d.*	5,124	34	10			
		150,514	30	1¾	226,868	9	11
		150,514			226,868	9	11

Cr.

		Quarters.	Price. *s.*	*d.*	£.	*s.*	*d.*
1785	By rye exported	13,163	28	0			
1786		6,736	27	2			
1787		12,683	27	8			
1788		31,220	27	8			
1789		39,946	29	10			
1790		47	34	0			
1791		3,528	31	4			
1792		16,151	30	10			
1793		512	34	10			
		123,986	30	1¾	186,495	12	2
	Balance paid by Great Britain, in the above 9 years, for rye imported, being *per annum*, for 2947$\frac{5}{9}$ *qrs.* 4485*l.* 17*s.* 6*d.*	26,528			40,372	17	9
		150,514			226,868	9	11

Great Britain, *Dr.*

		Quarters.	Price. *s.*	*d.*	£.	*s.*	*d.*
1785	To foreign peas and beans imported -	16,813	30	8			
1786		35,709	33	2			
1787		42,884	31	10			
1788		10,902	27	2			
1789		391	27	2			
1790		43,168	31	0			
1791		14,726	30	6			
1792		43,259	31	4			
1793	Average price of the above 9 years, 31*s.* 1*d.*	48,274	37	4			
		256,126	31	1	398.062	6	9
		256,126			398,062	6	9

Cr.

		Quarters.	Price. *s.*	*d.*	£.	*s.*	*d.*
1785	By peas and beans exported -	15,904	30	8			
1786		16,309	33	2			
1787		18,260	31	10			
1788		15,135	27	2			
1789		27,891	72	2			
1790		17,577	31	0			
1791		13,721	30	6			
1792		17,291	32	4			
1793		13,483	37	4			
		155,571	31	1	241,783	5	3
	Balance paid by Great Britain in the above 9 years for peas and beans imported, being *per annum* for 11,172$\frac{7}{9}$ *qrs.* 17,364*l.* 6*s.* 10*d.* - -	100,555			156,279	1	6
		256,126			398,062	6	9

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ACCOUNT of Exports and Imports of Corn into Great Britain, from January 5th 1785, to January 5th 1793.

GREAT BRITAIN, *Dr.* *Cr.*

		Quarters.	Price. s.	Price. d.	£.	s.	d.			Quarters.	Price. s.	Price. d.	£.	s.	d.
1785	To foreign oats imported -	274,089	17	2	235,259	5	6	1785	By oats exported	25,273	17	2	22,097	13	2
								1786		19,293	18	0	17,308	16	0
1786		478,473	18	0	430,625	14	0	1787		17,098	16	8	13,935	18	1
1787		512,004	15	8	426,670	0	0	1788		14,418	15	8	11,294	2	0
1788		413,827	16	0	313,814	12	10	1789		32,683	16	0	26,146	8	0
1789		429,722	16	0	343,777	12	0	1790		14,275	18	10	13,422	5	10
1790		735,173	18	10	692,282	18	2	1791		16,358	18	2	11,858	10	4
1791		788,709	18	2	716,410	13	6	1792		25,709	18	2	23,352	6	10
1792		1,008,401	18	2	913,964	4	10	1793		17,473	21	10	19,074	13	10
1793	Average price of the above 9 years, 17*s.* 10*d.*	722,523	21	10	788,754	5	6		Balance paid by Great Britain, in the above 9 years, for oats imported, being *per annum* for 375,593$\frac{9}{4}$ *qrs.* 522,496*l.* 10*s.* 3*d.* -	182,580	17	10	161,090	14	1
		5,362,921	17	10	4,863,559	6	4			5,180,341			4,702,468	12	3
		5,362,921			4,863,559	6	4			5,362,921			4,863,559	6	4

GENERAL Abſtract of the Exports and Imports of Corn from and into Great Britain for 9 Years, from 1785 to 1793 incluſive.

	Quarters	£.	s.	d.		Quarters.	£.	s.	d.
To foreign wheat imported from 1785 to 1793 -	1,635,305	3,740,760	3	9	By wheat exported from 1785 to 1793 - -	1,303,265	2,980,831	1	3
To barley ditto - -	553,552	691,940	0	0	By barley ditto - -	1,115,348	1,394,185	0	0
To rye ditto - -	150,514	226,868	9	7	By rye ditto - -	123,986	186,495	12	2
To peas and beans ditto -	256,126	398,062	6	9	By peas and beans ditto -	155,571	241,783	5	3
To oats ditto - -	5,362,921	4,863,559	6	4	By oats ditto - -	182,580	161,090	14	1
					By ſurplus quantity of grain imported by Great Britain, in the 9 years above-mentioned, after deducting the quantity exported, being at the rate of 564,185 *qrs.* $\frac{9}{3}$ value 550,756$\frac{2}{9}$*l.* *per ann.*	5,077,668	4,956,804	13	8
	7,958,418	9,921,190	6	5		7,958,418	9,921,190	6	5

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The fame writer, after obferving that the act of 1791 in fome degree difcouraged the importation of corn from abroad, by increafing the rates or duties on it, which was a defect in the old laws, yet ftill that ftatute is far from a ftate of perfection. A radical error had, he conceives, been committed in the outfet of the corn laws, which has never been removed, which is that of the relative regulating rates of exportation and importation for the different kinds of grain, not having been fixed for fuch, proportionably to their real values, the labour and expence they ftand the farmer in raifing and bringing to market, as in fuch inftances he would be under the neceffity of relinquifhing the cultivation of any particular fort of grain, fo rated from the corn dealer, in confequence being able to have almoft a complete command of the home market, from his being capable of fupplying it from abroad. This he contends is the cafe at prefent in regard to oats, as from various ftatements he fhews, that if the rate of importation for that fort of grain had been regulated originally, "in proportion to the current values in 1670 and 1688, when the prefent fyftem of corn laws was firft enacted," it fhould have been in the following proportion. "As 28*s.*, the average price of wheat is to 85*s.* 4*d.*, the import rate of wheat including the duty, fo is 12*s.*, the average price of oats, to 36*s.* 6*d.*, being the relative import rate at which oats ought to have been imported, including the duty; whereas the law allowed foreign oats to be imported at 17*s.* 4*d.* including the duty. This he fhews to have continued ftill the cafe with this fort of grain, from which the culture has been greatly abandoned by our farmers; and a large importation of that fort of corn, though much inferior to our own, rendered neceffary, 5,362,921 quarters having been imported from 1785 to 1793 at the value of 4,863,599*l.* 6*s.* 4*d.*

It is concluded on the whole, that as the "wealth of nations varies confiderably at different times, fo ought the rates which regulate the export and import of foreign corn; if thefe affect the money price of our own produce in the home market, and tend to fink its relative value below the current price of labour, with which it muft always bear a juft and neceffary proportion, the rates muft confequently be raifed in order to preferve agriculture, the only folid bafis on which the real wealth and lafting profperity of a ftate can be founded." Should our induftry and capital continue to increafe for thirty years, in the fame ratio it has done fince the peace of 1783, the money in circulation, the price of labour, and the expence of cultivation may be double what it now is; and the price of corn will naturally increafe in the fame degree: fhould the rates, at which corn from abroad is then permitted to be imported, have a tendency to obftruct fuch a rife, he contends, that they muft either be heightened or this country will lofe its agriculture, as has already happened in the cafe of oats; but that, on the other hand, fhould the profperity of the country decline, fo as to leffen the demand for labour, or the floating capital to one-half, the price of corn fhould fink in the fame proportion, to the diminifhed price of labour, and the import rates be lowered, if the means of preventing fuch a neceffary diminution. Confequently, that, if thefe principles be well founded, a permanent law for the regulation of the export and import of grain, is inconfiftent with found policy; it fhould be fuch as to expire regularly at fixed periods, according to the wifdom of the legiflature, on taking the fituation of the country into full confideration, fo as to regulate it in conformity to the price of labour, which is "the moft certain index of the growing profperity, ftationary fituation, or declining ftate of the nation."

In fupport of which Mr. Malpus, in his late work on the "Principle of Population," obferves, that in order "to reftore our independence, and build our national greatnefs and commercial profperity on the fure foundation of agriculture, it is evidently not fufficient to propofe premiums for tillage, to cultivate this or that wafte, or even to pafs a general inclofure bill, though thefe are all excellent as far as they go. If the increafe of the commercial population keep pace with thefe efforts, we fhall only be where we were before, with regard to the neceffity of importation. The object required is, to alter the relative proportion between the commercial and the agricultural population of the country, which, he thinks, can only be done by fome fyftem, that will determine a greater proportion of the national capital to the national land." And he "fees no other way at prefent of effecting this object, but by corn laws adapted to the peculiar circumftances of the country, and the ftate of foreign markets." Thefe are ftated as the leading principles and circumftances which are neceffary to be particularly had in view in the framing of laws for the regulation of the trade in corn.

Corn, in *Surgery*, is a hard, dry, cuticular, warty, or horny induration in the fkin, and fometimes alfo in the fubjacent cellular membrane. In the former cafe, the induration may be moved backwards and forwards; but in the latter, it is immoveable. Corns are in general not larger than about the fize of a fmall pea, and are produced in confequence of external preffure, efpecially in fuch parts as are expofed to much friction, and where the fkin is very near to the bone. They are, therefore, moft generally found in the toes, or the foles of the feet; but fometimes alfo in other parts, as on the upper ridge of the hip-bone, where they are produced by the preffure of women's ftays. Sometimes alfo fimilar indurations are formed in the ears of women, who wear heavy ear-rings. When they are formed in the feet, they generally arife from the ufe of too narrow or high-heeled fhoes, and fometimes merely by wearing the ftockings too tight. Frequently they produce no inconvenience; but fometimes they become fo painful as to render the patient entirely lame. The pain is increafed by wearing warm ftockings, tight fhoes, violent motion of the body, ftanding or walking too long, drinking fpirituous liquors, and during variable weather. They are generally painful in hot weather, but rarely fo in cold.

With refpect to the cure, the furgeon may either endeavour to remove the pain for a time, or radically to free the patient from the difeafe. The violence of the pain may be immediately relieved, by the patient's fitting-down, taking off his narrow fhoes, placing his foot in a horizontal pofition, and cooling it a little. A more permanent relief may be obtained, by fhaving off the prominent part of the corn with a knife, as far as it can conveniently be got at, without, however, exciting any hæmorrhage, and by the ufe of emollient warm fomentations. The patient cannot be radically freed from his corns, unlefs he refolves, during the progrefs of the cure, to wear no other than wide, foft, and low-heeled fhoes, and to walk and ftand as little as poffible. If this is out of his power, and he is under the neceffity of frequently walking or ftanding for a confiderable time, the preffure may be prevented in the following manner: Take a piece of linen fpread with fome emollient plafter; lay one piece over another, from eight to twelve times together, and cut a hole in the middle of them, exactly the fame fize and circumference as the corn; then apply it in fuch a manner that the corn enters the hole in the plafter, and is thus defended againft the contact of the ftockings and fhoes. When fuch a plafter has been worn for the fpace of fome weeks, the corn, if recent, generally difappears without requiring any other

other remedy. When the corn is ſituated in the ſole of the foot, we need only cut a hole into a felt-ſole, ſo as to fit the corn, and introduce it into the ſhoe.

By the following treatment, corns may be removed with certainty, radically, and ſpeedily, eſpecially if we employ at the ſame time the perforated ſole or plaſter: Rub two or three times a day an emollient liniment, ſuch as the ointment of althæa, or, which is ſtill better, the volatile liniment, upon the corn, and keep it covered during the intervals with an emollient plaſter. Every morning and evening let the foot be kept for half an hour in warm water, and the corn well rubbed with ſoap. Let the external part of the corn, which will have become perfectly white, ſoft, and pulpy, be then ſcraped with a blunt knife, till all the ſoft part is removed, and till the operation begins to give pain to the patient; upon which, we muſt immediately deſiſt. This treatment is to be continued till the corn is entirely extirpated; for if we deſiſt from it earlier, the corn will grow again. However, we muſt take care not to cut the part with the knife, ſo as to make it give pain or bleed.

Amongſt a variety of remedies that have been recommended for corns, the following are the principal: green wax, ſoap plaſter, diachylon, mercurial or hemlock plaſter, a piece of bacon, the juicy pulp of a freſh lemon, and even a piece of green oil-cloth, &c. which are to be changed as often as may be neceſſary. The following remedies have alſo been recommended as infallible: ℞ Gumm. ammoniac. Cer. citrin. aa ℥ij Aerug. æris ʒvj. M. F. Emplaſtr. S. To be ſpread upon linen and applied to the corn. Or, ℞ Empl. de galbano, de ammoniac. diachyl. comp. aa ℥ſs. Camph. ℈ij. M. F. Empl. D. S. To be ſpread pretty thick upon linen, and applied to the corn, in pieces juſt ſufficiently large to cover it. In order to aid the operation of the remedy, we may previouſly ſoften the corn in warm water, and ſcrape off as much of it as we are able. The following plaſter has been ſaid to produce the ſeparation of the corn within three or four days: ℞ Gumm. galban. ℥j. in aceto diſſolut. & ad ſpiſſitudinem evaporat. Add. Picis naval ℥ſs. Empl. diach. ſimpl. ʒij. In fine, Sal. ammon. virid. Aeris pulveriſ. aa ℈j. M. F. Empl. The exciſion of the corn is not to be recommended as a radical method of cure, both on account of the difficulty and danger with which it is attended, and becauſe it ſometimes proves unſucceſsful. When the patient has got rid of his corns, he muſt avoid all the above-mentioned cauſes which tend to produce them, or they will again return.

Corns, in *Veterinary Science*, a troubleſome diſeaſe in the feet of horſes, moſt generally occurring in the fore feet, and in the inſide heel, within the angle or union of the quarter with the bar; though theſe bruiſes are ſometimes found in both quarters or ſides of the foot.

Terms improperly uſed in any art or ſcience render its acceſs more difficult, obſcure our views of it, and retard its advancement: ſo the term *corns* is, in this caſe, a groſs miſapplication of words, creating perplexity and miſconception, and which actual experience even in the diſeaſe is hardly ſufficient to do away.

When the ſkin of the human foot is gradually compreſſed or rubbed, without any ſudden and violent irritation that ſhall raiſe the cuticle or create a ſore, it thickens firſt, then becomes horny, and is rightly enough termed a corn, from *cornu*, Lat. or *corne*, Fr. *horn*.

In the horſe, on the contrary, whoſe foot is every where thickly clothed with natural horn, ſuch an occurrence, if it were poſſible, could not be a diſeaſe; but if a bruiſe takes place in the foot, at the point above deſcribed, it is alſo called a *corn*, though agreeing in nothing with the former diſeaſe, but in the common circumſtance of its affecting the foot with pain and lameneſs.

Where a corn, as it is called, exiſts in the foot, it is known by a redneſs, more or leſs intenſe, in the angle formed by the union of the bar with the ſides of the foot, and is moſt generally obſerved, as we have already ſtated, in the inner quarter: it is tender, if preſſed upon, producing lameneſs; and if the irritation is carried far enough, it feſters, and the pus, being prevented eſcaping below by the ſole, forms a paſſage inſide the hoof upwards, through the foliated ſubſtance or elaſtic proceſſes, to the coronet; and if a ſhoe, preſſing too hard upon the part, continues to be uſed, the irritation being kept up for a long time, the part becomes weakened in its function, not forming good ſound horn, and a painful diſeaſe is created, which is eradicated with difficulty, and is liable to return, after relief has been obtained, by the ſlighteſt renewal of this permanent preſſure, or of irritation of any kind.

Having briefly deſcribed the diſeaſe, as it commonly appears, we proceed to conſider its cauſe, and the cure.

As it is unequal preſſure that produces corns, even in ſtrong feet, from the ſhoe bearing too hard upon the point of the foot above indicated; ſo, in feet naturally weak, a ſlighter degree of preſſure, if the preſſure be permanent, ſhall be ſufficient to induce it: ſo that the diſeaſe may be obſerved in all ſorts of feet, but far more frequently in weak ones, as in low heeled feet, or where the heels project very much, and the horn turns under, and is thin.

The horſe's foot, we may remark, by being continually bound by the nails which attach the ſhoe to the foot, is ever hardening and diminiſhing in its volume, under their influence and preſſure, and eſpecially all the elaſtic parts of the foot, which, not being then called into much action, become inert and rigid, or are abſorbed; the poſterior parts of the foot, in particular, are deranged by it, and, in its contracting the foot, often forms waving lines of horn, which turn under at the heels, ſo that the ſhoe will take its bearing on the parts ſo diſpoſed, in a direction tending inwards, and bring on bruiſes and weakneſs, or *corns*, as the ſmiths have been pleaſed to call them.

The inflammation induced by the bruiſe or preſſure occaſions an increaſe, or ſometimes rupture, of the blood-veſſels of the part preſſed on, ſo that inſtead of lymph, the red parts of the blood flow into them: and hence that redneſs in the horn of the bruiſed part, the external indication of this diſeaſe.

If the preſſure be ſpeedily and effectually removed, and all external irritation be kept away, healthy horn forms again, and the diſeaſe diſappears; but if the irritation be kept up for any length of time, or has been attended with much violence, the vaſcular parts go on to ſuppurate; and the pus, as we have obſerved, forces its way with great pain to the coronet. Its frequent recurrence leaves the parts very weak, and the ſmiths are then apt to imagine it is natural to them, and convey this idea to others, and ſeldom admit the real cauſe of the diſeaſe.

One circumſtance, we believe not much underſtood, it is of importance to diſcloſe here, reſpecting the production of this diſorder, and which cannot be too generally known and conſidered, as it may be the means of warning thoſe whoſe experience has not yet informed them of the danger: it is this, that if we make a perpendicular ſection of the horſe's foot, acroſs the two points of the heel, where the corns uſually are found, it will be obſerved that the outſide and inſide heels exhibit different appearances: the vaſcular parts lying much lower on the inſide than on the outſide quarter; ſo much ſo, that any one holding the foot from the ground, and

and levelling the fole to his eye with his drawing-knife or buttrefs, he would meet with the blood of the infide quarter before he had brought it to what he would conceive the proper level of the outer, and before he at all fufpects it; for the horfe's foot, no doubt for the wifeft purpofes, is not made a regular cone, as on a carelefs infpection we fhould apprehend it to be, but is placed inclining on the ground, with the infide the higheft, forming a fpecies of rhomb or lozenge; the inner parts being thinner in horn, more elaftic, and flefhy; while the outer are ftouter in horn, and with lefs vafcular matter, and more adapted for receiving the wear, which, we may obferve, takes place primarily on the outer fide of the toe or pince, as may be feen by looking at the fhoes when taken off, or obferving the wear of the natural foot unfhod; and thus compreffion and uneafinefs are prevented by the greater yielding and elafticity of the inner quarter and the heels: for had the foot been on every fide equally unyielding, refiftance, compreffion, and pain, under heavy burdens, or great or long continued exertions of the animal, would have been produced.

It is this difference which may deceive the fmith, and make him bring the fhoe nearer the quick on this quarter than he intends; and it is the fuperior elafticity and vafcularity of his fore feet that occafions them to be more the fubjects of this difeafe than the hind, where corns rarely occur, and which we have heard the fmiths attribute to the caufe of their ftanding with their hind feet in the dung of the ftable.

The pofition, alfo, in which the fmith is obliged to hold the foot between his thighs, turned upwards, and drawn away from the horfe outwards, will tend to increafe his deception, in regard to thefe circumftances of the apparent levelling of the hoof; and where there is a weak, low, flefhy heel, as it is termed, a flight miftake is fufficient to produce a bruifed heel, or corn, which in ftouter feet it would be more difficult to do; though in thefe we fometimes find it has been done.

A fhoe too narrow for the foot, or with the heel made very floping inwards, would alfo induce a bruife of thefe parts; for we fee, by the brightnefs of the fhoe at this part, after it has been on fome time and removed, that the nails do not entirely prevent the motion of the heels on this furface.

Finally, a fhoe not equally fitted to bear alike on all the parts of the foot, but bearing on the toe and heels only, efpecially the inner heel, and not taking fufficient preffure at the quarters, would, by this partiality of preffure, induce inflammation and pain. Clenching the nails too forcibly near the heel, fo as to induce more preffure there than at the toe, would alfo do the fame thing. Under the article FARRIERY, we propofe confidering fome other parts of this fubject, having barely inferted enough of that branch of the bufinefs here as may be faid particularly to belong to this fubject.

If this reafoning, therefore, be true, the corn arifes from the weaknefs and infufficiency of the foot to bear the preffure of a nailed fhoe, or from partial and ill difpofed preffure in the ftrong feet, or improper paring: therefore the ancients, who, we believe, knew nothing of this nail fhoeing, had not their horfes fubject to this difeafe; and fuch, on examining their writings, turns out to be the fact: for though they have defcribed, and often moft truly, the difeafes of the horfe, they have not defcribed this difeafe, fo as for us to conclude on its identity. The "Pulmunculus ad aperturam" of Vegetius, lib. ii. cap. 56. has fome of the characters of the corn; but it is not clear whether oxen or horfes were the objects of it, and he recommends unfoleing for it: whatever it is, it was probably a difeafe arifing from a weak heel, which, by long journies or rough roads, might be fo bruifed as to bring on fimilar confequences.

Having treated of the appearance of the corn and its caufes, we have now to confider the remedy, firft obferving that prevention from it is ever the wifeft line of conduct, efpecially in a difeafe where the mechanical caufes of it are obvious, and can be prevented. Where the corn or bruifed heel has taken place, the firft and moft natural fuggeftion is to remove the fhoe, and take away all the red difeafed horn with the drawing knife, fo as, on the re-application of the fhoe, to remove all preffure from the part, and thus admit a new growth of horn not fubject to external preffure. For this purpofe, the horfe may be turned to grafs during its growth, when in general it will grow down apparently perfect: it is, however, if the difeafe has been of any duration, too apt to return, if the fmith brings only the ordinary preffure of a fhoe upon it; though this takes place by degrees, and not at the firft fhoeing: the parts weakened by the difeafe become unable to fuftain even this preffure, and firft become tender, and afterwards lame; or the parts fefter, according to the degree of it. The barred fhoe, on this account, is often had recourfe to by the fmiths with good fuccefs; the preffure to the corn being done away by the parts of the fhoe oppofite it being bent out of the line or plane of the fhoe, and then to the foot a light ftopping of turpentine dreffings on tow is applied, and bound in with tar cloth. The continuance of this, which is feldom perfifted in long enough, reftores the horn to foundnefs; which being then left off, and the ordinary fhoe applied, induces again the confequences, fooner or later, that we have defcribed. A fhoe may be beat or filed out with a fpace oppofite the corn; but we have found it more eafy and certain, when the parts are arrived at this ftate, to make a fhoe rather thicker than the ordinary fhoe, and to cut off entirely that extremity of it that comes oppofite the corn, to a fhort diftance from it, fo as to be affured no preffure can arife from the fhoe itfelf; for if the fhoe be left long, however managed, by long wear it is apt to play and become relaxed, from the parts both of the hoof and fhoe giving way to each other, and thus creating a degree of loofenefs, when the heel of the fhoe, coming upon the part, reproduces the difeafe. It will be objected to this propofal, that the corn is left unprotected, and at firft it will be a little tender, but this will fpeedily go off, and at each fhaving will become of lefs confequence; and it is better of the two evils to contend with the occurrence of accidental preffure from irregularities in the road, than the perpetual preffure of the fhoe. In flight cafes, after the fhoe has been nailed on pretty firmly, we have taken a fmall faw, and fawed away the horn refting on the fhoe at this part, fo as to make it prefs lefs there than on any other part of the foot; but if the fhoe be allowed to ftay on too long, the nails, as we before ftated, become relaxed, by the horn giving way, and preffure will occafionally take place on the corn.

Of late we have had feveral opportunities of ufing the fhoe above defcribed, and have found it in practice beyond our expectation; nor have we found it, though avowedly imperfect, produce any of the ills we had apprehended it would be fubject to. There are other methods than thofe we have defcribed, but we do not mention them, from finding them infufficient. Where pus has formed, the horn covering it being effectually removed, digeftives of turpentine are ufed, as in any other wound, till the horning of the fore takes place, when the caufe that originally produced it muft be carefully avoided.

Corn-*Bottle*, in *Agriculture.* See Centaury and Weed.

Corn-*Butterfly*, in *Entomology*. See Papilio.

Corn-*Crowfoot*, in *Agriculture*, is the common name of a plant of the weed kind, often found among corn crops, and which is very troublefome to the farmer. It has an upright ftem, with pale green leaves, cut into long narrow acute fegments, the flowers are of a pale colour. It is extremely difficult to be eradicated from places where it is eftablifhed. See Weed.

Corn, *Ears of*, in *Natural Hiftory*. Under this name different authors have defcribed a variety of organic remains found in the ftrata of the earth. M. Scheuchzer, in particular, gives the figure of a foffil, which he defcribes as an ear of corn, and from its figure, and fuppofed fulnefs, he argues, that the Mofaic deluge took place in the month of May! but Mr Walch confiders this body rather as a zoophyte, the rays of which are divided by tranfverfe lines, marking their feparation into diftinct vertebra.

The fpica fecalina, and graminis panici of Dr Richardfon, and the ear of barley which Mylius has figured, are of like doubtful origin; the latter, in particular, does not bear the proportions of an ear of barley.

The ftangengraupen of the German mineralogifts more nearly refemble ears of corn, than the above. Thefe are flat, oblong, blackifh, and fometimes greenifh bodies; but, becoming white, and acquiring a metallic luftre on their prominent parts by friction. Many have fuppofed thefe to be mineral fubftances, to which mere accident has given their prefent form; but they feem to be real vegetable fubftances, impregnated with metallic particles. They vary confiderably in form, but are in general flattened, and are ftudded with little round prominences, bearing very much the appearance of corn. They are found but very rarely, and perhaps only in the copper mines of Frankenburg in Heffe. M. Lihman, who has written exprefsly on thefe fubftances, does not confider them as changed vegetable fubftances, but as being of mineral origin; he found them to confift of copper, arfenic, fulphur, and iron, with a fmall quantity of filver in their compofition. Wolfart, who has delineated and defcribed thefe fubftances, calls them *frumenti metallares*, acknowledging that he cannot refer them to any particular fpecies of grain. Mr. Parkinfon gives two figures of thefe fubftances, but concludes his defcription thus: "I am therefore of opinion, that we muft be fatisfied with confidering them as foffils, whofe origin muft be referred to fome hitherto unknown fubject of the vegetable kingdom." Mr. Whitehurft, "Theory of the Earth," p. 169. mentions corn among the vegetable impreffions found in the coal meafures of Derbyfhire; but this is doubtlefs as ill-founded as any of the foregoing; and we have the beft reafon to fuppofe, that minute and fcientific examinations will place all thefe among the incognita of a former ftate of aquatic exiftence.

Corn-*Farm*, in *Agriculture*, is that fort of farm which is principally cultivated and conducted under the fyftem of corn, or the chief produce of which is grain. All the more dry forts of land are adapted to this purpofe. See Corn and Farm.

Corn-*Flag*, in *Botany*. See Gladiolus.

Corn-*Flag*, in *Agriculture*, is the name of a troublefome plant of the weed kind, which increafes greatly by the root; when eftablifhed in the field, it is with difficulty extirpated, as it is capable of fending up new plants from every part of its roots. See Weed.

Corn, *Indian*. See Indian *Corn* and Maize.

Corn *Land*, that kind of land which is adapted to the growth of grain. See Farm.

Corn, *Lent*, is a term applied to that fort of grain which is ufually fown, or put into the foil about that feafon.

Corn *Marygold*, is the name of a plant of the weed kind, of which there are two fpecies, one found commonly in arable land, and the other in paftures of the more moift kind. It is a great enemy to all forts of corn crops. It is extirpated with much difficulty, as it multiplies both by its roots and feeds. Deep and effectual hoeings, frequently repeated, are of courfe requifite, before it runs up to feed. See Weed.

Corn *Meafure*, in *Rural Economy*, that fort of meafure which is ufed for grain. See Measure, and Weights and Measures.

Corn *Mill*, that fort of mill which is employed in the grinding of corn. See Mill.

Corn *Parfley*, in *Agriculture*, is the name of a low branching plant of the weed kind, often met with among corn crops. See Weed.

Corn *Rent*, that fort of rent which is regulated by the price of grain. See Rent.

Corn-*Rents*, in *Law*, denote thofe third parts of the old rents on college leafes, which were to be referved by the leffees. Stat. 18 Eliz. cap. 6. Thefe were the invention of lord-treafurer Burleigh, and fir Thomas Smith, then principal fecretary of ftate, for upholding the revenues of colleges.

Thefe great ftatefmen, obferving how much the value of money had funk, and the price of all provifions rifen, by the quantity of bullion imported from the new-found Indies, which effects were likely further to increafe, devifed this method. Their forefight and penetration have in this refpect been very apparent; for though the rent fo referved in corn was at firft but one-third of the old rent, or half of what was ftill referved in money, yet now the proportion is nearly inverted; and the money arifing from corn rents is, *communibus annis*, almoft double to the rents referved in money.

Corn-*Rocket*, in *Botany*. See Bunias.

Corn-*Sallad*, in *Agriculture*, a fpecies of the Valerian. See Valerian.

Corn-*Sharping*. See Sharping.

Corn, *Spring*, a term fignifying fuch forts of grain as are put into the earth in the fpring feafon.

Corn-*Stand*. See Stand.

Corn-*Stubble*, that fort of ftubble which remains after reaping or cutting any fort of grain crop. It fhould conftantly be collected for the purpofe of litter. See Stubble.

Corn-*Stubble Rake*, is a large kind of horfe-rake, employed in fome counties with much benefit. See Rake.

Corn-*trug*. See Trug-*corn*.

Corn-*violet*. See Weed.

Corn, *white*, a general term ufed to fignify all forts of grain.

Corn-*Worm*, a fort of infect of the caterpillar kind, which is faid to be very detrimental to corn.

CORNA, in *Ancient Geography*, an epifcopal town of Afia, in Lycaonia, mentioned in the acts of the council of Chalcedon, held in 451.

CORNA, in *Geography*, a town of Afiatic Turkey, in the Arabian Irak, on the Euphrates; 6 miles N. W. of Baffora.

CORNACHINE Powder, in *Pharmacy*, a purging powder,

der, called alfo earl of Warwick's powder, and pulvis de tribus. It is compofed of equal parts of antimonium diaphoreticum, diagrydium, and cream of tartar.

CORNACHINI, Thomas, in *Biography*, born at Arezzo, in Tufcany, about the middle of the 16th century, obtained confiderable celebrity, as profeffor of medicine at Pifa, where he lectured to large audiences feveral years. He died in 1605, and was fucceeded in the profefforfhip by his fon Mark, who publifhed at Venice, in 1607, in fol. "Tabulæ Medicæ," the only work left by his father, in which he has collected the defcriptions and accounts of difeafes left by the Greek and Arabian phyficians, with commentaries upon them. His fon had the credit of giving his name to a purging powder, Pulvis Cornachini, confifting of calomel, fcammony, and burnt hartfhorn, which ftill retains its credit, for its efficacy in deftroying the afcarides, a fmall worm, infecting the bowels of children. Mark alfo publifhed, "De Hominis Generatione, de vino, et aqua, balneifque Pifanis," Franckfort, 1607. fol. and a "Difcovery on the Method of Curing, tuto, cito, et jucundé," he fays, all thofe difeafes, which are faid to be derived from peccant humours. Haller Bib. Med. Eloy Dict. Hift.

CORNACUM, in *Ancient Geography*, a town of Lower Pannonia, according to Ptolemy and Antonine's Itinerary.

CORNAGE, an ancient tenure, the fervice whereof was to blow a horn, when any invafion of the Scots was perceived.

This tenure, which was a fpecies of grand ferjeanty, was very frequent in the northern counties, near the Picts and the Roman walls; but by ftat. 12 Car. II. all tenures are converted into free, and common focage.

An old rental calls *cornage*, *newtgeldt*, q. d. *neat-geld.* Lord Coke fays, in old books, it is called HORNGELD.

CORNARISTS, in *Ecclefiaftical Hiftory*, the difciples of Theodore Cornhert, an enthufiaftic fecretary of the ftates of Holland. He writ at the fame time againft the Catholics, Lutherans, and Calvinifts. He maintained that every religious communion needed reformation; but he added, that no perfon had a right to engage in accomplifhing it, without a miffion fupported by miracles. He was alfo of opinion, that a perfon might be a good Chriftian, without being a member of any vifible church.

CORNARIUS, John, in *Biography*, a phyfician of great eminence, and author of numerous treatifes on the theory and practice of medicine, was born at Zwickaw, in Upper Saxony, in the year 1500. Haller fays, his proper name was Haguenbot or Hanbut, but that following the cuftom of the time, he took the name of Cornarius, which he affixed to all his publications. He is faid to have attached himfelf to the ftudy of medicine, in the hope of difcovering fome method, or medicine, capable of reftoring, or invigorating his conftitution, naturally feeble and delicate. With this view, he refided in fucceffion, at feveral German univerfities, and at length at Bafle, in Switzerland, where he met with copies of Hippocrates, Ætius, and other of the Greek fathers, in their own language, which he had not before been able to procure. Returning with this treafure to his own country, having previoufly taken the degree of doctor in medicine at Padua, he fet himfelf down to tranflate firft the works of Hippocrates into Latin, which he completed in five years, and publifhed at Bafle, in folio, in 1543; then Ætius, and Paul of Ægina. He had before publifhed, *viz.* in 1529. "Univerfæ rei medicæ, epigraphe, feu enumeratio," which has been feveral times reprinted. "De rectis medicinæ ftudiis amplectendis" "De conviviorum veterum Græcorum;" "De pefte libri duo; de Podagræ laudibus," in 1553, with various other differtations. While thus employed, he did not neglect the practice of medicine, of which he is faid to have had a confiderable portion. His tranflations of Hippocrates, having been rudely attacked by Fuchfius, he anfwered it by a fatyrical effufion, which he called, Vulpecula excoriata. This was printed at Franckfort in 1543, in 4to. Fuchfius anfwered this by a fimilar piece of fatire, Cornarius furens. The tranflation of Hippocrates has long fince been fuperfeded by thofe of Vander Linden, and Fœfius, and thofe of Ætius, and Paulus Ægineta, were not much longer lived. They were however works of great labour, and contributed to leffen the difficulties of the tafk to thofe that followed. Cornarius died at Jena, March the 16th, 1558. His fon, Diomede, fucceeded to his practice. He was appointed profeffor of medicine, in the univerfity of Vienna, and phyfician to the emperor Maximilian II. He publifhed at Leipfic, in 1595, in 4to. "Confiliorum medicinalium tractatus;" alfo "Hiftoriæ admirandæ raræ, et orationes medicinales." Haller Bib. Eloy. Dict. Hift.

CORNARO, Francis, cardinal and bifhop of Brefcia in the fixteenth century, began his career as a military man, during the contefts in Italy excited by the rival interefts of Charles V. and Francis I. in which the Venetian republic was involved. Upon a general pacification, he quitted the army and devoted himfelf to the purfuits of literature and the ftudy of politics. He was afterwards fixed upon as ambaffador from the republic to the emperor Charles V. In 1527 he was raifed to the dignity of cardinal by pope Clement VII. and after his admiffion into the college, he confined his labours to the deliberations of that body, where his learning and experience were highly appreciated. He died in his fixty-fifth year, A. D. 1543, of the gout, with which he had been long afflicted. Moreri.

Cornaro, George Basil, cardinal and bifhop of Padua, was born in 1658. He alfo began life in the army, which he left for the church. He was member of the order of Malta, and grand prior of Cyprus, an office which was hereditary in his family. His application to literature, and his acquirements by foreign travel, pointed him out as a perfon well and highly qualified to fill offices of great refponfibility in the republic. He was firft appointed to the fuperintendency of the marine, and would have been fent as ambaffador to France, had not his preference led him to embrace an ecclefiaftical life. He accordingly went to Rome, where he was entrufted with certain commiffions which led him to high preferment and great dignities in the church.

In 1692 he was appointed ambaffador to the court of Portugal, and was made titular archbifhop of Rhodes. On his return, he was created cardinal by Innocent XII. and nominated to the bifhopric of Padua. He died in the year 1722. Moreri.

Cornaro, Lewis, of a noble Venetian family, though from his not enjoying the honours attached to it, fuppofed not to have been legitimate, was born in 1467. He lived to a great age, which he attributed, and probably with juftice, to a ftrict, abftemious regimen, adopted by him, on his recovering from a fevere illnefs, when he was more than forty years of age. His health had been declining feveral years, prior to this attack, owing as he acknowledges to his living a debauched and voluptuous life. In entering on his new regimen, he took care to avoid, he fays, the extremes of heat, or cold, together with all violent exercife, and to live in a pure dry air; all which, he contended, were equally important in attaining the end propofed, the reftoration of a decayed conftitution, as temperance and diet. During the remainder of his life, he only took twelve ounces of folid food,

food, *viz.* bread, foups, yolks of eggs, and meat, and fourteen ounces of wine in the day. This portion, as he grew old, he rather diminifhed than increafed, obferving that the power of concoction is then lefs vigorous, and as that weakens, the ingefta fhould be leffened. He married a lady of the houfe of Spilemberg, at Udina, by whom he had an only child, a daughter, when they were both advanced in years. At the age of 83 he wrote his "Difcorfi della vita fobria:" a fhort treatife on the advantages of temperance, from which this account is principally taken. The work has been repeatedly tranflated, and printed in every country in Europe. He was then, he fays, fo brifk, lively, and active, that he could mount his horfe, without affiftance from any rifing ground. Sometimes he retired to his villa, feated in a valley, watered by the Brenta, encircled with large, well cultivated fields, and a confiderable number of buildings, made habitable by his own induftry. "It had been full of fens and bogs, he fays, a habitation, more fit for fnakes, toads, and ferpents, than for man." He had the pleafure of enjoying the fociety of his daughter and eleven grandchildren fhe had produced; who amufed him with their mufical exhibitions, in which fcience as well as in that of architecture, he had no inconfiderable fkill. He died at Padua, April 26th, 1566, at the age of 98. His wife, who furvived him, lived alfo to nearly the fame age. Sir John Sinclair, in his "Code of health and longevity," mentions the edition of 1779 as the beft Englifh tranflation of Cornaro's works. There are four difcourfes on one fubject, penned at different times; the firft, which he wrote at the age of 83, is intitled "A treatife on a fober life," in which he declares war againft every kind of intemperance. The fecond was compofed three years after, and contains directions for repairing a bad conftitution. The third he wrote when he was 91, entitled "An earneft exhortation to a fober life;" and the laft is a letter to Barbaro, patriach of Aquileia, written when he was 95, which contains a lively defcription of the health, vigour, and perfect ufe of all his faculties, which he had the happinefs of enjoying at that advanced period of life. Eloy. Dict. Hift. Gen. Biog.

Cornaro-Piscopia, Lucretia Helena, an illuftrious Venetian lady, was born at Venice in 1646. At the age of eleven having imbibed a devotional temper, and an ardent love of literature, fhe took a vow of chaftity, which fhe maintained through life, though a difpenfation was obtained from it, without her knowledge. She was an excellent linguift, being thoroughly converfant with feveral of the modern languages and with the Latin, the Greek, Hebrew, and Arabic. She had a tafte for poetry and mufic, and compofed verfes which fhe fung to her inftrument. In many of the abftrufe fciences fhe was deeply read, and acquired fo much reputation, that it was propofed to give her a feat among the doctors of theology at Padua; this was oppofed by the bifhop; fhe was however honoured with a cap of doctor in philofophy. The ceremony ufed on the occafion was performed in 1678 in the cathedral of Padua, at which an immenfe concourfe of people was affembled as witneffes of fo extraordinary a fight. She was elected a member of all the principal literary focieties in Italy, and no perfon of diftinction vifited the country without paying his refpects to this excellent lady. She had a great defire to enter into fome religious fociety; but by the entreaties of her father fhe remained under his roof, contenting herfelf with wearing the habit of the Benedictine nuns, and obferving the rules of the order. She died in the year 1684, and her works were collected and publifhed in 8vo. at Parma, 1688, but their merit is not equal to the high reputation which the author fuftained during life. Moreri.

CORNAU, in *Geography*, a town of Germany, in the circle of Weftphalia, and county of Diepholz; 6 miles N. of Diepholz.

CORNAVII, in *Ancient Geography*, a people of the ifle of Albion, who were fituated to the weft of the Coritani or Cor-Iceni, in that country, according to Camden, which is now divided into Warwickfhire, Worcefterfhire, Shropfhire, and Chefhire. There were feveral Britifh tribes of this name, in other parts of this ifland; and particularly in the moft northerly part of Britain, called Strathnavern, which feems to retain fome veftige of the name of its firft poffeffors; and they all feem to have been called Cornavii, from the two Britifh words *Corn*, a horn, and *Au*, a river, defcriptive of the form and fituation of their refpective countries. Befides the Cornavii, there was another Britifh tribe or nation, feated in the countries above mentioned; and feeming to have poffeffed the beft part of the two counties of Warwick and Worcefter. This nation is called by Tacitus (Annal. l. xii. c. 38.) the Jugantes, by a miftake as it is thought of his tranfcribers, for Wigantes, or Huicii, their real name.

The Wigantes, fignifying in the ancient language of Britain, brave men, feem to have been an independent nation under their own prince Venutius, who married the famous Cartefmandua, queen of the Brigantes. But both the Wigantes and Cornavii, were in fuch ftrict alliance with the Iceni and Cor-Iceni, that they were reduced at the fame time, and by the fame generals, under the dominion of the Romans. (Tacit. Annal. l. xii. c. 29, 30.) That brave and induftrious people built many forts, ftations, and towers in the country of the Cornavii and Wigantes, to keep the inhabitants in fubjection.

As the fecond journey of Antoninus from beyond the wall of Severus to Richborough in Kent, paffes through this country from north to fouth, it will conduct us to feveral of thefe Roman towns and ftations. The moft northerly of thefe towns was Condate, fuppofed to be Northwich in Chefhire. We come next to Diva or Deva, now Chefter, which was a city of great confideration in the time of the Romans, a colony, and the ftation of the 20th legion. Purfuing the fame route fouthward, we meet with the following towns in their order; Bovium, near Stretton; Mediolanum near Drayton; Rutunium, near Wem; Uriconium, near Wroxeter, the ancient capital of the Cornavii; Uxacona, near Sheriff-Hales; Pennocrucium, near the river Penk; Etocetum, Wall near Litchfield; and Manduеffedum, near Mancefter, in Warwickfhire. The precife boundaries of the feveral Roman provinces in Britain are fo little known, that we cannot be certain whether the whole country of the Cornavii and Wigantes was within the limits of that which was called Britannia Prima, or fome part of it belonged to Britannia Secunda.

CORNAX, Matthias, in *Biography*, a native of Meldola, a fmall town in Italy, ftudied medicine at Venice, where he afterwards continued to practife, and was appointed one of the teachers in the art. He is here noticed, on account of his having publifhed a cafe of a woman who had carried an extra fœtus in the abdomen, for the fpace of five years. An abfcefs at length forming, near the navel, and burfting, our practitioner enlarged the aperture, and extracted through the wound, a half putrid fœtus. The woman recovered, but becoming again pregnant, and it not being practicable to deliver her by the natural paffage, fhe died. It

It does not appear that the body was opened. The cafe was originally publifhed at Venice in 1550, in 4to, "Hiftoria quinquennis fere geftationis," &c. It was republifhed in 1564, with other fimilar cafes, in the author's "Enchiridion Medicæ confultationis apud Ægrotos, &c; Bafiliæ," 8vo. Haller Bib. Ch.

CORNAZZANI, Anthony, an eminent Italian poet, who flourifhed in the fifteenth century. He was born at Placentia, but refided chiefly in the early part of life at Milan, but after the death of Sforza he was obliged to take refuge at Venice, where he was hofpitably received by Bartholomew Colleone, whofe life he afterwards wrote. From Venice he went to France, and from thence to Ferrara, where he finally fettled under the patronage of Duke Hercules the firft, and his duchefs Lucretia Borgia. He is chiefly known by his fonnets and lyric poems, fome of which are reckoned the moft perfect of their kind in the language. He wrote the lives of the Virgin Mary and of Chrift in verfe; and among his profe works, we have, befides the life of Colleone, a treatife "De Mulieribus admirandis;" and another entitled "De excellentum Virorum principibus."

CORNE, or Corna, in *Ancient Geography*, a town of Cappadocia, towards the Euphrates, to the fouth of Melitene.

Corne, in *Geography*, an ifland, ten miles long and one wide, in the gulf of Mexico, near the coaft of Weft Florida. N. lat. 30° 11'. W. long. 88° 32'.

Corne, a town of France, in the department of the Mayne and Loire; 7 miles E. of Angers.

Corne. See Horn-*work*.

Corne *a amorcer*, priming-horn. An ox-horn filled with fine powder for priming cannon.

END OF VOL. IX.

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